**EVIDENCE-BASED PRACTICE TIP**

Think about the relationship between the wording of the hypothesis, the type of research design suggested, and the level of evidence provided by the findings of a study using each kind of hypothesis. You may want to consider which type of hypothesis potentially will yield the strongest results applicable to practice.

Hypotheses reflecting experimental designs also test the effect of the experimental treatment (i.e., independent variable **X**) on the outcome (i.e., dependent variable **Y**). This suggests that the strength of the evidence provided by the results is Level II (experimental design) or Level III (quasi-experimental design).

In contrast, hypotheses related to nonexperimental designs reflect associative relationship statements, such as the following:

• **X** will be negatively related to **Y.**

• There will be a positive relationship between **X** and **Y**.

This suggests that the strength of the evidence provided by the results of a study that examined hypotheses with associative relationship statements would be at Level IV (nonexperimental design).

[Table 2.6](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#t0060) provides an example of this concept. The Critical Thinking Decision Path will help you determine the type of hypothesis or research question presented in a study.

**TABLE 2.6**

**Elements of a Clinical Question**

| **Population** | **Intervention** | **Comparison Intervention** | **Outcome** |
| --- | --- | --- | --- |
| Older adult hospitalized patients with indwelling urinary catheters | Daily nurse-led catheter rounds | No daily nurse-led catheter rounds | Decreased number of CAUTIs |

*CAUTIs,* Catheter acquired urinary tract infections.

**CRITICAL THINKING DECISION PATH**

**Determining the Use of a Hypothesis or Research Question**

**Developing and refining a clinical question: A consumer’s perspective**

Practicing nurses, as well as students, are challenged to keep their practice up to date by searching for, retrieving, and critiquing research articles that apply to practice issues that are encountered in their clinical setting (see [Chapter 20](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0020.xhtml)). Practitioners strive to use the current best evidence from research when making clinical and health care decisions. As research consumers, you are not conducting research studies; however, your search for information from clinical practice is converted into focused, structured clinical questions that are the foundation of evidence-based practice and quality improvement projects. Clinical questions often arise from clinical situations for which there are no ready answers. You have probably had the experience of asking, “What is the most effective treatment for. . . ?” or “Why do we still do it this way?”

Using similar criteria related to framing a research question, focused clinical questions form a basis for searching the literature to identify supporting evidence from research. **Clinical questions** have four components:

• Population

• Intervention

• Comparison

• Outcome

These components, known as PICO, provide an effective format for helping nurses develop searchable clinical questions. [Box 2.2](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#b0020) presents each component of the clinical question.

**BOX 2.2**

**Components of a Clinical Question Using the PICO Format**

**Population:** The individual patient or group of patients with a particular condition or health care problem (e.g., adolescents age 13–18 with type 1 insulin-dependent diabetes)

**Intervention:** The particular aspect of health care that is of interest to the nurse or the health team (e.g., a therapeutic [inhaler or nebulizer for treatment of asthma], a preventive [pneumonia vaccine], a diagnostic [measurement of blood pressure], or an organizational [implementation of a bar coding system to reduce medication errors] intervention)

**Comparison intervention:** Standard care or no intervention (e.g., antibiotic in comparison to ibuprofen for children with otitis media); a comparison of two treatment settings (e.g., rehabilitation center vs. home care)

**Outcome:** More effective outcome (e.g., improved glycemic control, decreased hospitalizations, decreased medication errors)

The significance of the clinical question becomes obvious as research evidence from the literature is critically appraised. Research evidence is used together with clinical expertise and the patient’s perspective to confirm, develop, or revise nursing standards, protocols, and policies that are used to plan and implement patient care ([Cullum, 2000](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0025); [Sackett et al., 2000](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0095); [Thompson et al., 2004](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0125)). Issues or questions can arise from multiple clinical and managerial situations. Using the example of catheter acquired urinary tract infections (CAUTIs), a team of staff nurses working on a medical unit in an acute care setting were reviewing their unit’s quarterly quality improvement data and observed that the number of CAUTIs had increased by 25% over the past 3 months. The nursing staff reviewed the unit’s standard of care and noted that although nurses were able to discontinue an indwelling catheter, according to a set of criteria and without a physician order, catheters were remaining in place for what they thought was too long and potentially contributing to an increase in the prevalence of CAUTIs. To focus the nursing staff’s search of the literature, they developed the following question: Does the use of daily nurse-led catheter rounds in hospitalized older adults with indwelling urinary catheters lead to a decrease in CAUTIs? Sometimes it is helpful for nurses who develop clinical questions from a quality improvement perspective to consider three elements as they frame their focused question: (1) the situation, (2) the intervention, and (3) the outcome.

