# NURSING RESEARCH

## Generating and Assessing Evidence for Nursing Practice

Denise F. Polit
Cheryl Tatano Beck

ELEVENTH EDITION

Wolters Kluwer

# Quick Guide to Bivariate Statistical Tests

| Level of measurement of dependent variable | Group Comparisons: Number of groups (the independent variable) | | | | Correlational analyses (To examine relationship strength) |
|---|---|---|---|---|---|
| | 2 Groups | | 3+ Groups | | |
| | Independent Groups Tests | Dependent Groups Tests | Independent Groups Tests | Dependent Groups Tests | |
| Nominal (Categorical) | $\chi^2$ p. 401 (or Fisher's exact test) p. 402 | McNemar"s test p. 402 | $\chi^2$ p. 401 | Cochran's *Q* | Phi coefficient (dichotomous) or Cramér's *V* (not restricted to dichotomous) p. 403 |
| Ordinal (Rank) | Mann-Whitney Test p. 396 | Wilcoxon signed ranks test p. 396 | Kruskal-Wallis *H* test p. 400 | Friedman's test p. 400 | Spearman's rho (or Kendall's tau) pp. 403 |
| Interval or Ratio (Continuous)* | Independent group *t test* pp. 394-395 | Paired *t test* p. 396 | ANOVA pp. 396-399 | RM-ANOVA pp. 400 | Pearson's *r* p. 402 |
| | Multifactor ANOVA for 2+ independent variables p. 398 | | | | |
| | RM-ANOVA for 2+ groups x 2+ measurements over time p. 424 | | | | |

*For distributions that are markedly nonnormal or samples that are small, the nonparametric tests in the row above (for ordinal measures) may be needed.

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*TO*

*The memory of Denise's husband:*

*Alan A. Janosy, 1943-2019*

# Acknowledgments

This 11th edition, like the previous 10 editions, depended on the contributions of dozens of people. Many faculty and students who used the text have made invaluable suggestions for its improvement, and to all of you we are very grateful. In addition to all those who assisted us during the past 40 years with the earlier editions, the following individuals deserve special mention.

We would like to acknowledge the comments of reviewers of the previous edition of this book, anonymous to us initially, whose feedback influenced our revisions. Faculty at Griffith University in Australia made useful suggestions and inspired the inclusion of some new content. Valori Banfi, reference librarian at the University of Connecticut, provided ongoing assistance. Dr. Carrie Morgan Eaton at the University of Connecticut provided regular feedback. Dr. Deborah Dillon McDonald and Dr. Xiaomei Cong were extraordinarily generous in giving us access to NINR grant application material for the *Resource Manual*.

We also extend our thanks to those who helped to turn the manuscript into a finished product. The staff at Wolters Kluwer has been of great assistance to us over the years. We are indebted to Mark Foss, Meredith Brittain, David Murphy, Brittany Clements, Barton Dudlick, and all the others behind the scenes for their fine contributions.

Finally, we thank our family and friends. Our husbands Alan and Chuck have become accustomed to our demanding schedules, but we recognize that their support involves a lot of patience and many sacrifices.

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# Preface

Research methodology is a dynamic enterprise. Even after writing 10 editions of this book, we have continued to draw new material and inspiration from ground-breaking advances in research methods and in nurse researchers' use of those methods. It is thrilling to share many of those developments in this new edition. We expect that many of the new methodologic and technological enhancements will be translated into powerful evidence for nursing practice. Four years ago, we considered the 10th edition as a watershed edition of a classic textbook, having added two new chapters. We are persuaded, however, that this 11th edition is even better than the previous one. We have retained many features that made this book a classic textbook and resource, including its focus on research as a support for evidence-based nursing, but have introduced important innovations that we hope will help to shape the future of nursing research.

# New to This Edition

## New Chapters

We are excited to have added two new chapters to this edition. The first new chapter (Chapter 12) focuses on quality improvement and improvement science. Quality improvement (QI) has not historically been considered "research" because knowledge from QI has been deemed too localized to be of broad interest. Yet, QI initiatives undertaken by interprofessional teams often yield important lessons for healthcare professionals in diverse settings. In the new chapter, we discuss methods and frameworks that can be used to develop and assess improvement projects.

We are particularly enthusiastic about our second new chapter, which concerns the applicability, generalizability, and relevance of research evidence (Chapter 31). There is growing awareness that approaches being used to support evidence-based practice (EBP) have limitations in terms of their *applicability* to individual patients or subgroups of patients. EBP efforts prioritize rigorous evidence from tightly controlled studies with select populations that often exclude many patients typically seen in real-world settings. Moreover, evidence for EBP usually represents *average effects* for these atypical populations. Our new chapter describes a range of cutting-edge strategies for generating *practice-based evidence* that is patient-centered. We discuss such approaches as comparative effectiveness research, pragmatic clinical trials, adaptive interventions, SMART designs, subgroup (moderator) analyses, and multivariable risk-stratified analyses for better understanding the diversity of treatment effects. This chapter is consistent with the emerging interest in *precision healthcare.*

## Extensively Revised Chapters

We have made major revisions to two chapters in this book. We have revamped Chapter 2, the chapter on evidence-based practice, to better guide efficient evidence searches (e.g., via the 6S hierarchy of preappraised evidence) and for ranking evidence on traditional level-of-evidence (LOE) scales. We have also extensively revised another chapter that has relevance for EBP: the chapter on systematic reviews (Chapter 30). The types of reviews being undertaken, and the methods used to conduct them, have expanded considerably in recent years. We describe in some detail the GRADE system for assessing the degree of *confidence* a review team has in the estimated effects of an intervention on key outcomes. We also describe differences in two broad approaches to qualitative syntheses, distinguishing interpretive approaches (metasyntheses) from aggregative approaches using meta-aggregation.

## New and Added Content

Throughout the book, we have included material on methodologic innovations that have arisen in nursing, medicine, and the social sciences during the past 4 to 5 years.

The many additions and changes are too numerous to describe here. One deserves special mention, however: we have revised the chapter on qualitative data analysis (Chapter 25) to provide greater support for the actual tasks of coding and categorizing data.

The inclusion of two new chapters and the expansion of others made it challenging to keep the textbook to a manageable length. Our solution was to include some content in supplements that are available online. Every chapter has an online supplement (and some chapters in this edition have two supplements), which gave us the opportunity to add a considerable amount of new material. For example, one new supplement is devoted to the conduct of plausibility analyses as a tool for strengthening internal validity in nonrandomized intervention studies. Other supplements include a description of various randomization methods such as urn randomization, an overview of item response theory, and a description of statistical process control.

Here is a complete list of the supplements for the 33 chapters of the textbook:

1. The History of Nursing Research
2. A. Evaluating Clinical Practice Guidelines—AGREE II
   B. Evidence-Based Practice in an Organizational Context
3. Deductive and Inductive Reasoning
4. Complex Relationships and Hypotheses
5. A. Finding Evidence for a Clinical Query
   B. Literature Review Summary Tables
6. Prominent Conceptual Models of Nursing Used by Nurse Researchers, and a Guide to Middle-Range Theories
7. Historical Background on Unethical Research Conduct
8. Research Control
9. Randomization Strategies
10. A. Selected Experimental and Quasi-Experimental Designs: Diagrams, Uses, and Drawbacks/Validity Threats
    B. Plausibility Assessments and Other Strategies When Randomization is Not Possible
11. Other Specific Types of Research
12. Statistical Process Control
13. Sample Recruitment and Retention
14. Other Types of Structured Self-Reports
15. Cross-Cultural Validity and the Adaptation/Translation of Measures
16. Overview of Item Response Theory
17. SPSS Analysis of Descriptive Statistics
18. SPSS Analysis of Inferential Statistics
19. SPSS Analysis and Multivariate Statistics

20. Some Preliminary Steps in Quantitative Analysis Using SPSS
21. Clinical Significance Assessment with the Jacobson–Truax Approach
22. Historical Nursing Research and Other Types of Qualitative Inquiry
23. Models of Generalizability in Qualitative Research
24. Additional Types of Unstructured Self-Reports
25. Transcribing Qualitative Data
26. Whittemore and Colleagues' Framework of Quality Criteria in Qualitative Research
27. Transforming Quantitative and Qualitative Data
28. Complex Intervention Development: Additional Resources
29. Examples of Various Pilot and Feasibility Objectives
30. A. Publication Bias in Systematic Reviews
    B. Supplementary Resources for Qualitative Evidence Synthesis
31. The RE-AIM Framework
32. A. Tips for Publishing Reports on Pilot Intervention Studies
    B. Impact Factor and Publication Information for Selected Nursing Journals
33. Proposals for Pilot Intervention Studies

Another feature of this edition concerns readers' access to references we cited. To the extent possible, the studies we have chosen as examples of research methods are published as open-access articles. These studies are identified in the reference list at the end of each chapter, and a link to the articles is included in the accompanying *Resource Manual for Nursing Research,* 11th Edition (available for separate purchase) in the online Toolkit (for more information, see the section "A Comprehensive Package for Teaching and Learning" later in this preface.) In addition, one Wolters Kluwer article per chapter that is available on the book's companion website is also identified in each chapter's reference list.

We hope that our many revisions will help users of this book to maximize their learning experience.

## Organization of the Text

The content of this edition is organized into six main parts.

