

Introduction to Evidence-Based Practice

UNIT 1

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*Without evidence, clinical
practice cannot advance
scientifically.*

~Nola Schmidt
and Janet Brown

CHAPTER OBJECTIVES

At the end of this chapter, you will be able to:

- < Define *evidence-based practice* (EBP).
- < List the three components of EBP.
- < Distinguish EBP from research utilization.
- < List sources of evidence for nursing practice.
- < Identify barriers to the adoption of EBP and pinpoint strategies to overcome them.
- < Explain how the process of diffusion facilitates moving evidence into nursing practice.
- < Explain the purpose of the hierarchy of evidence.
- < Discuss the development of the hierarchy of evidence in health care.
- < Distinguish among the types of evidence found in the seven levels of the hierarchy of evidence.
- < Explain why nurses have an ethical obligation to maintain an evidence-based practice.
- < Identify ethical concerns that may be raised when implementing EBP.

KEY TERMS

barriers	evidence-based practice (EBP)	quality improvement (QI) projects
case-control studies	hierarchy of evidence	quantitative research
case series studies	innovation	quasi-experimental designs
case study	integrative reviews	randomized control trials (RCTs)
clinical practice guidelines (CPGs)	laggards	research utilization
cohort studies	meta-analysis	summaries
concept analysis	metasynthesis	synopses
correlational designs	mixed methods design	systematic review
descriptive survey designs	model of diffusion of innovations	theory
early adopters	narrative reviews	
EBP project	qualitative research	

CHAPTER 1

What Is Evidence-Based Practice?

Nola A. Schmidt and Janet M. Brown

It is not uncommon for students to question the need to study nursing evidence-based practice and research. To many students, it seems much more exciting and important to be with patients in various settings. It is often hard for beginning practitioners to appreciate the value of learning the research process and the importance of evidence in providing patient care. To appreciate the importance of *evidence*, imagine that a family member required nursing care. Would it not be much more desirable to have care based on evidence rather than on tradition, trial and error, or an educated guess? To be competent, a nurse must have the ability to provide care based on evidence. Developing your knowledge base about evidence-based practice and research will enhance the quality of nursing care.

1.1 EBP: What Is It?

At the end of this section, you will be able to:

- < Define *evidence-based practice* (EBP).
- < List the three components of EBP.
- < Distinguish EBP from research utilization.
- < List sources of evidence for nursing practice.
- < Identify barriers to the adoption of EBP and pinpoint strategies to overcome them.
- < Explain how the process of diffusion facilitates moving evidence into nursing practice.

KEY TERM

evidence-based practice (EBP): Practice based on the best available evidence, patient preferences, and clinical judgment

Overview of EBP

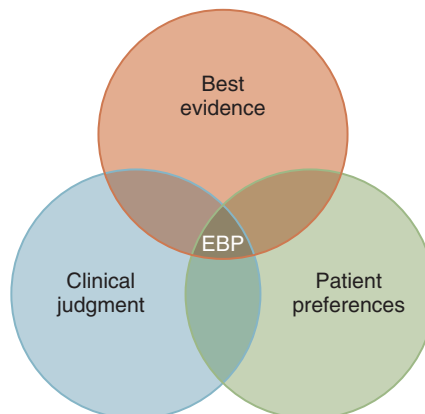
When examining the literature about *evidence-based practice (EBP)*, one will find a variety of definitions. Most definitions include three components: research-based information, clinical expertise, and patient preferences (**Figure 1-1**). Ingersoll's (2000) classic definition succinctly captures the essence of EBP, defining it as “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” (p. 152). What does this mean? EBP is a process involving the examination and application of research findings or other reliable evidence that has been integrated with scientific theories. For nurses to participate in this process, they must use their critical-thinking skills to review research publications and other sources of information. After the information is evaluated, nurses use their clinical decision-making skills to apply evidence to patient care. As in all nursing care, patient preferences and needs are the basis of care decisions and therefore essential to EBP.

FYI

Nurses' unique perspective on patient care obliges nurses to build their own body of evidence through scientific research. There are a variety of sources of evidence for nursing research, some of which build a stronger case than others do.

EBP has its roots in medicine. Archie Cochrane, a British epidemiologist, admonished the medical profession for not critically examining evidence (Cochrane, 1972). He contended that organizations and policy makers should make decisions for health care based on scientific evidence (Melnyk & Fineout-Overholt, 2019), and he believed that random clinical trials were the “gold

FIGURE 1-1 Components of EBP



standard” for generating reliable and valid evidence. He suggested that rigorous, systematic reviews of research from a variety of disciplines be conducted to inform practice and policy making. As a result of his innovative idea, the Cochrane Center established a collaboration “to promote evidence-informed health decision-making by producing high-quality, relevant, accessible systematic reviews and other synthesized research evidence” (Cochrane Collaboration, 2020). Others (Straus et al., 2018) have built on Dr. Cochrane’s philosophy, and the definition of EBP in medicine evolved to include clinical judgment and patient preferences. In nursing, Dr. Bernadette Melnyk is nationally and internationally recognized as an expert in EBP. In addition to her extensive publication record, she is often invited to speak at conferences and serve as a consultant.

KEY TERM

research utilization:
Changing practice based on the results of a single research study

During this time, nursing was heavily involved in trying to apply research findings to practice, a process known as **research utilization**. This process involves changing practice based on the results of a single research study (Melnyk & Fineout-Overholt, 2019). Nursing innovators recognized that shifting from this model to an EBP framework would be more likely to improve patient outcomes and provide more cost-effective methods of care (Ingersoll, 2000; Melnyk & Fineout-Overholt, 2019). Why? Many nursing questions cannot be answered by a single study, and human conditions are not always amenable to clinical trials. Also, the research utilization process does not place value on the importance of clinical decision making, nor is it noted for being patient focused.

A variety of EBP models have been developed. Three models that are especially well known in nursing are shown in **Table 1-1**. Although each is unique, they have commonalities. For example, each one begins with a question or need for the identification of acquiring knowledge about a question. All involve appraisal of evidence and making a decision about how to use evidence. These models conclude by closing the loop through evaluation to determine that the practice change is actually meeting the expected outcomes.

Sources of Evidence

Over the years, a variety of sources of evidence have provided information for nursing practice. Although it would be nice to claim that all nursing practice is based on substantial and reliable evidence, this is not the case. Evidence



CRITICAL THINKING EXERCISE 1-1

Look carefully at the steps in each EBP model cited in **Table 1-1**. Are you reminded of a similar process?