• The situation is the patient or problem being addressed. This can be a single patient or a group of patients with a particular health problem (e.g., hospitalized adults with indwelling urinary catheters).

• The intervention is the dimension of health care interest, and often asks whether a particular intervention is a useful treatment (e.g., daily nurse-led catheter rounds).

• The outcome addresses the effect of the treatment (e.g., intervention) for this patient or patient population in terms of quality and cost (e.g., decreased CAUTIs). It essentially answers whether the intervention makes a difference for the patient population.

The individual parts of the question are vital pieces of information to remember when it comes to searching for evidence in the literature. One of the easiest ways to do this is to use a table, as illustrated in [Table 2.6](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#t0060). Examples of clinical questions are highlighted in [Box 2.3](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#b0030). [Chapter 3](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0003.xhtml) provides examples of how to effectively search the literature to find answers to questions posed by researchers and research consumers.

**BOX 2.3**

**Examples of Clinical Questions**

• Does using a Discharge Bundle combined with Teachback Methodology reduce pediatric readmissions? ([Shermont et al., 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett" \l "bib0105))

• What is the most effective IV insulin practice guideline for cardiac surgery patients? ([Westbrook et al., 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0140))

• Does using a structured content and electronic nursing handover reduce patient clinical management errors? ([Johnson et al., 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0035))

• What is the impact of nursing teamwork on nurse-sensitive quality indicators? ([Rahn, 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett" \l "bib0080))

• Do PCMH access and care coordination measures reflect the contributions of all team members? ([Annis et al., 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett" \l "bib0015))

• Is a patient-family-staff partnership video the most effective approach for preventing falls in hospitalized patients? ([Silkworth et al., 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett" \l "bib0110))

• What is the impact of prompt nutrition care on patient outcomes and health care costs? ([Meehan et al., 2016](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0055))

*PCMH*, Patient-centered medical home.

**EVIDENCE-BASED PRACTICE TIP**

You should be formulating clinical questions that arise from your clinical practice. Once you have developed a focused clinical question using the PICO format, you will search the literature for the best available evidence to answer your clinical question.

**Appraisal for evidence-based practice the research question and hypothesis**

When you begin to critically appraise a research study, consider the care the researcher takes when developing the research question or hypothesis; it is often representative of the overall conceptualization and design of the study. In a quantitative research study, the remainder of a study revolves around answering the research question or testing the hypothesis. In a qualitative research study, the objective is to answer the research question. Because this text focuses on you as a research consumer, the following sections will primarily pertain to the evaluation of research questions and hypotheses in published research reports.

**Critiquing the research question and hypothesis**

The following [Critical Appraisal Criteria](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#b0170) box provides several criteria for evaluating the initial phase of the research process—the research question or hypothesis. Because the research question or hypothesis guides the study, it is usually introduced at the beginning of the research report to indicate the focus and direction of the study. You can then evaluate whether the rest of the study logically flows from its foundation—the research question or hypothesis. The author will often begin by identifying the background and significance of the issue that led to crystallizing development of the research question or hypothesis. The clinical and scientific background and/or significance will be summarized, and the purpose, aim, or objective of the study is then identified.

Often the research question or hypothesis will be proposed before or after the literature review. Sometimes you will find that the research question or hypothesis is not specifically stated. In some cases, it is only hinted at or is embedded in the purpose statement, and you are challenged to identify the research question or hypothesis. In other cases, the research question is embedded in the findings toward the end of the article. To some extent, this depends on the style of the journal.

Although a hypothesis can legitimately be nondirectional, it is preferable, and more common, for the researcher to indicate the direction of the relationship between the variables in the hypothesis. Quantifiable words such as “greater than,” “less than,” “decrease,” “increase,” and “positively,” “negatively,” or “related” convey the idea of objectivity and testability. You should immediately be suspicious of hypotheses or research questions that are not stated objectively. You will find that when there is a lack of data available for the literature review (i.e., the researcher has chosen to study a relatively undefined area of interest), a nondirectional hypothesis or research question may be appropriate.

You should recognize that how the proposed relationship of the hypothesis or research question is phrased suggests the type of research design that will be appropriate for the study, as well as the level of evidence to be derived from the findings. **Example:** ➤ If a hypothesis proposes that treatment **X1** will have a greater effect on **Y** than treatment **X2**, an experimental (Level II evidence) or quasi-experimental design (Level III evidence) is suggested (see [Chapter 9](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0009.xhtml)). If a research question asks if there will be a positive relationship between variables **X** and **Y**, a nonexperimental design (Level IV evidence) is suggested (see [Chapter10](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0010.xhtml)).