- **Part 1—Foundations of Nursing Research and Evidence-Based Practice** introduces fundamental concepts in nursing research. Chapter 1 briefly summarizes the history and future of nursing research, discusses the philosophical underpinnings of qualitative research versus quantitative research, and describes major purposes of nursing research. Chapter 2, extensively revised, offers guidance on using research to support evidence--based practice. Chapter 3 introduces readers to key research terms and presents an overview of steps in the research process for both qualitative and quantitative studies.
- **Part 2—Conceptualizing and Planning a Study to Generate Evidence for Nursing** further sets the stage for learning about the research process by discussing issues relating to a study's conceptualization: the formulation of research questions and hypotheses (Chapter 4), the review of relevant research (Chapter 5), the development of theoretical and conceptual contexts (Chapter 6), and the fostering of ethically acceptable approaches in doing research (Chapter 7). Chapter 8 provides an overview of important issues that researchers must attend to during the planning of any study.
- **Part 3—Designing and Conducting Quantitative Studies to Generate Evidence for Nursing** presents material on undertaking quantitative nursing studies. Chapter 9 describes fundamental principles of quantitative research design, and Chapter 10 focuses on methods to enhance the rigor of a quantitative study, including mechanisms of research control. Chapter 11 examines research with different and distinct purposes, such as noninferiority trials, realist evaluations, surveys, and outcomes research. Chapter 12, a new chapter in this edition, is devoted to methods used in quality improvement and improvement science. Chapter 13 presents strategies for sampling study participants in quantitative research. Chapter 14 describes structured data collection methods that yield quantitative information. Chapter 15 discusses the concept of measurement and then focuses on methods of assessing the quality of formal measuring instruments. In this edition, we describe methods to assess the properties of point-in-time measurements (reliability and validity) and longitudinal measurements—i.e., change scores (reliability of change scores and responsiveness). Chapter 16 presents material on how to develop high-quality self-report instruments. Chapters 17, 18, and 19 present an overview of univariate, bivariate, and multivariate statistical analyses, respectively. Chapter 20 describes the development of an overall analytic strategy for quantitative studies, including material on handling missing data. Chapter 21, a chapter that

was added in the 10th edition, discusses the issue of interpreting results and making inferences about clinical significance.

- **Part 4—Designing and Conducting Qualitative Studies to Generate Evidence for Nursing** presents material on undertaking qualitative nursing studies. Chapter 22 is devoted to research designs and approaches for qualitative studies, including information on critical theory, feminist, and participatory action research. Chapter 23 discusses strategies for sampling study participants in qualitative inquiries. Chapter 24 describes methods of gathering unstructured self-report and observational data for qualitative studies. Chapter 25 discusses methods of analyzing qualitative data, with specific information on grounded theory, phenomenologic, and ethnographic analyses. Greater guidance on coding qualitative data has been added to this edition. Chapter 26 elaborates on methods qualitative researchers can use to enhance (and assess) integrity and trustworthiness throughout their inquiries.
- **Part 5—Designing and Conducting Mixed Methods Studies to Generate Evidence for Nursing** presents material on mixed methods nursing studies. Chapter 27 discusses a broad range of issues, including asking mixed methods questions, designing a study to address the questions, sampling participants in mixed methods research, and analyzing and integrating qualitative and quantitative data. Chapter 28 presents information about using mixed methods approaches in the development of complex nursing interventions. In Chapter 29, a chapter that was new in the 10th edition, we provide suggestions for designing and conducting pilot studies and using data from the pilots to make decisions about "next steps."
- **Part 6—Building an Evidence Base for Nursing Practice** provides additional information on linking research and clinical practice. Chapter 30 offers an overview of methods of conducting systematic reviews that support EBP. In this greatly expanded chapter in this edition, we provide guidance on conducting meta-analyses (and an evaluation of confidence in the evidence using the GRADE system), metasyntheses, qualitative evidence syntheses using meta--aggregation, and mixed studies reviews. Chapter 31, a new chapter in this edition, offers cutting-edge advice on strategies to enhance the *applicability* of practice-based evidence to clinical decisions for individuals and subgroups. Chapter 32 discusses the dissemination of evidence—how to prepare a research report (including theses and dissertations) and how to publish research findings. The concluding chapter (Chapter 33) offers suggestions and guidelines on developing research proposals and obtaining financial support; it includes information about applying for NIH grants and interpreting scores from NIH's scoring system.

# Key Features

This textbook was designed to be helpful to those who are learning how to do research, as well as to those who are learning to appraise research reports critically and to use research findings in practice. Many of the features successfully used in previous editions have been retained in this 11th edition. Among the basic principles that helped to shape this and earlier editions of this book are (1) an unswerving conviction that the development of research skills is critical to the nursing profession, (2) a fundamental belief that research is intellectually and professionally rewarding, and (3) a steadfast opinion that learning about research methods does not need to be intimidating nor dull. Consistent with these principles, we have tried to present the fundamentals of research methods in a way that both facilitates understanding and arouses curiosity and interest. Key features of our approach include the following:

- **Research examples.** Each chapter concludes with one or two actual research examples designed to highlight methodologic features described in the chapter and to sharpen the reader's critical thinking skills. In addition, many research examples are used throughout the book to illustrate key points and to stimulate ideas for a study. Many examples used in this edition are published as open--access articles that can be used for further learning and classroom discussion.
- **Specific practical tips on doing research.** The textbook is filled with practical suggestions on how to translate the abstract notions of research methods into realistic strategies for conducting research. Every chapter includes several tips for applying the chapter's lessons to real-life situations. These tips are an acknowledgment that there is often a gap between what gets taught in research methods textbooks and what a researcher needs to know to conduct a study.
- **Critical appraisal guidelines.** Almost all chapters include guidelines for conducting a critical appraisal of various aspects of a research report.
- **A comprehensive index.** We have crafted an exceptionally thorough index. We know that our book is used as a reference book as well as a textbook, and we recognize how crucial it is to access needed information efficiently.
- **Aids to student learning.** This book includes several additional features designed to enhance and reinforce learning, including the following: succinct, bulleted summaries at the end of each chapter; tables and figures that provide examples and graphic materials in support of the text discussion; and a detailed glossary.
- **Clear, user-friendly style.** Our writing style is designed to be easily digestible and nonintimidating. Concepts are introduced carefully and systematically, difficult ideas are presented clearly, and readers are assumed to have no prior exposure to technical terms.

# A Comprehensive Package for Teaching and Learning

To further facilitate teaching and learning, a carefully designed ancillary package has been developed to assist faculty and students.

## Resources for Instructors

Tools to assist you with teaching your course are available upon adoption of this text at http://thepoint.lww.com/Polit11e.

- An **e-Book** gives you access to the book's full text and images online.
- The **Test Generator** lets you put together exclusive new tests from a bank containing more than 790 questions to help you in assessing your students' understanding of the material.
- **PowerPoint Presentations** summarizing key points in each chapter provide an easy way for you to integrate the textbook with your students' classroom experience, either via slide shows or handouts. Multiple-choice and true/false questions are integrated into the presentations to promote class participation and allow you to use i-clicker technology.
- An **Image Bank** of all the images in the book allows you to use these illustrations in your PowerPoint slides or as you see fit in your course.
- Other helpful resources include **Answers to Application Exercises** (the exercises are found in the student resources) and **Strategies for Effective Teaching.**

Contact your sales representative for more details and ordering information.

## Resources for Students

An exciting set of free resources is available to help students review material and become even more familiar with vital concepts. Students can access all these resources at http://thepoint.lww.com/Polit11e using the codes printed in the front of their textbooks.

- **Chapter supplements** include material to enhance the content of each chapter (the full list of these supplements is included earlier in this preface).
- **Application Exercises** test methodologic skills with short-answer and essay questions related to research studies.
- **Journal Articles** offer access to current research available in Wolters Kluwer journals.

- A **Spanish–English Audio Glossary** provides helpful terms and phrases for communicating with patients who speak Spanish.
- A description of **Nursing Professional Roles and Responsibilities** provides information about these functions.

## *Resource Manual for Nursing Research*, 11th Edition

Available for separate purchase, ***Resource Manual for Nursing Research*, 11th Edition** augments the textbook in important ways. The manual itself provides students with exercises that correspond to each text chapter, with opportunities to carefully glean information from and critically appraise actual studies. The appendices include 13 research journal articles in their entirety, plus portions of two successful grant applications for studies funded by the National Institute of Nursing Research. The 13 reports cover a range of nursing inquiries, including qualitative, quantitative, and mixed methods studies, an instrument development study, an evidence-based practice project, a quality improvement project, and two systematic reviews. Full critiques of two of the reports are also included and can serve as models for a comprehensive critical appraisal.

- **The online Toolkit to the *Resource Manual*** is a "must have" innovation that will save considerable time for both students and seasoned researchers. Included on the manual's companion webpage, the Toolkit offers dozens of research resources in Word documents that can be downloaded and used or adapted in research projects. The resources reflect best-practice research material, most of which has been pretested and refined in our own research. The Toolkit originated with our realization that in our technologically advanced environment, it is possible to not only *illustrate* methodologic tools as graphics in the textbook but also to make them directly available for use and adaptation. Thus, we have included dozens of documents in Word format that can readily be used in research projects, without requiring researchers to "reinvent the wheel" or tediously retype material from the textbook. Examples include informed consent forms, a demographic questionnaire, content validity forms, templates for statistical tables, and a coding sheet for a meta-analysis—to name only a few. The Toolkit also lists relevant and useful websites for each chapter, which can be "clicked" on directly without having to retype the URL and risk a typographical error. Links to open-access articles cited in the textbook, as well as other open-access articles relevant to each chapter, are included in the Toolkit.

# A Comprehensive, Digital, Integrated Course Solution: *Lippincott® CoursePoint*

The same trusted solution, innovation and unmatched support that you have come to expect from *Lippincott CoursePoint* is now enhanced with more engaging learning tools and deeper analytics to help prepare students for practice. This powerfully integrated, digital learning solution combines learning tools, case studies, real-time data, and the most trusted nursing education content on the market to make curriculum-wide learning more efficient and to meet students where they are at in their learning. And now, it is easier than ever for instructors and students to use, giving them everything they need for course and curriculum success!
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- Unparalleled reporting provides in-depth dashboards with several data points to track student progress and help identify strengths and weaknesses.
- Unmatched support includes training coaches, product trainers, and nursing education consultants to help educators and students implement CoursePoint with ease.

It is our hope that the content, style, and organization of *Nursing Research,* 11th Edition continue to meet the needs of a broad spectrum of nursing students and nurse researchers. We also hope that the book will help to foster enthusiasm for the kinds of discoveries that research can produce and for the knowledge that will help support an evidence-based nursing practice.
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# Table of Contents

## Table of Contents

# PART 1

# Foundations of Nursing Research and Evidence-Based Practice

# CHAPTER 1

# Introduction to Nursing Research in an Evidence-Based Practice Environment

## Nursing Research in Perspective

In all parts of the world, nursing has experienced a profound culture change. Nurses are increasingly expected to understand and conduct research, and to base their professional practice, in part, on research evidence—that is, to adopt an **evidence--based practice (EBP)**. EBP involves using the best evidence (as well as clinical judgment and patient preferences and circumstances) in making patient care decisions, and "best evidence" typically comes from research conducted by nurses and other healthcare professionals.