TABLE 1-1

Models of EBP

Star Model of Knowledge Transformation	Iowa Model of EBP	Model of Diffusion of Innovations
1. Discovery research	1. Ask clinical question	1. Acquisition of knowledge
2. Evidence summary	2. Search literature	2. Persuasion
3. Translation to guidelines	3. Critically appraise evidence	3. Decision
4. Practice integration	4. Implement practice change	4. Implementation
5. Process, outcome evaluation	5. Evaluate	5. Confirmation
Stevens (2013)	Iowa Model Collaborative (2017)	Rogers (2003)

derived from tradition, authority, trial and error, personal experiences, intuition, borrowed evidence, and scientific research are all used to guide nursing practice. Just as you know from your own life, some sources are not as dependable as others.

Tradition has long been an accepted basis for information. Consider this: Why are vital signs taken routinely every 4 hours on patients who are clinically stable? The rationale for many nursing interventions commonly practiced is grounded in the phrase “This is the way we have always done it.” Nurses can be so entrenched in practice traditions that they fail to ask questions that could lead to changes based on evidence. Consistent use of tradition as a basis for practice limits effective problem solving and fails to consider individual needs and preferences.

How often have you heard the phrase “Because I said so”? This is an example of authority. Various sources of authority, such as books, articles, web pages, and individuals and groups, are perceived as being meaningful sources of reliable information; yet, in reality, the information provided may be based on personal experience or tradition rather than scientific evidence. Authority has a place in nursing practice as long as nurses ascertain the legitimacy of the information provided.

Trial and error is another source of evidence. Although we all use this approach in our everyday problem solving, it is often not the preferred approach for delivering nursing care. Because trial and error is not based on a systematic scientific approach, patient outcomes may not be a direct result of the intervention. For example, in long-term care the treatment of decubitus ulcers

is often based on this haphazard approach. Nurses frequently try a variety of approaches to heal ulcers. After some time, they settle on one approach that is more often than not effective. This approach can lead to reduced critical thinking and wasted time and resources.

Nurses often make decisions about patient care based on their personal experiences. Although previous experience can help to build confidence and hone skills, experiences are biased by perceptions and values that are frequently influenced by tradition, authority, and trial and error. Personal intuition has also been identified as a source of evidence. It is not always clear what is meant by intuition and how it contributes to nursing practice. Intuition is defined as “quick perception of truth without conscious attention or reasoning” (IA Users Club, Inc., 2015, p. 1). Whereas on very rare occasions a “gut feeling” may be reliable, most patients would prefer health care that is based on stronger evidence. Thus, intuition is not one of the most advantageous sources of evidence for driving patient care decisions because nurses are expected to use logical reasoning as critical thinkers and clinical decision makers.

Because of the holistic perspective used in nursing and the collaboration that occurs with other healthcare providers, it is not uncommon for nurses to borrow evidence from other disciplines. For example, pediatric nurses rely heavily on theories of development as a basis for nursing interventions. Borrowed evidence can be useful because it fills gaps that exist in nursing science and provides a basis on which to build new evidence; it can be a stronger type of evidence than are sources not based on theory and science. When nurses use borrowed evidence, it is important for them to consider the fit of the evidence with the nursing phenomenon.

Because nursing offers a unique perspective on patient care, nurses cannot rely solely on borrowed evidence and must build their own body of evidence through scientific research. Scientific research is considered to yield the best source of evidence. Nurses can use many different research methods to describe, explain, and predict phenomena that are central to nursing care. To have an EBP, whenever possible nurses must emphasize the use of research-based information based on *theory* over the use of evidence obtained through tradition, authority, trial and error, personal experience, and intuition. Scientific research provides the best source for evidence for making decisions about patient care.

Adopting an Evidence-Based Practice

One would think that when there is compelling scientific evidence, findings would quickly and efficiently transition into practice. However, most often this is not the case. Many *barriers* complicate the integration of findings into

KEY TERMS

theory: A set of concepts linked through propositions to explain a phenomenon

barriers: Factors that limit or prevent change

practice. In fact, it can take as many as 200 years for an innovation to become a standard of care.

For example, individuals are often surprised to learn that more sailors in the navy died from scurvy than were killed in accidents and warfare during the 16th and 17th centuries. Out of concern for his sailors, Captain James Lancaster conducted an experiment in 1601 to determine whether lemon juice could prevent scurvy. On a voyage of four ships from England to India, he gave three teaspoonfuls of lemon juice to the sailors on one of his ships. In contrast, the “control group,” which consisted of sailors on the other three ships, were not given any lemon juice. Lancaster found that the sailors who received the lemon juice did not get scurvy; however, 110 out of 278 sailors from the other three ships had died from scurvy by the time they were half-way to India.

Based on these results, would you expect the British Navy to promptly implement the practice of giving lemon juice to sailors? Yes, of course—but surprisingly, this was not the case. It wasn’t until 150 years later when a British Navy physician, James Lind, learned of Lancaster’s results and conducted another experiment. Sailors who were diagnosed with scurvy were given either two oranges and one lemon, or one of five other supplements. Because the sailors who received the citrus fruits recovered quickly, they were able to help care for the sailors who received the other treatments. Even with the evidence from this second experiment, it took nearly another 50 years before the British Navy adopted the practice of giving sailors citrus juice on long voyages. Once this practice was adopted, scurvy was eliminated.

Why did it take almost 200 years for the British Navy to adopt the practice of giving sailors citrus juice to prevent scurvy? One reason is that there were well-known people proposing other theories about how to treat scurvy. For example, during his travels in the Pacific, Captain Cook, the famous explorer, reported that citrus fruits were not effective in treating scurvy. Unfortunately, because Dr. Lind was not as prominent a figure as Captain Cook, his study results were discounted. Because the British Navy was slow to adopt this practice, you might think that it was slow to adopt new innovations; however, other innovations, such as new ships and guns, were often accepted quickly (Rogers, 2003).