Hypotheses and research questions are never proven beyond the shadow of a doubt. Researchers who claim that their data have “proven” the validity of their hypothesis or research question should be regarded with grave reservation. You should realize that, at best, findings that support a hypothesis or research question are considered tentative. If repeated replication of a study yields the same results, more confidence can be placed in the conclusions advanced by the researchers.

When critically appraising clinical questions, think about the fact that the clinical question should be focused and specify the patient population or clinical problem being addressed, the intervention, and the outcome for a particular patient population. There should be evidence that the clinical question guided the literature search and that appropriate types of research studies are retrieved in terms of the study design and level of evidence needed to answer the clinical question.

**CRITICAL APPRAISAL CRITERIA**

**Developing Research Questions and Hypotheses**

**The research question**

1. Does the research question express a relationship between two or more variables, or at least between an independent and a dependent variable, implying empirical testability?

2. How does the research question specify the nature of the population being studied?

3. How has the research question been supported with adequate experiential and scientific background material?

4. How has the research question been placed within the context of an appropriate theoretical framework?

5. How has the significance of the research question been identified?

6. Have pragmatic issues, such as feasibility, been addressed?

7. How have the purpose, aims, or goals of the study been identified?

**The hypothesis**

1. Is the hypothesis concisely stated in a declarative form?

2. Are the independent and dependent variables identified in the statement of the hypothesis?

3. Is each hypothesis specific to one relationship so that each hypothesis can be either supported or not supported?

4. Is the hypothesis stated in such a way that it is testable?

5. Is the hypothesis stated objectively, without value-laden words?

6. Is the direction of the relationship in each hypothesis clearly stated?

7. How is each hypothesis consistent with the literature review?

8. How is the theoretical rationale for the hypothesis made explicit?

9. Given the level of evidence suggested by the research question, hypothesis, and design, what is the potential applicability to practice?

**The clinical question**

1. Does the clinical question specify the patient population, intervention, comparison intervention, and outcome?

2. Does the clinical question address an outcome applicable to practice?

**Key points**

• Developing the research question and stating the hypothesis are key preliminary steps in the research process.

• The research question is refined through a process that proceeds from the identification of a general idea of interest to the definition of a more specific and circumscribed topic.

• A preliminary literature review reveals related factors that appear critical to the research topic of interest and helps further define the research question.

• The significance of the research question must be identified in terms of its potential contribution to patients, nurses, the medical community in general, and society. Applicability of the question for nursing practice, as well as its theoretical relevance, must be established. The findings should also have the potential for formulating or altering nursing practices or policies.

• The final research question is a statement about the relationship of two or more variables. It clearly identifies the relationship between the independent and dependent variables, specifies the nature of the population being studied, and implies the possibility of empirical testing.

• Research questions that are nondirectional may be used in exploratory, descriptive, or qualitative research studies.

• Research questions can be directional, depending on the type of study design being used.

• Focused clinical questions arise from clinical practice and guide the literature search for the best available evidence to answer the clinical question.

• A hypothesis is a declarative statement about the relationship between two or more variables that predicts an expected outcome. Characteristics of a hypothesis include a relationship statement, implications regarding testability, and consistency with a defined theory base.

• Hypotheses can be formulated in a directional or a nondirectional manner and be further categorized as either research or statistical hypotheses.

• The purpose, research question, or hypothesis provides information about the intent of the research question and hypothesis and suggests the level of evidence to be obtained from the study findings.

• The interrelatedness of the research question or hypothesis and the literature review and the theoretical framework should be apparent.

• The appropriateness of the research design suggested by the research question or hypothesis is also evaluated.

**Critical thinking challenges**

• Discuss how the wording of a research question or hypothesis suggests the type of research design and level of evidence that will be provided.

• Using the study by [Hawthorne, Youngblut, and Brooten (2016)](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/CHP0002.xhtml?favre=brett#bib0030) (see [Appendix B](https://jigsaw.vitalsource.com/books/9780323431316/epub/OEBPS/xhtml/Appendix_B.xhtml)), describe how the background, significance, and purpose of the study are linked to the research questions.

•  The prevalence of catheter acquired urinary infections (CAUTIs) has increased on your hospital unit by 10% in the last two quarters. As a member of the Quality Improvement (QI) Committee on your unit, collaborate with your committee colleagues from other professions to develop an interprofessional action plan. Deliberate to develop a clinical question to guide the QI project.

• A nurse is in charge of discharge planning for frail older adults with congestive heart failure. The goal of the program is to promote self-care and prevent rehospitalizations. Using the PICO approach, the nurse wants to develop a clinical question for an evidence-based practice project to evaluate the effectiveness of discharge planning for this patient population. How can the nurse accomplish that objective?