### What is Nursing Research?

**Research** is systematic inquiry that relies on disciplined methods to answer questions or solve problems. Nurses are increasingly engaged in disciplined studies that benefit nursing and its clients. **Nursing research** is systematic inquiry designed to generate evidence about issues of importance to the nursing profession, including nursing practice, education, administration, and informatics. In this book, we emphasize **clinical nursing research** aimed at guiding nursing practice and improving the health and quality of life of nurses' clients.

Nursing research has experienced remarkable growth in the past few decades, providing nurses with a growing evidence base from which to practice. Yet many questions persist, and mechanisms for incorporating research innovations into nursing practice still are in development.

**Examples of Nursing Research Questions:**

- How effective is a web-based intervention in improving parent-adolescent communication about sexuality and sexual health? (Varas-Díaz et al., 2019)
- What are the experiences of college students who are newly diagnosed with type 1 diabetes mellitus? (Saylor et al., 2019)

### The Importance of Research in Nursing

Findings from rigorous research provide evidence for informing nurses' decisions. Nurses have come to accept the desirability of incorporating research evidence into

their actions, if the evidence shows that the actions are clinically appropriate and result in positive patient outcomes.

In some countries, research plays an important role in nursing credentialing and status. For example, the American Nurses Credentialing Center—an arm of the American Nurses Association and a prestigious credentialing organization in the United States—developed a Magnet Recognition Program to acknowledge healthcare organizations that provide high-quality nursing care. The 2019 Magnet application manual incorporates revisions that strengthen evidence-based requirements (Graystone, 2017). Indeed, applicants must now submit at least three nursing studies, indicating that Magnet hospitals must not only be involved in EBP but also in the creation of new practice knowledge. The good news is that there is growing evidence that the focus on research and EBP may have important payoffs. For example, Barnes and coresearchers (2016) found that Magnet hospitals had lower rates of central line–associated bloodstream infection than non-Magnet hospitals, even when differences in other hospital characteristics were taken into account. And McCaughey et al. (2019) found that patients treated at a Magnet hospital were more satisfied with their care than patients in non-Magnet hospitals.

Changes to nursing practice now occur regularly because of EBP efforts. Practice changes often are local initiatives that are not publicized, but broader clinical changes are also occurring based on accumulating research evidence about beneficial practice innovations.

**Example of Evidence-Based Practice:**

"Kangaroo care" (the holding of diaper-clad infants skin-to-skin by parents) is now routinely practiced in neonatal intensive care units (NICUs), but before 2000, only a minority of NICUs offered kangaroo care options. Expanded adoption of this practice reflects mounting evidence that early skin-to-skin contact has benefits without negative side effects (e.g., Johnston et al., 2017; Moore et al., 2016). Some of that evidence came from rigorous studies conducted by nurse researchers (e.g., Bastani et al., 2017; Billner-Garcia et al., 2018; Cho et al., 2016).

## The Consumer–Producer Continuum in Nursing Research

Most nurses are likely to engage in research activities along a continuum of participation. At one end are *consumers of nursing research*, who read research reports or research summaries to keep up-to-date on findings that might affect their practice. EBP depends on well-informed research consumers.

At the other end of the continuum are *producers of nursing research*: nurses who conduct research. At one time, most nurse researchers were academics who taught in nursing schools, but research is increasingly being conducted by clinical nurses who seek solutions to recurring problems in patient care.

Between these end points on the continuum lie a variety of research activities that are undertaken by nurses. Even if you never personally carry out a study, you may (1)

contribute to an idea for a clinical study; (2) gather information for a study; (3) advise clients about participating in research; (4) seek answers to a clinical problem by searching for and appraising research evidence; or (5) discuss the implications of a study in a **journal club** in your practice setting, which involves meetings (in groups or online) to discuss research articles. Understanding research can improve the depth and breadth of every nurse's professional practice.

TIP The Cochrane Collaboration, an important organization for EBP, offers an online journal club resource with podcasts, slides, and discussion questions (http://www.cochranejournalclub.com). Journal clubs can help to create an environment of lifelong learning and can foster a commitment to EBP (Gardner et al., 2016). Links to some articles about journal clubs are provided in the Toolkit in the accompanying *Resource Manual*.

## Nursing Research in Historical Perspective

Table 1.1 summarizes some of the key events in the historical evolution of nursing research. An expanded summary of the history of nursing research appears in the Supplement to this chapter on thePoint.

**TABLE 1.1**
**Historical Landmarks in Nursing Research**

| Year | Event |
|---|---|
| 1859 | Nightingale's *Notes on Nursing* is published. |
| 1900 | *American Journal of Nursing* begins publication. |
| 1923 | Columbia University establishes first doctoral program for nurses.<br>Goldmark Report with recommendations for nursing education is published. |
| 1936 | Sigma Theta Tau awards first nursing research grant in the United States. |
| 1948 | Brown publishes report on inadequacies of nursing education. |
| 1952 | The journal *Nursing Research* begins publication. |
| 1955 | Inception of the American Nurses' Foundation to sponsor nursing research. |
| 1957 | Establishment of nursing research center at Walter Reed Army Institute of Research. |
| 1963 | *International Journal of Nursing Studies* begins publication. |
| 1965 | American Nurses' Association (ANA) sponsors nursing research conferences. |
| 1969 | *Canadian Journal of Nursing Research* begins publication. |
| 1972 | ANA establishes a Commission on Research and Council of Nurse Researchers. |
| 1976 | Stetler and Marram publish guidelines on assessing research for use in practice.<br>*Journal of Advanced Nursing* begins publication. |
| 1982 | Conduct and Utilization of Research in Nursing (CURN) project publishes report. |
| 1983 | *Annual Review of Nursing* Research begins publication. |
| 1985 | ANA Cabinet on Nursing Research establishes research priorities. |
| 1986 | National Center for Nursing Research (NCNR) is established within U.S. National Institutes of Health. |
| 1988 | Conference on Research Priorities is convened by NCNR. |
| 1989 | The U.S. Agency for Health Care Policy and Research (AHCPR) is established. |
| 1993 | NCNR becomes a full institute, the National Institute of Nursing Research (NINR). |
| | The Cochrane Collaboration is established. |
| | Magnet Recognition Program makes first awards. |

| Year | Event |
|---|---|
| 1995 | Joanna Briggs Institute, an EBP collaborative, is established in Australia. |
| 1997 | Canadian Health Services Research Foundation is established with federal funding. |
| 1998 | The European Academy of Nursing Science (EANS) is launched. |
| 1999 | AHCPR is renamed Agency for Healthcare Research and Quality (AHRQ). |
| 2000 | NINR's annual funding exceeds $100 million.<br>The Canadian Institute of Health Research is launched.<br>Council for the Advancement of Nursing Science (CANS) is established. |
| 2005 | The Quality & Safety Education for Nurses (QSEN) initiative is inaugurated. |
| 2006 | NINR issues strategic plan for 2006-2010. |
| 2010 | The Institute of Medicine publishes a report, *The Future of Nursing,* that includes research priorities and recommendations for lifelong learning. |
| 2011 | NINR celebrates 25th anniversary and issues a new strategic plan. |
| 2016 | NINR issues *The NINR Strategic Plan: Advancing Science, Improving Lives.* |
| 2019 | NINR budget exceeds $145 million. |

Most people would agree that research in nursing began with Florence Nightingale in the 1850s. Her most well-known research contribution involved an analysis of factors affecting soldier mortality and morbidity during the Crimean War. Based on skillful analyses, she was successful in effecting changes in nursing care—and, more generally, in public health. After Nightingale's work, research was absent from the nursing literature until the early 1900s, but most early studies concerned nurses' education rather than patient care.

In the 1950s, research by nurses began to accelerate. For example, the American Nurses' Foundation, which is devoted to the promotion of nursing research, was founded. The surge in the number of studies conducted in the 1950s created the need for a new journal; *Nursing Research* came into being in 1952. As shown in Table 1.1, dissemination opportunities in professional journals grew steadily thereafter.

In the 1960s, nursing leaders expressed concern about the shortage of research on practice issues. Professional nursing organizations, such as the Western Interstate Council for Higher Education in Nursing, established research priorities, and practice-oriented research on various clinical topics began to emerge in the literature.

During the 1970s, improvements in client care became a more visible research priority, and guidance on assessing research for application in practice settings emerged. Also, nursing research expanded internationally. For example, the Workgroup of European Nurse Researchers was established in 1978 to develop greater communication and opportunities for partnerships among 25 European National Nurses Associations.

In the United States, the National Center for Nursing Research (NCNR) at the National Institutes of Health (NIH) was established in 1986. Several forces outside of nursing also helped to shape the nursing research landscape in the 1980s. A group from the McMaster Medical School in Canada designed a clinical learning strategy that was called evidence-based medicine (EBM). EBM, which promulgated the view that research findings were superior to the opinions of authorities as a basis for clinical decisions, constituted a profound shift for medical education and practice, and has had a major effect on all healthcare professions.

Nursing research was strengthened and given more visibility when NCNR was promoted to full institute status within the NIH. In 1993, the **National Institute of Nursing Research (NINR)** was established, helping to put nursing research more into the mainstream of health research. Funding opportunities for nursing research expanded in other countries as well.