Even when the benefits and advantages of an *innovation* have been made evident, adoption can be slow to occur. In 2005, Pravikoff, Tanner, and Pierce conducted a large survey of registered nurses (RNs) from across the United States. Of the clinical nurses who responded to the survey, more than 54% were not familiar with the term *EBP*. The typical source of information for 67% of these nurses was a colleague. Alarming, 58% of the respondents had never used research articles to support clinical practice. Only 18% had ever used a hospital library. Additionally, 77% had never received instruction in the use of electronic resources. In 2013, a survey conducted at a Magnet hospital found that 96% of nurses were aware that EBP was being

KEY TERM

innovation:
Something new or novel



CRITICAL THINKING EXERCISE 1-2

Consider your last clinical experience. How much of your practice was based on scientific research? What other sources of evidence did you use? Divide a circle into sections (like a pie chart) to show how much influence each of the sources of evidence had on the patient care you provided.

implemented at their institution (White-Williams et al., 2013). Although this shows a significant improvement over 7 years, one must keep in mind that the inclusion of only a Magnet facility may present a bias, because to earn Magnet Recognition EBP must be inherent in the organization. Three years later, this was confirmed by Warren et al. (2016), who compared the perception of nurses who worked at Magnet facilities with those who did not. They found that nurses working at Magnet hospitals thought that their organizations were equipped to implement EBP. They also found that younger RNs who were newer to practice were more likely to have positive beliefs about EBP. However, it remains challenging to shift the attitudes of nurses about EBP. In 2020, Muddermann et al. studied nurses in a rural hospital. After eight educational sessions over 5 months, they found that there was a statistically significant increase in participant knowledge about EBP, but there was no change in attitude regarding EBP. This shows that although there has been more acceptance of EBP over the past 15 years, EBP as an innovation has not been fully adopted.

Overcoming Barriers

It has been shown that as EBP has evolved, barriers have remained unchanged. Studies have demonstrated that the reasons nurses do not draw on research are related to individual factors, organizational factors, and research-related factors. Individual factors are those characteristics that are inherent to the nurse. Major barriers to nurses using research findings at the point of care include nurses not valuing research, nurses being resistant to change, and lack of time and resources to obtain evidence (Cebeci et al., 2019). Organizational factors are related to administration, resources, facilities, and culture of the system. Factors can include organizational management failing to embrace EBP (Melnik et al., 2016) and lack of institutional support, such as financial or release time. Research-related factors can include the communication gap between researcher and clinician, the technical writing associated with research reports, and lack of dissemination of research findings (Cebeci et al., 2019).

KEY TERM

model of diffusion of innovations:
Model to assist in understanding how new ideas come to be accepted in practice

Without strategies to overcome these barriers, EBP will never be fully adopted. To overcome barriers related to individual factors, strategies need to be aimed at instilling an appreciation for EBP, increasing knowledge, developing necessary skills, and changing behaviors (Muddermann et al., 2020). Strategies to overcome organizational barriers must be directed toward creating and maintaining an environment where EBP can flourish (Tuppal et al., 2019). Research-related barriers can be overcome by writing user-friendly research reports and using technology to disseminate research findings. Practical strategies for successfully overcoming these barriers are summarized in **Table 1-2**.

To overcome barriers to using research findings in practice, it can be helpful to use a model to assist in understanding how new ideas come to be accepted practice. The *model of diffusion of innovations* (Rogers, 2003) has been used in the nursing literature for this purpose (Eaton et al., 2018; Lin & Bautista, 2017; Piraino et al., 2017). You are already familiar with the concept of diffusion. From studying chemistry, you know that diffusion involves the movement of molecules from areas of higher concentration to areas of lower concentration. In the same way, innovative nursing practices frequently begin in a small number of institutions and eventually spread, or diffuse, becoming standard practice everywhere. The model includes four major concepts:

TABLE 1-2 Strategies for Overcoming Barriers to Adopting EBP		
Type of Barrier	Barrier	Strategy
Individual	Lack of time	<div>Devote 15 minutes per day to reading evidence related to a clinical problem.</div> <div>Sign up for emails that offer summaries of research studies in your area of interest.</div> <div>Use a team approach to equitably distribute the workload among members.</div> <div>Bookmark websites that have clinical guidelines to promote faster retrieval of information.</div> <div>Evaluate available technologies (i.e., tablets) to create time-saving systems that allow quick and convenient retrieval of information at the bedside.</div> <div>Negotiate release time from patient care duties to collect, read, and share information about relevant clinical problems.</div> <div>Search for established clinical guidelines because they provide synthesis of existing research.</div>

Type of Barrier	Barrier	Strategy
Individual	Lack of value placed on research in practice	<p>Make a list of reasons why healthcare providers should value research, and use this list as a springboard for discussions with colleagues.</p> <p>Invite nurse researchers to share why they are passionate about their work.</p> <p>Seek support from colleagues.</p> <p>When disagreements arise about a policy or protocol, find an article that supports your position and share it with others.</p> <p>When selecting a work environment, ask about the organizational commitment to EBP.</p> <p>Link measurement of quality indicators to EBP.</p> <p>Participate in EBP activities to demonstrate professionalism that can be rewarded through promotions or merit raises.</p> <p>Provide recognition during National Nurses Week for individuals involved in EBP projects.</p>
Individual	Lack of knowledge about EBP and research	<p>Take a course or attend a continuing education offering on EBP.</p> <p>Invite a faculty member to a unit meeting to discuss EBP.</p> <p>Consult with advanced practice nurses.</p> <p>Attend conferences where clinical research is presented and talk with presenters about their studies.</p> <p>Volunteer to serve on committees that set policies and protocols.</p> <p>Create a mentoring program to bring novice and experienced nurses together.</p>
Individual	Lack of technological skills to find evidence	<p>Consult with a librarian about how to access databases and retrieve articles.</p> <p>Learn to bookmark important websites that are sources of clinical guidelines.</p> <p>Commit to acquiring computer skills.</p>
Individual	Lack of ability to read research	<p>Organize a journal club where nurses meet regularly to discuss the evidence about a specific clinical problem.</p> <p>Write down questions about an article and ask an advanced practice nurse to read the article and assist in answering the questions.</p> <p>Clarify unfamiliar terms by looking them up in a dictionary or research textbook.</p> <p>Use one familiar critique format when reading research.</p> <p>Identify clinical problems and share them with nurse researchers.</p> <p>Participate in ongoing unit-based studies.</p> <p>Subscribe to journals that provide uncomplicated explanations of research studies.</p>

Type of Barrier	Barrier	Strategy
Individual	Resistance to change	Keep an open mind. Listen to other points of view. Use self-reflection to understand one's own reluctance to change.
Organizational	Resistance to change	Listen to people's concerns about change. When considering an EBP project, select one that interests the staff, has a high priority, is likely to be successful, and has baseline data. Mobilize talented individuals to act as change agents. Create a means to reward individuals who provide leadership during change.
Organizational	Lack of resources to access evidence	Write a proposal for funds to support access to online databases and journals. Collaborate with a nursing program for access to resources. Investigate funding possibilities from others (i.e., pharmaceutical companies, grants).
Organizational	Lack of resources	Link organizational priorities with EBP to reduce cost and increase efficiency. Recruit administrators who value EBP. Form coalitions with other healthcare providers to increase the base of support for EBP. Use EBP to meet accreditation standards or gain recognition (i.e., Magnet Recognition).
Research-related	Poor dissemination	Use social media to share research findings. Write research reports using user-friendly language. Collaborate with clinicians to identify topics relevant to clinical practice.

KEY TERMS

early adopters:

Individuals who are the first to embrace an innovation

laggards:

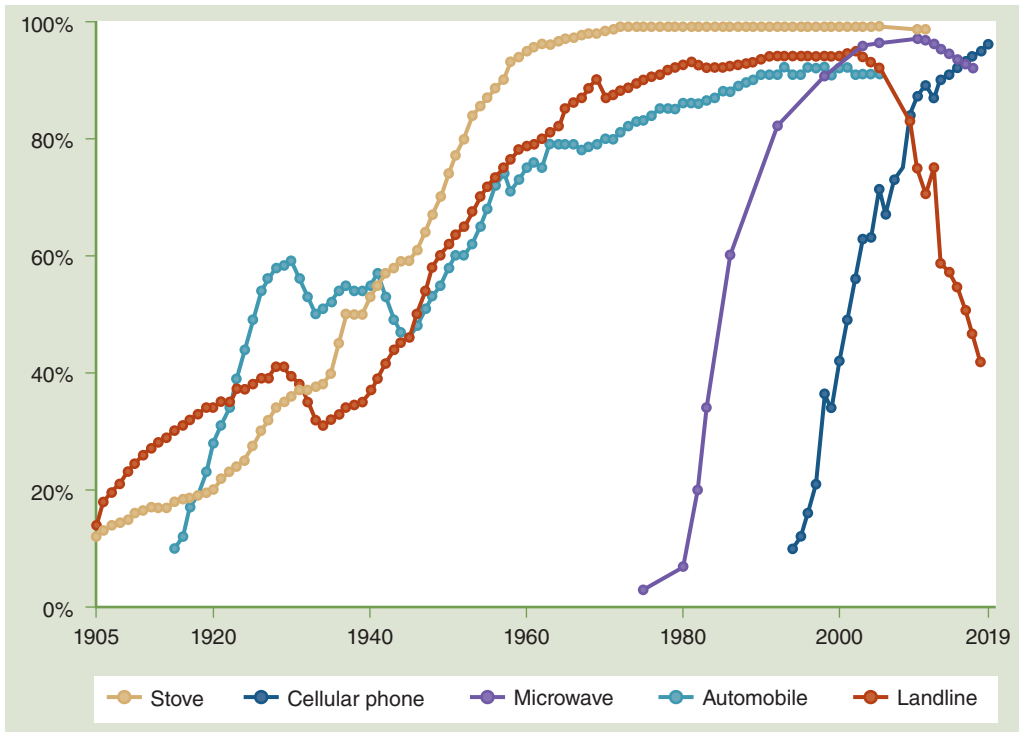
Individuals who are slow or fail to adopt an innovation

innovation, communication, time, and social system. Rogers (2003) defines *diffusion* as “the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system” (p. 11). An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. Before adopting an innovation, individuals seek information about its advantages and disadvantages.

Initially, only a minimal number of individuals, known as *early adopters*, embrace the innovation. With time, early adopters who are opinion leaders, through their interpersonal networks, become instrumental as the diffusion progresses through the social system. Those individuals who are slow or who fail to adopt the innovation are known as *laggards*. In the scurvy example,

it took about 200 years for the innovation to diffuse throughout the British Navy. You may also be surprised to see how long it has taken other things we take for granted to diffuse throughout American households (**Figure 1-2**).

FIGURE 1-2 Diffusion of Technological Innovations Over Time



Reproduced from Comin and Hobijn (2004) and others. Technology adoption in US households, 1860 to 2019. Published online at OurWorldInData.org. Retrieved from <https://ourworldindata.org/grapher/technology-adoption-by-households-in-the-united-states>



CRITICAL THINKING EXERCISE 1-3

In the scurvy example, identify communication channels and social system barriers to the adoption of citrus fruits as a treatment for scurvy. Now, consider how the model of diffusion of innovations could have been applied to this situation. How could the physicians have overcome the barriers you identified and convinced others to become early adopters so that citrus became accepted practice for the treatment of scurvy?

FYI

If you think the information in Figure 1-2 is interesting, you can go to <https://ourworldindata.org/search?q=household+technology> and build your own graph by choosing a variety of technologies to compare.



TEST YOUR KNOWLEDGE 1-1

1. Which of the following is *not* a component of the definition of EBP?
 - a. Clinical expertise
 - b. Nursing research
 - c. Organizational culture
 - d. Patient preferences
2. How can nurses who use EBP best be described?
 - a. As change agents
 - b. As early adopters
 - c. As innovators
 - d. As laggards
3. To promote EBP, which of the following must be addressed? (Select all that apply.)
 - a. Lack of commitment to EBP
 - b. Lack of computer skills
 - c. Lack of time
 - d. Lack of value placed on research in practice

How did you do? 1. c; 2. a; 3. a, b, c, d

1.2 The Hierarchy of Evidence

At the end of this section, you will be able to:

- < Explain the purpose of the hierarchy of evidence.
- < Discuss the development of the hierarchy of evidence in health care.
- < Distinguish among the types of evidence found in the seven levels of the hierarchy of evidence.

With all the sources of evidence for nurses, how does one decide what evidence is best quality? Quality can be rated in a number of ways. One specific way to distinguish quality is by using a hierarchy. A *hierarchy* is a system for ranking people or things according to their importance (Cambridge

University Press, 2020b). For example, the quality of beef is graded on marbling of fat in the muscle and maturity of the animal when slaughtered. This hierarchy has eight levels of quality ranging from prime (the highest quality) to choice, select, standard, commercial, cutter, and canner (the lowest quality) (U.S. Department of Agriculture, 2019).