## Current and Future Directions for Nursing Research

Nursing research continues to develop at a rapid pace and will undoubtedly flourish throughout the 21st century. Broadly speaking, the priority for future nursing research will be the promotion of excellence in nursing science. Toward this end, nurse researchers and practicing nurses will be sharpening their research skills and using those skills to address emerging issues of importance to the profession and its clientele. Among the trends we foresee for the early 21st century are the following:

- *Continued focus on EBP.* Encouragement for nurses to engage in evidence-based patient care and lifelong learning is sure to continue. In turn, improvements will be needed both in the quality of studies and in nurses' skills in locating, understanding, critically appraising, and using relevant study results. Relatedly, there is an emerging interest in **translational research**, which involves research on how findings from studies can best be translated into practice.
- *Accelerating emphasis on research synthesis.* Research syntheses that integrate research evidence across studies are the cornerstone of EBP. Of particular importance is a type of synthesis called **systematic reviews**, which rigorously integrate research information on a research question. Clinical practice guidelines typically rely on such systematic reviews. We offer some guidance on how to create, as well as how to appraise, research syntheses in this book.
- *Expanded local research and quality improvement efforts in healthcare settings.* Projects designed to solve local problems are increasing. This trend will be reinforced as more hospitals apply for (and are recertified for) Magnet status in the United States and in other countries. Mechanisms need to be developed to ensure that evidence from these projects becomes available to others facing similar problems.
- *Strengthening of* **interprofessional collaboration**. Collaboration of nurses with researchers in related fields has expanded in the 21st century as researchers address fundamental healthcare problems. In turn, such collaborative efforts could lead to nurse researchers playing a more prominent role in national and international healthcare policies. One major recommendation in the Institute of Medicine's influential 2010 report *The Future of Nursing* was that nurses should be full partners with physicians and other healthcare professionals in redesigning health care.
- *Increased emphasis on patient-centeredness.* **Patient centeredness** has become a central concern in health care, as well as in research. In the United States, the Patient-Centered Outcomes Research Institute (PCORI) funds research focused on assisting patients and their caregivers to make well-informed healthcare decisions. Efforts are increasing to ensure that research is relevant to patients and that patients play a role in setting research priorities. **Comparative effectiveness research**, which involves direct comparisons of alternative treatments, has emerged as an important tool for patient-centered research.
- *Relatedly, greater interest in the* **applicability** *of research.* More attention is being paid to figuring out how study results can be applied to individual patients or groups of patients. A limitation of the current EBP model is that standard strategies offer evidence on *average effects* of healthcare interventions under ideal circumstances. Ideas are emerging about how best to enhance the applicability of research in real-world settings.
- *Growing interest in defining and ascertaining* **clinical significance** . Research findings increasingly must meet the test of being clinically significant, and patients have taken center-stage in efforts to define clinical significance.
- *Growing interest in* **precision health care** *and* **symptom science**. NINR has embraced research in these areas (Cashion & Grady, 2015). Symptom science involves research to study the underlying behavioral and molecular mechanisms of symptoms, irrespective of the health disorder. The Precision Healthcare Initiative is helping to advance nursing *omic* research (e.g., genomic, microbiomic).

What are nurse researchers likely to be studying in the future? Although there is rich diversity in research interests—as we illustrate throughout this book in our research

examples—research priorities have been articulated by several nursing organizations, including NINR, Sigma Theta Tau International, and other nursing organizations throughout the world. For example, the primary areas of interest articulated in the 2016 NINR strategic plan were Symptom Science: Promoting Personalized Health Strategies; Wellness: Promoting Health and Preventing Disease; Self-Management: Improving Quality of Life for Individuals with Chronic Illness; and End-of-Life and Palliative Care: The Science of Compassion. Two cross-cutting areas of emphasis were promoting innovation and developing innovative strategies for research careers (NINR, 2016). And in 2017, the Science Committee of the Council for the Advancement of Nursing Science (CANS) in the United States identified four priorities: precision science, big data and data analytics, determinants of health, and global health (Eckardt, 2017).

# Sources of Evidence for Nursing Practice

Nurses make clinical decisions based on knowledge from many sources, including coursework, textbooks, and their own clinical experience. Because evidence is constantly evolving, learning about best practice nursing will persist throughout your career.

Some of what you have learned is based on systematic research, but some is not. What *are* the sources of evidence for nursing practice? Until recently, knowledge primarily was handed down from one generation to the next based on experience, trial and error, tradition, and expert opinion. A brief discussion of some alternative sources of evidence shows how research-based information is different.

## Tradition and Authority

Decisions are sometimes based on custom or tradition. Certain "truths" are accepted as given, and such "knowledge" is so much a part of a common heritage that few seek validation. Some nursing interventions are based on custom and "unit culture" rather than on sound evidence. Indeed, one analysis suggested that some "sacred cows" (ineffective traditional habits) persisted even in a healthcare center recognized as a leader in EBP (Hanrahan et al., 2015).

Another common source of information is an authority, a person with specialized expertise. Reliance on authorities (such as faculty or textbook authors) is unavoidable but imperfect: authorities are not infallible, particularly if their expertise is based primarily on personal experience or out-of-date materials.

## Clinical Experience and Trial and Error

Clinical experience is a functional source of knowledge and plays an important role in EBP. Yet personal clinical experience has some limitations as a knowledge source because each nurse's experience is too narrow to be generally useful. Moreover, the same objective event is often perceived differently by different nurses.

Trial and error involves trying alternatives successively until a solution to a problem is found. Trial and error may offer a practical means of securing knowledge, but the method tends to be haphazard and solutions may be idiosyncratic.

## Logical Reasoning

Solutions to some problems are developed by logical reasoning, which combines experience, the intellect, and formal systems of thought. **Inductive reasoning** involves developing generalizations from specific observations. For example, a nurse may observe the anxious behavior of (specific) hospitalized children and conclude that (in general) children's separation from their parents is stressful. **Deductive reasoning** involves developing specific predictions from general principles. For example, if we assume that separation anxiety occurs in hospitalized children (in general), then we

might predict that (specific) children in a hospital whose parents do not room-in will manifest symptoms of stress. Both types of reasoning are useful for understanding phenomena, and both play a role in research. Logical reasoning by itself, however, is limited because the validity of reasoning depends on the accuracy of the initial premises.

## Assembled Information

In making clinical decisions, healthcare professionals rely on information that has been assembled for a various purposes. For example, local, national, and international *benchmarking data* provide information on such issues as infection rates or the rates of various procedures (e.g., cesarean births) and can facilitate evaluations of clinical practices. *Cost data*—information on the costs associated with certain procedures, policies, or practices—are sometimes used as a factor in clinical decision-making. *Quality improvement and risk data*, such as medication error reports, can be used to assess the need for practice changes. Such sources are useful, but they do not provide a mechanism for making clinical decisions or guiding improvements.

## Disciplined Research

Research conducted in a disciplined framework is the best method of acquiring knowledge. Nursing research combines logical reasoning with other features to create evidence that, although fallible, tends to be especially reliable. Carefully synthesized findings from rigorous research are especially valuable. The current emphasis on EBP requires nurses to base their clinical practice to the greatest extent possible on research-based findings rather than on tradition, authority, intuition, or personal experience—although nursing will always remain a rich blend of art and science.

# Paradigms and Methods for Nursing Research

A **paradigm** is a world view, a general perspective on the complexities of the world. Paradigms for human inquiry are often characterized in terms of the ways in which they respond to basic philosophical questions, such as, "What is the nature of reality?" and "What is the relationship between the inquirer and those being studied?"

Disciplined inquiry in nursing has been conducted mainly within two broad paradigms, *positivism* and *constructivism*. This section describes these two paradigms and outlines the research methods associated with them. In later chapters, we describe the *transformative paradigm* that underpins *critical theory research* (Chapter 22) and a *pragmatism paradigm* that underlies *mixed methods research* (Chapter 27).

## The Positivist Paradigm

The paradigm that dominated healthcare research for decades is called **positivism** (or *logical positivism)*. Positivism is rooted in 19th century thought, guided by such philosophers as Newton and Locke. Positivism reflects a broader cultural phenomenon (*modernism*) that emphasizes the rational and the scientific.

A fundamental assumption of positivists is that there is a reality *out there* that can be studied and known. (An **assumption** is a basic principle that is believed to be true without proof.) Adherents of positivism assume that nature is basically ordered and regular and that reality exists independent of human observation (Table 1.2). The related assumption of **determinism** refers to the positivists' belief that phenomena are not haphazard but rather have antecedent causes. If a person has a cerebrovascular accident, a positivist assumes that there must be a reason that can be potentially identified. Within this paradigm, much research activity is aimed at understanding the underlying causes of phenomena.

**TABLE 1.2**

**Major Assumptions of the Positivist and Constructivist Paradigms**

| Philosophical Question | Positivist Paradigm Assumption | Constructivist Paradigm Assumption |
|---|---|---|
| What is the nature of reality? | Reality exists; there is a real world driven by real natural causes | Reality is multiple and subjective, mentally constructed by individuals |
| In what way is the researcher related to those being researched? | The researcher is independent from those being researched; findings are not influenced by the researcher | The researcher interacts with those being researched; findings are the creation of the interactive process |
| What is the role of values in the inquiry? | Values and biases are to be held in check; objectivity is sought | Subjectivity and values are inevitable and desirable |
| What are the best methods for obtaining evidence? | Deductive processes → hypothesis testing | Inductive processes → hypothesis generation |
| | Emphasis on discrete, specific concepts | Emphasis on entirety of a phenomenon, holistic |
| | Focus on the objective and quantifiable | Focus on the subjective and nonquantifiable |
| | Outsider knowledge—researcher is external, separate | Insider knowledge—researcher is part of the process |
| | Fixed, prespecified design | Flexible, emergent design |
| | Controls over context | Context-bound |
| | Large, representative samples | Small, information-rich samples |
| | Measured (quantitative) information | Narrative (unstructured) information |
| | Statistical analysis | Qualitative analysis |
| | Seeks generalizations | Seeks in-depth understanding |

Positivists value objectivity and attempt to hold personal beliefs and biases in check. The positivists' scientific approach involves using orderly procedures with tight controls of the research situation to test hunches about the phenomena being studied.
Strict positivist thinking has been challenged, and few researchers adhere to the tenets of pure positivism. In the **postpositivist paradigm**, there is a belief in reality and a desire to understand it, but postpositivists recognize the impossibility of total objectivity. They do, however, see objectivity as a goal and strive to be as neutral as possible. Postpositivists also recognize the obstacles to knowing reality with certainty and therefore seek *probabilistic* evidence—i.e., learning what the true state of a phenomenon *probably* is. This modified positivist position remains a dominant force in healthcare research. For the sake of simplicity, we refer to it as positivism.