Just as beef comes in different levels of quality, so does scientific evidence. Using a hierarchy can be a helpful strategy for rating the quality of evidence to make decisions about nursing practice. Although there are various hierarchies of evidence in the literature, there is a general consensus about how to rate the quality of evidence. To rank the quality of evidence from lowest to highest, nurses can refer to the *hierarchy of evidence* (Figure 1-3). This hierarchy has seven levels of evidence. Quality is based on the strength of the study design. Some types of studies are designed in ways that yield results that nurses can use with confidence. Studies involving high levels of control are ranked higher than studies that have lower levels of control. When a study is considered to have a high level of control, it often includes randomization, large samples, and control over variables during the experiment. Lower levels of evidence do not involve randomization or have smaller samples.

Although the hierarchy is a helpful tool for rating the quality of evidence, there are other factors that are worthy of consideration. For example, a nurse might have two pieces of evidence. One piece may be Level II evidence but have many errors in the study. The other piece may be Level IV but be a well-designed study in which one can have a lot of confidence about the findings. So it may be that the Level IV evidence is the best choice for nursing practice.

Level I

Level I is considered the highest quality of evidence. What sets Level I evidence apart from evidence in other levels is that Level I evidence summarizes more than one study. Level I includes summaries, synopses, meta-analyses, systematic reviews of randomized controlled trials (RCTs), and clinical practice guidelines.

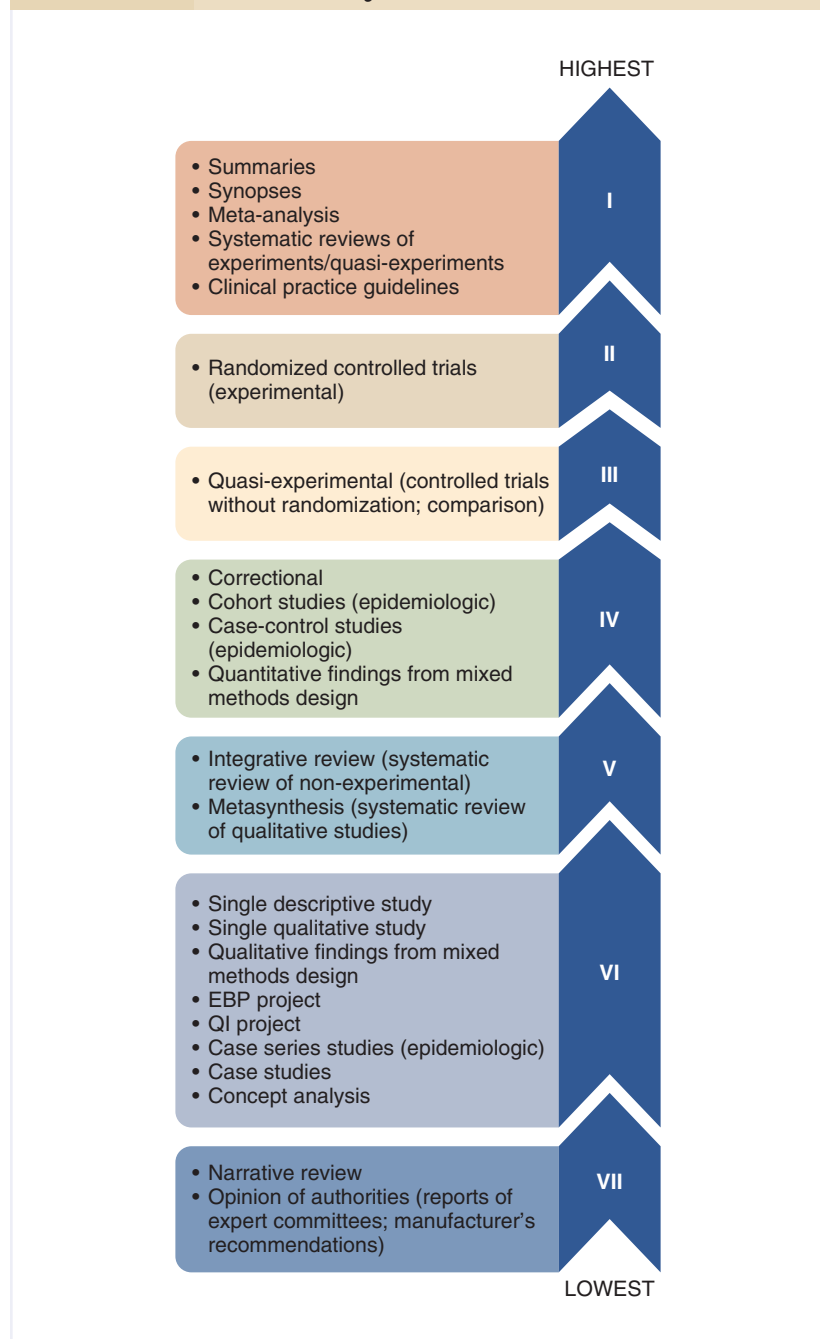
KEY TERM

hierarchy of evidence: A seven-level scale used to rate the strength of evidence



CRITICAL THINKING EXERCISE 1-4

There are a number of different hierarchies utilized in health care. For example, in the emergency department patients are triaged and seen in the order of the severity of their symptoms. Cancer is categorized by stage. Can you think of other hierarchies that are used in health care?

FIGURE 1-3**Hierarchy of Evidence**

Summaries are best practice recommendations based on an appraisal of information about a particular practice question. An excellent source for summaries is the Joanna Briggs Institute (JBI). After stating a clinical question, key findings are identified and ranked. Summaries end with best practice recommendations. Usually limited to one to three pages, summaries are particularly helpful for nurses to quickly find evidence for practice in their clinical settings.

Another type of Level I evidence is **synopses**. A synopsis is a brief description of evidence that provides an overview of key points of evidence from multiple sources. Basically, a synopsis is a shorter version of a summary. Synopses look like abstracts and are typically only a paragraph. The difference between an abstract and a synopsis is that an abstract summarizes a single study, whereas a synopsis is about more than one study. Good sources for finding synopses include the Database of Abstracts of Reviews of Effects (DARE) and the American College of Physicians Journal Club (Oakland University, 2020).