## The Constructivist Paradigm

The **constructivist paradigm** (also called the *naturalistic paradigm*) began as a countermovement to positivism with writers such as Weber and Kant. Just as positivism reflects the cultural phenomenon of modernism that burgeoned after the industrial revolution, naturalism is an outgrowth of the cultural transformation called *postmodernism*. Postmodern thinking emphasizes the value of *deconstruction*, taking apart old ideas and structures, and *reconstruction*, putting ideas and structures together in new ways. The constructivist paradigm represents a major alternative system for conducting disciplined research in nursing. Table 1.2 compares the major assumptions of the positivist and constructivist paradigms.
For the naturalistic inquirer, reality is not a fixed entity but rather is a construction of the people participating in the research; reality exists within a context, and many constructions are possible. Naturalists thus take the position of relativism: if there are multiple interpretations of reality that exist in people's minds, then there is no process by which the ultimate truth or falsity of the constructions can be determined.
The constructivist paradigm assumes that knowledge is maximized when the distance between the researcher and those under study is minimized. The voices and interpretations of study participants are crucial to understanding the phenomenon of interest. Findings in a constructivist inquiry are the product of the interaction between the inquirer and the participants.

## Paradigms and Methods: Quantitative and Qualitative Research

**Research methods** are the techniques researchers use to structure a study and to gather and analyze information relevant to the research question. The two alternative paradigms correspond to different approaches to developing evidence. A key methodologic distinction is between **quantitative research**, which is most closely allied with positivism, and **qualitative research**, which is associated with constructivist inquiry—although positivists sometimes undertake qualitative studies and constructivist researchers sometimes collect quantitative information. This section provides an overview of the methods associated with the two paradigms.

## The Scientific Method and Quantitative Research

The traditional **scientific method** refers to a set of orderly, disciplined procedures used to acquire information. Quantitative researchers use deductive reasoning to generate predictions that are tested in the real world. They typically move in a systematic fashion from the definition of a problem and the selection of concepts on which to focus, to the solution of the problem. By **systematic**, we mean that the investigator progresses logically through a series of steps, according to a prespecified plan of action.

Quantitative researchers use various control strategies. **Control** involves imposing conditions on the research situation so that biases are minimized and validity is maximized. Control mechanisms are discussed at length later in this book.

Quantitative researchers gather **empirical evidence**—evidence that is rooted in objective reality and gathered through the senses (e.g., through sight or hearing). Observations of the presence or absence of skin inflammation, patients' agitation, or infant birth weight are all examples of empirical observations. Reliance on empirical evidence means that findings are grounded in reality rather than in researchers' personal beliefs.

Evidence for a study in the positivist paradigm is gathered according to an established plan, using structured methods to collect needed information. Usually the information gathered is **quantitative**—that is, numeric information that is obtained through a formal *measurement* and is analyzed statistically.

A traditional scientific study strives to go beyond the specifics of a research situation. For example, quantitative researchers are typically not as focused on understanding why a *particular* person has a stroke as in understanding what factors influence its occurrence in people generally. The degree to which research findings can be generalized to individuals other than those who participated in a study is called **generalizability**.

The scientific method has enjoyed considerable stature as a method of inquiry and has been used productively by nurse researchers studying a wide range of nursing problems. This approach cannot, however, solve all nursing problems. One important limitation—common to both quantitative and qualitative research—is that research cannot be used to answer moral or ethical questions. Many intriguing questions about humans fall into this area—questions such as whether euthanasia should be practiced or abortion should be legal.

The traditional research approach also must address measurement challenges. To study a phenomenon, quantitative researchers try to measure it using numeric values that express quantity. For example, if the phenomenon of interest is patient stress, researchers would want to assess if patients' stress is high or low. Physiologic phenomena like blood pressure can be measured with great accuracy and precision, but measuring psychological phenomena (e.g., stress, resilience, depression) is challenging.

Another issue is that nursing research focuses on humans, who are inherently complex and diverse. Quantitative studies typically concentrate on relatively few concepts (e.g., weight gain, fatigue, pain). Complexities tend to be controlled and, if possible, eliminated, rather than studied directly, and this narrowness of focus can

sometimes obscure insights. Quantitative research within the positivist paradigm has been accused of an inflexibility of vision that fails to capture the full breadth of human experience.

### Constructivist Methods and Qualitative Research

Researchers in constructivist traditions emphasize the inherent complexity of humans, their ability to shape and create their own experiences, and the idea that truth is a composite of realities. Constructivist studies are thus focused on understanding the human experience as it is lived, usually through the collection and analysis of **qualitative** materials that are narrative and subjective.

Researchers who criticize the scientific method believe that it is overly *reductionist*—that is, it reduces human experience to the few concepts under investigation, and those concepts are defined in advance by the researcher rather than emerging from the perspective of those under study. Constructivist researchers tend to emphasize the dynamic and holistic aspects of human life and attempt to capture those aspects in their entirety.

Flexible, evolving procedures are used to capitalize on findings that emerge during the study. Constructivist inquiry often takes place in the **field** (i.e., in naturalistic settings), sometimes over an extended time period. In constructivist research, the collection of information and its analysis typically progress concurrently; as researchers sift through information, insights are gained, new questions emerge, and further evidence is sought to amplify or confirm the insights. Through an inductive process, researchers integrate information to develop a theory or description that helps illuminate the phenomenon of interest.

Constructivist studies yield rich, in-depth information that can elucidate varied dimensions of a complicated phenomenon. Findings from qualitative research are typically grounded in the real-life experiences of people with first-hard knowledge of a phenomenon. Nevertheless, the approach has several limitations. Human beings are used directly as the instrument through which information is gathered, and humans are extremely intelligent and sensitive—but fallible—tools. The subjectivity that enriches the analytic insights of skillful researchers can yield trivial and obvious "findings" among less competent ones.

Another potential limitation involves the subjectivity of constructivist inquiry, which sometimes raises concerns about the idiosyncratic nature of the conclusions. Would two constructivist researchers studying the same phenomenon in similar settings arrive at similar conclusions? The situation is further complicated by the fact that most constructivist studies involve a small group of participants. Thus, the generalizability of findings from constructivist inquiries is sometimes a potential concern.

## Multiple Paradigms and Nursing Research

Paradigms should be viewed as lenses that help to sharpen our focus on phenomena, not as blinders that limit intellectual curiosity. Nursing knowledge would be thin if there were not a rich array of methods available within the two paradigms—methods

that are often complementary in their strengths and limitations. We believe that intellectual pluralism is advantageous.

We have emphasized differences between the two paradigms and associated methods so that distinctions would be easy to understand. Subsequent chapters of this book elaborate further on differences in terminology, methods, and research products. It is equally important to note, however, that the two main paradigms have many features in common, only some of which are mentioned here:

- *Ultimate goals.* The aim of disciplined research, regardless of paradigm, is to answer questions and solve problems. Both quantitative and qualitative researchers seek to capture the truth about an aspect of the world in which they are interested, and both groups can make meaningful contributions to evidence for nursing practice.
- *External evidence.* Although the word *empiricism* has come to be associated with the classic scientific method, researchers in both traditions gather and analyze evidence empirically, that is, through their senses.
- *Reliance on human cooperation.* Human cooperation is essential in both qualitative and quantitative research. To understand people's circumstances and experiences, researchers must persuade them to participate in the investigation *and* to speak and act candidly.
- *Ethical constraints.* Research with human beings is guided by ethical principles that sometimes are at odds with research goals. Ethical dilemmas sometimes confront researchers, regardless of paradigm or method.
- *Fallibility of disciplined research.* Virtually all studies have limitations. Every research question can be addressed in many ways, and inevitably there are tradeoffs. The fallibility of any single study makes it important to understand and critically appraise researchers' methodologic decisions when evaluating evidence quality.

Thus, despite philosophic and methodologic differences, researchers using traditional scientific or constructivist methods face many similar challenges. The selection of an appropriate method depends on researchers' personal philosophy and on the research question. If a researcher asks, "What are the effects of cryotherapy on nausea and oral mucositis in patients undergoing chemotherapy?" the researcher needs to study effects by carefully measuring patient outcomes. On the other hand, if a researcher asks, "What is the process by which parents learn to cope with the death of a child?" the researcher would be hard pressed to quantify such a process. Personal world views of researchers help to shape their questions.

In reading about the alternative paradigms for nursing research, you likely were more attracted to one of the two paradigms. It is important, however, to learn about both approaches to disciplined inquiry and to recognize their respective strengths and limitations. In this textbook, we describe methods associated with both qualitative and quantitative research to assist you in becoming *methodologically bilingual*. This is especially important because large numbers of nurse researchers are now undertaking **mixed methods research** that involves the collection and analysis of both qualitative and quantitative data (Chapters 27-29).

# The Purposes of Nursing Research

The general purpose of nursing research is to answer questions and solve problems of relevance to nursing. Specific purposes can be classified in various ways. For example, a distinction sometimes is made between basic and applied research. **Basic research** is undertaken to discover general principles of human behavior and biophysiologic processes. Some basic research (*bench research*) is performed in laboratory settings and focuses on the molecular and cellular mechanisms that underlie disease. **Applied research** is aimed at examining how basic principles can be used to solve practice problems. Nurse researchers undertake both types of research.

Another way to classify research purposes concerns the extent to which studies provide explanatory information. Specific study goals can range along a descriptive/explanatory continuum, but a fundamental distinction is between studies whose primary intent is to *describe* phenomena and those that are **cause-probing** — that is, designed to illuminate the underlying causes of phenomena. The descriptive/explanatory continuum includes studies whose purposes are identification, description, exploration, prediction/control, and explanation of health--related phenomena. For each purpose, various types of question are addressed—some more amenable to qualitative than to quantitative inquiry, and vice versa. Table 1.3 gives examples of questions asked for these purposes.

**TABLE 1.3**

**Research Purposes and Questions on the Description/Explanation Continuum**

| Purpose | Types of Questions: Quantitative Research | Types of Questions: Qualitative Research |
|---|---|---|
| Identification | | What is this phenomenon?<br>What is its name? |
| Description | How prevalent is the phenomenon?<br>How often does the phenomenon occur?<br>How intense is the phenomenon? | What are the dimensions or characteristics of the phenomenon?<br>What is important about the phenomenon? |
| Exploration | What factors are related to the phenomenon?<br>What are the antecedents of the phenomenon? | What is the full nature of the phenomenon? What is really going on here?<br>How is the phenomenon experienced? What is the process by which the phenomenon evolves? |
| Explanation | What is the underlying cause of the phenomenon?<br>Does the theory explain the phenomenon? | How does the phenomenon work?<br>What does the phenomenon mean?<br>How did the phenomenon occur? |
| Prediction | If phenomenon X occurs, will phenomenon Y follow?<br>What will happen if we modify a phenomenon or introduce an intervention? | – |
| Control | Can the occurrence of the phenomenon be prevented or controlled? | – |

In both nursing and medicine, several books have been written to facilitate evidence--based practice, and these books categorize studies in terms of the types of information needed by clinicians (Guyatt et al., 2015; Melnyk & Fineout-Overholt, 2015). These writers focus on several types of clinical purposes: Therapy/intervention; Diagnosis/assessment; Prognosis; Etiology (causation)/prevention of harm; Description; and Meaning/process.

## Therapy/Intervention

**Therapy/intervention questions** are addressed by healthcare researchers who want to learn about the effects of specific actions, products, or processes. Typically, researchers addressing this type of question are evaluating whether a new treatment or a practice change has beneficial effects.

The name "Therapy" for this category originates from promoters of EBP in medicine who focused on studies of the effects of "therapeutic" medical interventions, such as new drugs or surgical procedures. However, this category should be thought of more broadly to include research on the effects of alternative ways of doing things, usually with the intent of testing strategies for making improvements. *Therapy questions are foundational for evidence-based decision-making*. Evidence for changes to nursing practice, nursing education, and nursing administration comes from studies that have specifically tested the effects of intervening in a particular way. Table 1.4 provides some examples of studies in which nurse researchers addressed diverse Therapy/intervention questions. If such questions are answered in a rigorous fashion, the evidence might suggest a practice change or the implementation of an institutional innovation.

**TABLE 1.4**

**Examples of Therapy/Intervention Questions**

| Therapy/Intervention Question | Area of Focus |
|---|---|
| Does an education intervention improve teenagers' knowledge and behaviors relating to contraception? (Pivatti et al., 2019) | Nursing practice |
| Do muscle relaxation or nature sounds reduce fatigue in patients with heart failure? (Seifi et al., 2018) | Nursing practice |
| Does a nurse-led phone follow-up education program reduce cardiovascular risk among patients with cardiovascular disease? (Zhou et al., 2018) | Nursing practice |
| Does a simulation-based palliative care communication skill workshop improve self-perception of skills in expressing empathy and discussing spiritual issues among healthcare workers and students? (Brown et al., 2018) | Interprofessional education |
| Does simulation improve the ability of first year nursing students to learn vital signs? (Eyikara & Baykara, 2018) | Nursing education |
| Does a bundle of interventions to support nurses' engagement in evidence-based practice (EBP) increase their knowledge, attitudes, and use of library resources? (Carter et al., 2018) | Nursing administration |

Studies in this category range from evaluations of highly specific treatments (e.g., comparing two types of cooling blankets for febrile patients) to assessments of complex multisession interventions designed to change behaviors (e.g., nurse-led health promotion programs). **Intervention research** is essential for evidence-based practice, and nurses are increasingly engaging in this type of research. Research addressing Therapy questions is inherently cause-probing: the researcher wants to know if a certain intervention will *cause* improved outcomes.

## Diagnosis/Assessment

A burgeoning number of nursing studies concern the rigorous development and evaluation of formal instruments to screen, diagnose, and assess patients and to measure important clinical outcomes—that is, they address **Diagnosis/assessment questions**. High-quality instruments with documented accuracy are essential for both clinical practice and research. Typically, the question being addressed is: Does this new instrument yield reliable and valid information about an outcome, situation, or

condition of importance to nursing? Studies addressing Diagnosis questions are not cause-probing.

### Example of a Study Aimed at Diagnosis/Assessment

Kang and colleagues (2018) developed and evaluated the Automated Medical Error Assessment System, which was incorporated into an electronic health record system.

## Prognosis

Researchers who ask **Prognosis questions** strive to understand the outcomes that are associated with a disease or a health problem (i.e., its consequences), to estimate the probability they will occur, and to predict the types of people for whom the outcomes are most likely. Such studies facilitate the development of long-term care plans for patients and can suggest the need for appropriate interventions. For example, Prognosis studies provide valuable information for guiding patients to make lifestyle choices or to be vigilant for key symptoms. Prognosis questions are typically cause--probing; the researcher wants to know if, for example, a certain disease or behavior causes subsequent adverse outcomes.

### Example of a Study Aimed at Prognosis

Galazzi and colleagues (2018) studied the long-term quality of life outcomes of patients with severe respiratory failure who had undergone extracorporeal membrane oxygenation.

## Etiology (Causation)/Prevention of Harm

Nurses encounter patients who face potentially harmful exposures as a result of environmental agents or because of personal behaviors or characteristics. Providing information to patients about such harms and how best to avoid them depends on the availability of accurate evidence about factors that contribute to health risks. For example, there would be no smoking cessation programs if research had not provided strong evidence that smoking cigarettes causes or contributes to a wide range of health problems. Thus, identifying factors that affect or cause illness, mortality, or morbidity is an important purpose of many nursing studies. **Etiology questions** are inherently cause-probing—the purpose is to understand factors that cause health problems.

### Example of a Study Aimed at Identifying and Preventing Harm

Philpott and Corcoran (2018) did a study to identify factors that put men at risk of paternal postnatal depression in Ireland. The risk factors examined included a

prior history of depression, economic circumstances, marital status, and availability of paternity leave.

## Description

**Description questions** are not in a category typically identified in EBP-related classification schemes, but so many nursing studies have a descriptive purpose that we include it here. Examples of phenomena that nurse researchers have described include patients' pain, physical function, confusion, and levels of depression. Quantitative description focuses on the prevalence, size, intensity, and measurable attributes of phenomena. Qualitative researchers, by contrast, describe the dimensions or the evolution of phenomena.

### Example of a Quantitative Study Aimed at Description

Schoenfisch and colleagues (2019) did a study to describe hospital nursing staff's use of lift or transfer devices. They found that only 40% of the nurses used equipment for at least half of lifts/transfers.

### Example of a Qualitative Study Aimed at Description

Dose and Rhudy (2018) undertook a study to describe what was important to patients newly diagnosed with advanced cancer and receiving dignity therapy during cancer treatment.

## Meaning/Process

Designing effective interventions, motivating people to comply with treatments and health promotion activities, and providing sensitive advice to patients are among the many healthcare activities that can benefit from understanding clients' perspectives. Research that provides evidence about what health and illness mean to clients, what barriers to positive health practices they face, and what processes they experience in a transition through a healthcare crisis are important to evidence-based nursing practice. Studies that address **Meaning/process questions** are seldom focused on identifying the underlying causes of phenomena but might offer important clues.

### Example of a Study Aimed at Understanding Meaning/Process

Qin and coresearchers (2019) studied the process by which women experienced a cognitive–behavioral transition after undergoing pregnancy termination for fetal anomaly.

## Study Purposes and Evidence-Based Practice

Studies that address Therapy/intervention questions provide the most direct evidence for EBP. If we want to know, for example, whether wedge-shaped foam cushions are more effective in preventing heel pressure ulcers than standard foam pillows, we would need to look for rigorous studies that have addressed this Therapy question. However, other questions also play a role in improving the quality of nursing care, albeit in different ways.

Table 1.5 presents examples of different types of questions relating to cigarette smoking, using the study purpose categories we just described. The findings from studies relating to only one of these questions is directly *actionable*—the Therapy question. If there is strong evidence that nurse-led smoking cessation programs are effective in reducing smoking among young adults, we might consider initiating such a program in our own community.

**TABLE 1.5**

**Different Categories of Questions Related to Cigarette Smoking**

| Type of Question | Example of a Related Research Question on Cigarette Smoking |
|---|---|
| Therapy/intervention | Does a nurse-led smoking cessation program for young adults reduce smoking? |
| Diagnosis/assessment | Is our Smoking Susceptibility Index a valid and reliable measure of propensity to initiate smoking in teenagers? |
| Prognosis | Is a diagnosis of smoking-related lung cancer associated with increased risk of suicidal ideation? |
| Etiology (causation)/prevention of harm | Does being poor increase the risk that a person will smoke cigarettes? |
| Description | What percentage of high school students smoke 1+ packs of cigarettes/week, and what percentage of smokers have tried to quit? |
| Meaning/process | What is it like for long-term smokers to attempt and fail at quitting? |

If the other questions in Table 1.5 were answered in rigorous studies, the evidence could also play a role in guiding efforts to improve nursing practice—but not as directly. Answers to some of these questions might help to target those most in need of an intervention. For example, based on studies addressing the Diagnosis question, we could launch a prevention effort aimed at teenagers with high scores on the evidence-based Smoking Susceptibility Index, or results from an Etiology study might lead us to offer a smoking-cessation initiative in low-income neighborhoods. Evidence from the Prognosis question might prompt us to develop a strong program of emotional support for patients with lung cancer. We might be motivated to implement an intervention for high school students if we knew that rates of smoking were high (the Description question). And, if we knew that a high percentage of smokers in our community had been unsuccessful in efforts to quit, we might design an intervention with that information in mind. The stories from long-term smokers who failed to quit despite efforts to do so (the Meaning question) could lead us to involve them in the design of an intervention for hardened smokers.

Nurse researchers are making strides in addressing all types of questions about important health problems—but evidence regarding what "works" to address problems comes from studies focused on Therapy questions. Evidence about the scope of a problem, factors affecting the problem, the consequences of the problem, and the meaning of the problem can, however, play a crucial role in efforts to design better interventions, to aim our resources at those in greatest need, and to provide appropriate guidance to clients in everyday practice.