A **meta-analysis** is another type of evidence that fits in Level I and is a research method that estimates the effect of an intervention by using statistical methods to analyze data from both published and unpublished single studies. To put it another way, a meta-analysis is a “study about studies” (Salters-Pedneault, 2018, p. 1). Because a meta-analysis involves statistical analysis, it is unique from other types of evidence in Level I. Another unique factor is that a meta-analysis can include unpublished studies, making for a more robust sample of evidence. For example, assume that there are eight studies about guided imagery (GI). Four studies indicate that GI is effective for reducing pain; however, the other four studies indicate GI was not effective. By pooling findings from all eight studies, a better picture can be obtained about whether GI is an effective intervention. Not only do meta-analyses bring new insights to nursing practice, they can also identify where future studies should be directed.

Another type of evidence included in Level I is the **systematic review**, which is a rigorous and systematic synthesis of research findings from experimental and quasi-experimental studies about a clinical problem. Like all evidence in this level, systematic reviews involve compiling findings from various single studies. In a systematic review, the authors will provide a very detailed account about how they searched the literature and selected studies to be included in their review. However, systematic reviews are different from meta-analyses because only published works are used and there is no statistical analysis. High-quality systematic reviews are considered valuable tools for formulating policy and practice (Siddaway et al., 2019).

KEY TERMS

summaries:

Best practice recommendations based on an appraisal of information about a particular practice question

synopses: Brief descriptions of evidence that provide an overview of key points of evidence from multiple sources

meta-analysis: A research method that estimates the effect of an intervention by using statistical methods to analyze data from both published and unpublished single studies

systematic review: A rigorous and systematic synthesis of research findings from experimental and quasi-experimental studies about a clinical problem

KEY TERMS**clinical practice guidelines (CPGs):**

Statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options

randomized controlled trials (RCTs):

Clinical experimental studies that typically involve large samples and are sometimes conducted in multiple sites

quasi-experimental designs:

Research designs involving the manipulation of the independent variable but lacking random assignment to experimental and comparison groups

Nurses in healthcare settings often find *clinical practice guidelines (CPGs)* especially helpful. “Clinical practice guidelines are statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options” (Institute of Medicine [IOM], 2011, p. 6). Based on the best scientific evidence available, CPGs are developed by multidisciplinary panels of experts and stakeholders. Various care options are based on patient subgroups and patient preferences. The quality and strength of the care options are rated. In today’s dynamic healthcare environment, it is essential that CPGs be revised when new evidence is discovered (IOM, 2011; Shekelle et al., 2020).

Level II

Level II is known for including only one type of evidence: *randomized controlled trials (RCTs)*. Defined as designs involving random assignment to groups and manipulation of the independent variables, RCTs are considered the highest quality for study designs. These types of studies have a clinical focus and are used to answer questions that ask, “Is there a difference between the groups?” The hallmark of this type of design is that participants are assigned to groups by chance, and thus the groups are equal on various characteristics. RCTs are also high-quality designs because they are tightly controlled (Bhide et al., 2018). You may recognize an RCT as an experimental design. With this design, researchers are able to make stronger claims about the cause–effect relationship between the intervention and the outcome. Some RCTs can involve collaboration by research teams at multiple clinical sites resulting in large samples, which increases confidence in findings.

Level III

Like Level II, there is only one type of evidence in Level III: *quasi-experimental designs*. You probably already know that *quasi* means “to a degree, not completely” (Cambridge University Press, 2020c). As the name implies, quasi-experiments are almost like RCTs because they answer questions about differences between the groups and involve manipulation of the independent variable. What distinguishes them from RCTs is the lack of random assignment of participants to experimental and comparison groups. Without random assignment to groups, groups might have critical differences (Institute of Education Sciences, n.d.b). Consequently, how would researchers know what caused changes in the outcomes? Would changes be due to manipulation of the independent variable or the inherent differences in the groups? This is why quasi-experimental designs are considered a lower level of evidence compared to RCTs (Handley et al., 2018). Quasi-experimental

designs are also known as controlled trials without randomization, comparison studies, or cohort designs.

Level IV

The evidence in Level IV does not involve manipulation of an independent variable, making the evidence a lower quality compared to RCTs and quasi-experimental designs. Correlational and epidemiological cohort and case-control studies, as well as quantitative data from mixed methods studies, are included in this level.

Correlational designs are designed to answer the question, “Is there a relationship among the variables?” Correlational studies are nonexperimental designs used to study relationships among two or more variables. Because there are no comparison groups and no random assignment, one cannot make claims about causality. When using this design, researchers can claim that as a variable changes, another variable will also change; however, they have no proof that the change in the one variable caused the change in the other variable (Institute of Science Education, n.d.a).

Epidemiologic **cohort studies** are studies designed to observe patterns of disease in populations. Cohort means “a group of people who share a characteristic” (Cambridge University Press, 2020a). Like experimental and quasi-experimental designs, cohort studies have two or more groups, but differ because there is no manipulation of an independent variable. In cohort studies, individuals are grouped on whether they have been exposed or unexposed to a particular factor. Because the independent variable is not manipulated, findings from cohort studies are considered to be lower quality evidence compared to RCTs and quasi-experimental designs.

Another type of epidemiological study in Level IV is **case-control studies**. In these studies, participants are grouped on the presence or absence of a particular disease or condition and then compared for similarities and differences. As the name implies, cases are those individuals who have the disease. These individuals are then matched on critical characteristics with individuals who do not have the disease (Munnangi & Boktor, 2020). Researchers search for possible exposures individuals may have had in the past. There is only observation without any intervention; therefore, researchers do not measure the amount of the exposures, nor do they manipulate individuals or the environment.

Sometimes researchers combine quantitative methods with qualitative methods. This design is known as a **mixed methods design**. This presents a bit of a problem when deciding where to place this type of study in the hierarchy of evidence. Findings from the quantitative part of the study would be

KEY TERMS

correlational designs:

Nonexperimental designs used to study relationships among two or more variables

cohort studies:

Epidemiological designs in which participants are selected based on their exposure to a particular factor

case-control studies:

Epidemiological studies whereby participants are grouped on the presence or absence of a particular disease or condition and are then compared for similarities and differences

mixed methods design:

A design that combines both quantitative and qualitative data gathering and evaluation

KEY TERMS

integrative reviews: Scholarly papers that include published nonexperimental studies in the synthesis to answer clinical questions

metasynthesis: A systematic review of qualitative studies

descriptive survey designs: Nonexperimental studies that involve asking questions of a sample of individuals who are representative of a group

considered Level IV, and findings from the qualitative portion of the study would be in a lower level.