## Assistance for Users of Nursing Research

This book is designed primarily to help you develop skills for conducting research, but in an environment that stresses EBP, it is extremely important to hone your skills in reading, evaluating, and using nursing studies. We provide specific guidance to consumers in most chapters by including guidelines for critically appraising aspects of a study covered in the chapter. The questions in Box 1.1 are designed to assist you in using the information in this chapter in an overall preliminary assessment of a research report.

TIP The *Resource Manual* (RM) for this book offers rich opportunities to practice your critical appraisal skills. The RM's Toolkit on thePoint includes Box 1.1 as a Word document, which will allow you to adapt these questions, if desired, and to input answers to them directly in a Word document without having to retype the questions.

## Research Examples

Each chapter of this book presents brief descriptions of studies conducted by nurse researchers, focusing on aspects emphasized in the chapter. Read the full journal articles to learn more about the methods and results of these studies.

### Research Example of a Quantitative Study

**Study:** Promoting heart health among rural African Americans (Abbott et al., 2018)
**Study purpose:** The purpose of the study, which addressed a Therapy question, was to evaluate a culturally relevant health promotion intervention designed to reduce cardiovascular disease risk in rural African American adults—the "With Every Heartbeat is Life" program.
**Study methods:** Twelve rural churches in two counties of northern Florida were assigned, at random, to either receive the intervention (six churches) or not receive it (the other six churches). Pastors and community members from the churches then recruited people to participate in the study. A total of 115 adults were in the intervention group, and 114 were in the group not receiving the intervention (the control group). Those in the intervention group received the weekly, 90-minute cardiovascular health promotion intervention for 6 weeks, whereas those in the control group did not receive any health promotion education. Everyone who participated in the study completed questionnaires before the start of the study and 6 weeks later at the end of the study. The questionnaires were used to gather information about participants' attitudes, intentions, and self-efficacy to increase the consumption of produce, reduce dietary saturated fat intake, and increase exercise.
**Key findings:** Those in the intervention group had significantly greater improvements than those in the control group on most of the outcomes. For example, participants who received the program had significantly greater intentions to increase produce consumption and reduce dietary fat intake. Self-efficacy for healthy choices also increased significantly more among participants in the intervention group.
**Conclusions:** Abbott and colleagues concluded that nurse-led interventions in community settings can potentially reduce cardiovascular disease risk.

### Research Example of a Qualitative Study

**Study:** "I can never be too comfortable"—Race, gender, and emotion at the hospital bedside (Cottingham et al., 2018)
**Study purpose:** The purpose of this descriptive study was to explore how gender and race intersect to shape the emotion practice of nurses as they experience, manage, and reflect on their emotions in the workplace.
**Study methods:** As part of a larger study of nurses and emotional labor, audio diaries were elicited from a sample of 48 nurses who were diverse with respect to gender (both women and men) and race (white, black, and Asian). Study participants were given a digital voice recorder and were instructed to make a recording after six consecutive shifts. They were asked to reflect on how they felt during and after their

last shift, to describe things that influenced their emotions, and to explain how they responded to their own emotions. Participants were not asked to specifically reflect on experiences related to race. Each recording was transcribed for analysis.

**Key findings:** Analysis of the audio diary data revealed "a disproportionate emotional labor that emerges among women nurses of color in the white institutional space of American health care" (p. 145). Women of color were found to experience an emotional "double shift" in negotiating interactions between patients, coworkers, and supervisors. These women were found to have experiences that added to job-related stress and that resulted in depleted emotional resources that negatively influenced patient care.

**Conclusions:** The researchers expressed the hope that their study would help to make more visible the toll of the intersection of race and gender on emotional labor in nursing.

## Summary Points

- **Nursing research** is systematic inquiry undertaken to develop evidence on problems of importance to nurses. Nurses are adopting an **evidence-based practice (EBP)** that incorporates research findings into their clinical decisions.
- Nurses can participate in a range of research-related activities that span a continuum from being *consumers of research* (those who read and evaluate studies) to being *producers of research* (those who design and undertake studies). Engagement with research often occurs in practice settings through participation in a **journal club**.
- Nursing research began with Florence Nightingale but developed slowly until its rapid acceleration in the 1950s. Since the 1980s, the focus has been on **clinical nursing research**—that is, on problems relating to clinical practice.
- The **National Institute of Nursing Research (NINR)**, established at the U.S. National Institutes of Health in 1993, affirms the stature of nursing research in the United States.
- Contemporary issues in nursing research include the growth of EBP, expansion of local research and quality improvement efforts, research synthesis through **systematic reviews**, **interprofessional** studies, **patient-centeredness** in both clinical care and in research, interest in the **applicability** of research to individual patients or groups, interest in precision health care and symptom science, and efforts to measure the **clinical significance** of research results.
- Disciplined research stands in contrast to other knowledge sources for nursing practice, such as tradition, authority, personal experience, trial and error, and logical reasoning.
- Nursing research is conducted mainly within one of two broad **paradigms**—world views with underlying **assumptions** about reality: the positivist and the constructivist paradigms.
- In the **positivist paradigm**, it is assumed that there is an objective reality and that natural phenomena are orderly. The assumption of **determinism** is the belief that phenomena result from prior causes and are not haphazard.
- In the **constructivist** (*naturalistic*) **paradigm**, it is assumed that reality is not fixed, but it is a construction of human minds; "truth" is a composite of multiple constructions of reality.
- The positivist paradigm is associated with **quantitative research** —the collection and analysis of numeric information. Quantitative research is typically conducted within the traditional **scientific method**, which is a systematic, controlled process. Quantitative researchers gather and analyze **empirical evidence** (evidence collected through the human senses) and strive for **generalizability** of their findings.
- Researchers within the constructivist paradigm emphasize understanding the human experience as it is lived through the collection and analysis of subjective, narrative materials using flexible procedures that evolve in the **field**; this paradigm is associated with **qualitative research**.
- **Basic research** is designed to extend the knowledge base for the sake of knowledge itself. **Applied research** focuses on discovering solutions to immediate problems.
- A fundamental distinction, especially relevant in quantitative research, is between studies whose primary intent is to *describe* phenomena and those that are **cause-probing** —i.e., designed to illuminate underlying causes of phenomena. Specific research purposes on the description/explanation continuum include identification, description, exploration, prediction/control, and explanation.
- Nursing studies can be classified in terms of several EBP-related aims: **Therapy/intervention**; **Diagnosis/assessment**; **Prognosis**; **Etiology** (causation)/prevention of **harm**; **Description**; and **Meaning/process**. Rigorous answers to Therapy questions are foundational for EBP.

## Study Activities

Study activities are available to instructors on thePoint.

### Box 1.1 Questions for a Preliminary Overview of a Research Report

1. How relevant is the research question in this study to the actual practice of nursing? Does the study focus on a topic that is a priority area for nursing research?
2. Was the research quantitative or qualitative?
3. What was the underlying purpose (or purposes) of the study—identification, description, exploration, explanation, or prediction and control? Does the purpose correspond to an EBP focus such as Therapy/intervention, Diagnosis/assessment, Prognosis, Etiology (causation)/prevention of harm, Description, or Meaning/process?
4. Is this study fundamentally cause-probing?
5. What might be some clinical implications of this research? To what type of people and settings is the research most relevant? If the findings are valid, how might *I* use the results of this study in my clinical work?

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*A link to this open-access article is provided in the Toolkit for Chapter 1 in the *Resource Manual*.

**This journal article is available on for this chapter.

# CHAPTER 2

# Evidence-Based Nursing: Translating Research Evidence into Practice

Evidence-based practice (EBP) has been a major force in the health professions for the past few decades. In nursing, many organizations and initiatives have promoted EBP. For example, EBP has been named as one of the six core competencies in the Quality and Safety Education for Nurses (QSEN) initiative (Cronenwett, 2012).

This book will help you to develop skills to generate, and to evaluate, research evidence for nursing practice. Before we delve into the "how-tos" of research, we discuss key aspects of EBP to clarify the key role that research plays in EBP.

# Background of Evidence-Based Nursing Practice

This section provides a context for understanding evidence-based nursing practice and closely related concepts.

## Definition of Evidence-Based Practice

Dozens of definitions of evidence-based practice have been proposed. Here is the one offered by Melnyk and Fineout-Overholt (2019) in their textbook on EBP: "A paradigm and lifelong problem-solving approach to clinical decision making that involves the conscientious use of the best available evidence (including a systematic search for and critical appraisal of the most relevant evidence to answer a clinical question) with one's own clinical expertise and patient values and preferences to improve outcomes for individuals, communities, and systems" (p. 753). This definition, like many others, declares that EBP is a *decision-making* (or *problem-solving) process*. Most definitions also include the idea that EBP is built on a "three--legged stool," each "leg" of which is essential to the process: *best evidence, clinical expertise,* and *patient preferences and values.* Figure 2.1 depicts these concepts.