Level V

Evidence in Level V, like the evidence in Level I, consists of syntheses. What makes this level different from Level I is that evidence included for synthesis is lower-level evidence. This level includes integrative reviews and metasyntheses.

An *integrative review* is a scholarly paper that includes published nonexperimental studies in the synthesis to answer clinical questions. Although an integrative review may include RCTs and higher-level evidence, the inclusion of nonexperimental studies makes integrative reviews a lower quality of evidence in comparison to systematic reviews (Noble & Smith, 2018). A strength of integrative reviews is that they involve a systematic search of the literature and include stringent criteria for selecting studies for synthesis. Through analysis and synthesis, themes and categories can be developed to answer the clinical question.

A second type of evidence included in Level V is the *metasynthesis*. A metasynthesis is a systematic review of qualitative studies. Although a lower level of evidence, metasyntheses can make important contributions to EBP because they shed light on patient perceptions and experiences. Like systematic reviews, metasyntheses aim to identify high-quality recommendations for patient care. After a critical examination of relevant qualitative studies, findings from these studies are synthesized to develop broader themes or build nursing theory (Noyes et al., 2019).

Level VI

Level VI includes descriptive research. Most studies in this level answer the question, “What is it?” Studies typically involve a single group and include observation without interventions. Although evidence in this level can help nurses better understand clinical problems, it cannot be used to make claims about cause and effect. Single descriptive survey studies, single qualitative studies, qualitative findings from mixed methods studies, EBP projects, quality improvement (QI) projects, case series studies (epidemiologic), case studies, and concept analysis are different types of descriptive research.

Descriptive survey designs are nonexperimental studies that involve asking questions of a sample of individuals who are representative of a group. This design may have a variety of purposes, such as describing, comparing, or correlating characteristics. This is the most commonly used design for descriptive

research. Data, collected through questionnaires or personal interviews, are typically about attitudes, perceptions, or attributes of individuals. An advantage of descriptive survey designs is that a large number of respondents can be reached in a cost-effective, efficient manner. While the findings are considered lower quality, they can serve as a foundation for future higher-level research (Aggarwal & Ranganathan, 2020). Similarly, qualitative findings from a mixed methods study would also be in this level.

Descriptive research also includes *qualitative research*. Qualitative research is unique because it is research that uses words to describe human behaviors. Just as there are different *quantitative research* designs (e.g., RCT, quasi-experimental) to collect numerical data, there are different qualitative approaches, such as phenomenology, grounded theory, ethnography, and historical. Using in-depth interviews with or without observation, thick, rich descriptions can be generated about human behaviors. Qualitative findings can also be used to develop or refine theories (Ravitch & Mittenfelner Carl, 2020). To maintain an evidence-based practice, nurses can use qualitative findings to provide insight about patient preferences and guide improvements that can benefit patients (Kajamaa et al., 2019).

Although not research, findings from *EBP projects* are assigned to Level VI. An EBP project is an endeavor to change practice, based on best evidence, in a clinical setting. At first glance, an article about an EBP project will seem like a research article because there are similar components (Ginex, 2017). Both begin with a question and include a review of literature. The processes for implementing a research study and an EBP project can also appear similar. Both reports will contain statistics; however, the EBP project statistics will be less complicated compared to research statistics. Unlike research studies, there is no requirement to be approved by an ethics board because the risk to patients is comparable to receiving usual care. Additionally, during implementation of an EBP project there is less control over factors compared to conducting research. This lack of control over factors is why EBP projects are considered lower-level evidence. Despite being in Level VI, evidence from EBP projects can provide helpful examples for nurses who want to change practice to improve patient outcomes in their own healthcare settings.

In Level VI, another type of project is *quality improvement (QI) projects*. QI projects involve structured, continuous activities designed to systematically improve the ways care is delivered to patients. The focus of QI projects is on change at the system level. They are used to address issues such as workflow processes,

KEY TERMS

qualitative research: Research that uses words to describe human behaviors

quantitative research: Research that uses numbers to obtain precise measurements

EBP project: An endeavor to change practice, based on best evidence, in a clinical setting

quality improvement (QI) projects: Structured, continuous activities designed to systematically improve the ways care is delivered to patients

FYI

One way to tell the difference between articles about research and articles about EBP projects is to look carefully at the words. In research, authors will use phrases such as “this study,” whereas authors writing about EBP projects will use “this project.”

variations in care, administrative concerns, and efficiency (Ginex, 2017). QI projects are considered lower-level evidence because they are designed specifically for a particular organization, making the findings less applicable to other organizations. Like EBP projects, approval from an ethics board is not necessary.

Epidemiologic *case series studies* are another type of evidence in Level VI. A case series study is an epidemiological report used to describe rare diseases or outcomes. Because the purpose of a case series study is to understand the natural progression of disease in a population, there is no control and no intervention (Mathes & Pieper, 2017). Although this evidence is at a lower level, the findings can be foundational for designing future epidemiological studies.

A *case study* is a description of a single or novel event of interest. Case studies can be about topics such as a unique patient diagnosis, an unusual organizational event, or the effect of an innovative intervention. Case studies are also used as a qualitative method to intensively study a group of people. Although case studies can be used to show relationships between two or more participants (University of Southern California, 2020), small samples make this evidence lower level.

KEY TERMS

case series studies:

An epidemiological report used to describe rare diseases or outcomes

case study:

A description about a single or novel event of interest

concept analysis:

A process that explores the attributes and characteristics of a concept

narrative reviews:

Papers based on common or uncommon elements of works without concern for research methods, designs, or settings

Concept analysis is a process that explores the attributes and characteristics of a concept. Like a systematic integrative review, these analyses are considered scholarly works because of the rigorous steps involved in the process. Concept analyses are aimed at providing nurses a better understanding of a concept and are often used to refine or build theory (Foley & Davis, 2017). For example, one might perform a concept analysis of “protection.” For some healthcare providers, this concept may spark thoughts about universal body substance precautions, whereas it may make others think about birth control. Communication can be improved by having a clearer understanding of a concept.

Level VII

The lowest level of the hierarchy of evidence is Level VII, which consists primarily of evidence from sources of authority, sometimes coupled with scientific evidence. In addition to narrative reviews, Level VII contains evidence from the opinions of authorities, reports of expert committees, and manufacturer’s recommendations.

Narrative reviews are papers based on common or uncommon elements of works without concern for research methods, designs, or settings. Also known as a traditional literature review, narrative reviews can present the history and broad perspective of a topic (Noble & Smith, 2016). In many ways, narrative reviews can be likened to papers written for college-level courses. Narrative

reviews differ from systematic and integrative reviews because the search for evidence is not systematic or described in the paper. Because a small selection of evidence is included, narrative reviews can be biased in their conclusions; therefore, they are much weaker evidence compared to systematic and integrative reviews. Often found in trade journals, such as *AJN* or *Nursing 2021*, narrative reviews can help keep nurses up to date about practice changes.

When there is limited scientific evidence, nurses may have to rely on reports from authorities, who draw on their professional experiences to form clinical judgments. Experts may express opinions in the form of editorials or commentaries, which can engage nurses in scholarly dialogue. When evidence about a clinical practice problem is limited, experts may form committees to thoughtfully create practice recommendations for use until additional research can be conducted. Nurses often base practice on recommendations from manufacturers, such as instructions about medications. Even though these recommendations may be supported by research conducted by the manufacturer, bias may exist because of the commercial nature of business. Although reports from authorities are lower-level evidence, they continue to serve a purpose in EBP.

A Word of Caution About the Hierarchy of Evidence

The hierarchy of evidence is an excellent tool for helping nurses with the EBP process. When nurses are searching for evidence, it is more effective to begin searching for types of evidence found at the top of the hierarchy. For example, one summary may be all that is needed to quickly answer a question in the clinical setting.

In addition, nurses must consider the quality of individual items of evidence. In a perfect world, all evidence would be created under the best possible circumstances; unfortunately, this is not the case because there are always flaws or limitations that affect the quality of a study. For example, a well-designed quasi-experimental study (Level III) may provide better evidence for practice when compared to a poorly designed RCT (Level II). Therefore, nurses must be aware that using the hierarchy is just one strategy for evaluating evidence.

Challenge

Make a commitment to be an innovator when it comes to EBP! Begin building your knowledge and skills needed to overcome barriers that laggards often cite as reasons for not adopting EBP. Try adopting one or two of the strategies suggested for overcoming barriers. Over the course of your career, you will discover that EBP really does create excellence in patient care.



CRITICAL THINKING EXERCISE 1-5

Recall a question you encountered during your last clinical experience. How might you have answered that question using an EBP approach?



TEST YOUR KNOWLEDGE 1-2

1. A hierarchy is a:
 - a. system for ranking people or things according to their importance.
 - b. model for implementing EBP.
 - c. technique for assigning people to research groups.
 - d. type of study design.
2. Which of the following pieces of evidence is found at the top of the hierarchy of evidence?
 - a. Case-control study
 - b. Expert opinion
 - c. RCT
 - d. Systematic review of experiments

How did you do? 1. d; 2. a

1.3 Keeping It Ethical

At the end of this section, you will be able to:

- < Explain why nurses have an ethical obligation to maintain an evidence-based practice.
- < Identify ethical concerns that may be raised when implementing EBP.

One may wonder how EBP and ethics are connected. According to the Code for Nurses with Interpretive Statements (American Nurses Association [ANA], 2015), nurses have a covenant with society. As part of that covenant, nurses should have “a commitment to evidence informed practice” (ANA, 2015, p. 36). It is easy to understand that it is unethical for nurses to provide care that is not evidence based. Nurses have a paramount responsibility for

ensuring patient safety. Having scientific evidence is the best way to ensure that nursing interventions are safe. In turn, nurses have an obligation to maintain an evidence-based practice.

The connection between EBP and ethics can also become evident when practice changes are made, because ethical concerns may arise. One ethical concern may be that although the change in practice benefits some patients, others may not benefit. Ethical dilemmas may also arise when the outcomes that result from the practice change unintentionally lower the quality of care. Another potential ethical concern is when an EBP project is really a research project and is being conducted without the required approval of an ethics board (Melnik & Fineout-Overholt, 2019).



RAPID REVIEW

- » EBP involves: (1) practice grounded in research evidence integrated with theory, (2) clinician expertise, and (3) patient preferences.
- » Tradition, authority, trial and error, personal experiences, intuition, borrowed evidence, and scientific research are sources of evidence.
- » Individual-, organizational-, and research-related barriers can prevent adoption of EBP.
- » Innovations are adopted by the diffusion of the innovation over time through communication channels among the members of a social system.
- » For nurses to use EBP to improve patient care, they must be committed to being early adopters of innovations.
- » Nurses use the hierarchy of evidence to rank evidence from strongest to weakest.
- » The hierarchy of evidence has seven levels of evidence. The strongest evidence is in Level I, and the weakest evidence is in Level VII.
- » When looking for the best evidence, nurses should begin looking for the types of evidence found at the top of the hierarchy.
- » Evidence at all levels of the hierarchy has value and may contribute to nursing practice. In addition to determining its level, nurses must appraise the quality evidence.
- » Nurses have an ethical obligation to maintain an evidence-based practice.

Apply What You Have Learned

So that you can better understand EBP, throughout the text you will be guided through a series of exercises designed to involve you in the EBP process. The clinical problem used in this exercise is hand hygiene. You will search for articles on your own and critique the evidence to decide which best practice to recommend. You will also design a policy and evaluate outcomes. By actively engaging in these exercises, you will be well prepared to be a leader who successfully moves evidence to the point of care.

Sign into the Joanna Briggs Institute and retrieve the following summary:

- » Marin, T. (2020). Evidence summary. Hand hygiene compliance: Interventions in healthcare settings. Joanna Briggs Institute EBP Database, JBI@Ovid. JBI1549

Also retrieve from CINAHL or PubMed this systematic review:

- » Seo, H.-J., Sohng, K.-Y., Chang, S. O., Chaung, S. K., Won, J. S., & Choi, M.-J. (2019). Interventions to improve hand hygiene compliance in emergency departments: A systematic review. *Journal of Hospital Infection*, 102, 394–406. <https://doi.org/10.1016/j.jhin.2019.03.013>

After reading this evidence, how might you change your hand hygiene practices?

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