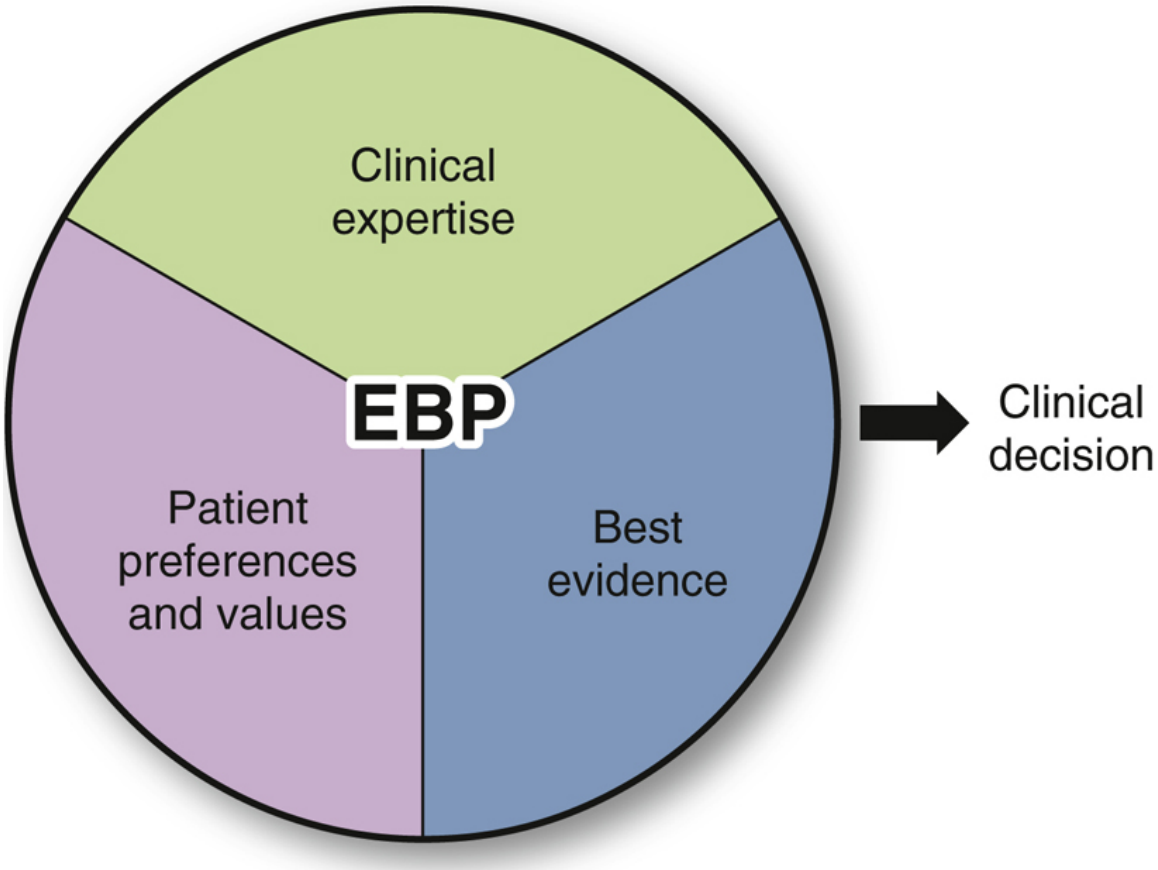


**FIGURE 2.1** Evidence-based practice components.

TIP Scott and McSherry (2009), in their review of evidence-based nursing concepts, identified 13 overlapping but distinct definitions of evidence-based nursing and EBP—and many more definitions have emerged. A few alternative definitions of EBP are presented in a table in the Toolkit of the accompanying *Resource Manual* .

### Best Evidence

A basic feature of EBP as a clinical problem-solving strategy is that it de-emphasizes decisions based on tradition or expert opinions. The emphasis is on identifying and evaluating the best available research evidence as a tool for solving problems.

TIP The consequences of *not* using research evidence can be devastating. For example, from 1956 through the 1980s, Dr. Benjamin Spock—who was considered an expert on the care of infants—published a top-selling book, *Baby and Child Care*. Spock advised putting babies on their stomachs to sleep. In their systematic review, Gilbert and colleagues (2005) wrote, "Advice to put infants to sleep on the front for nearly half a century was contrary to evidence from 1970 that this was likely to be harmful" (p. 874). They estimated that if medical advice had been guided by research evidence, over 60,000 infant deaths might have been prevented.

There continues to be debate about what qualifies as "*best*" evidence. Numerous organizations and authors have created *evidence hierarchies* that rank evidence sources according to the degree to which they provide unbiased evidence to guide clinical decisions. We discuss evidence hierarchies in more detail later in this chapter. Evidence, however, whether "best" or not, is never by itself a sufficient basis for clinical decision-making.

### Patient Values and Preferences

**Patient-centered care** has been defined by the Institute of Medicine (2001) as "providing care that is respectful of and responsive to individual patient preferences, needs and values, and ensuring that patient values *guide* all clinical decisions." Patient-centered care is an important feature of EBP.

"Patient preferences" encompass several concepts, including patient preferences for type of treatment; preferences for being involved in decision-making; patients' social or cultural values; preferences about involving family members in healthcare decisions; patients' priorities regarding quality of life issues; and their spiritual or religious values. Decisions also require understanding patients' circumstances, such as the resources at their disposal. Nurses thus need the skills to elicit and understand patient preferences—and to communicate information about "best evidence" to patients.

### Clinical Expertise and Experiential Evidence

Decision-making in clinical practice ultimately relies on clinicians' expertise, which is an amalgam of academic knowledge gained during training and continuing education, experiences with patient care, and interdisciplinary sharing of new knowledge. David

Sackett, the pioneer of evidence-based medicine, strongly advocated for the importance of clinical expertise in making decisions because even very strong research evidence may not be appropriate or applicable for individual patients.

Newhouse (2007) also stressed the importance of *experiential evidence*, which is internal evidence from local monitoring or evidence-gathering efforts, such as quality improvement projects. Clinical expertise and experiential evidence, combined with patient preferences, guide how "best evidence" can be used to make healthcare decisions.

## Evidence-Based Practice and Related Concepts

During the 1980s, concern about research utilization began to emerge. **Research utilization (RU)** is the use of findings from a study in a practical application. In RU, the emphasis is on translating new knowledge into real-world applications. EBP is a broader concept than RU because it integrates research findings with other factors, as just noted. Also, whereas RU begins with the research itself (How can I put this new knowledge to use in my clinical setting?), the start-point in EBP typically is a clinical question (What does the evidence suggest is the best approach to solving this clinical problem?).

During the 1980s and 1990s, RU projects were undertaken by numerous hospitals and nursing organizations. These projects were institutional attempts to implement changes in nursing practice based on research findings. During the 1990s, however, the call for research utilization was superseded by the push for EBP.

The EBP movement originated in the fields of medicine and epidemiology during the 1990s. British epidemiologist Archie Cochrane criticized healthcare practitioners for failing to incorporate research evidence into their decision-making. His work led to the establishment of the **Cochrane Collaboration**, an international partnership with centers established in 43 countries. The Collaboration prepares and disseminates reviews of research evidence and has a goal of making Cochrane "the home of evidence" relating to healthcare decision-making.

TIP The Cochrane Collaboration publishes a series called *Making a Difference*, which presents stories of how evidence from Cochrane reviews has made impacts on real--world decision-making and patient outcomes. For example, one article in this series focused on the benefits of continuity of midwife care (http://www.cochrane.org/news/cochrane-making-difference-midwifery).

Also during the 1990s, a group from McMaster Medical School in Canada (led by Dr. David Sackett) developed a clinical learning strategy, which they called *evidence-based medicine*. The evidence-based medicine movement has shifted to a broader conception of using best evidence by all healthcare practitioners (not just physicians) in a multidisciplinary team. EBP is considered a major shift for healthcare education and practice. In the EBP environment, a skillful clinician can no longer rely on a repository of memorized information but rather must be a lifelong learner who is adept in accessing, evaluating, and using new evidence.

TIP A debate has emerged concerning whether the term "evidence-based practice" should be replaced with "*evidence-informed practice*" (EIP). Those who advocate for EIP have argued that the word "based" suggests a stance in which patient preferences are not sufficiently considered in clinical decisions (e.g., Glasziou, 2005). Yet, as noted by Melnyk and Newhouse (2014), all current models of EBP incorporate clinicians' expertise and patients' preferences. They argued that "Changing terms now…will only

create confusion at a critical time where progress is being made in accelerating EBP" (p. 348). We concur and use the term EBP throughout this book.

**Knowledge translation (KT)** is a related term that is often associated with efforts to enhance systematic change in clinical practice. The term was coined by the Canadian Institutes of Health Research (CIHR), which defined KT as "the exchange, synthesis, and ethically-sound application of knowledge—within a complex system of interactions among researchers and users—to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened health care system" (CIHR, 2004). The World Health Organization (WHO) (2005) adapted the CIHR's definition and defined KT as "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health." Institutional projects aimed at KT often use methods and models that are similar to organizational EBP projects.

**Translational research** has emerged as a discipline devoted to developing methods to promote knowledge translation and the use of evidence. Translational science involves the study of interventions, implementation processes, and contextual factors that affect the uptake of new evidence in healthcare practice (Titler, 2014). In nursing, the need for translational research was an important impetus for the development of the Doctor of Nursing Practice degree. We discuss translational research in Chapter 11.

EBP can be undertaken by individual nurses working with patients or as a project taken on by a team within a healthcare organization. Organizational EBP projects share certain features with **quality improvement (QI)** efforts. We describe methodologic strategies for quality improvement in Chapter 12.

TIP EBP is widely endorsed in nursing, but its adoption often faces many challenges. Some of the obstacles include nurses' lack of research appraisal skills; their misperceptions about EBP; heavy patient loads and lack of time; nurses' and administrators' resistance to change; and lack of autonomy about practice decisions. Factors that facilitate EBP include strong organizational support; the availability of EBP mentors and resources; collaboration among healthcare professionals; and participation in journal clubs (Gardner et al., 2016; Newhouse & Spring, 2010).

# Resources for Evidence-Based Practice in Nursing

Although EBP can present challenges to nurses, resources to support EBP are increasingly available. We offer some guidance and urge you to explore other ideas with your colleagues, mentors, and health information experts.

## Preprocessed and Preappraised Evidence

Searching for best evidence requires skill, especially because of the accelerating pace of evidence production. Thousands of studies of relevance to nurses are published each month in professional journals. These **primary studies** are not preappraised for quality or clinical utility.

Fortunately, finding evidence useful for practice is often facilitated by the availability of evidence sources that are preprocessed (synthesized) and sometimes preappraised. DiCenso and colleagues (2009) have created a "6S" hierarchy of evidence sources, which is intended as a guide to evidence retrieval. The 6S hierarchy, typically shown as a pyramid, places five types of preprocessed evidence at the top, and individual studies at the bottom. The hierarchy is intended to help you see how to proceed with an evidence search. A clinician seeking evidence would start at the top of the hierarchy and work downward if appropriate evidence was lacking at a given level. Table 2.1 shows the **6S hierarchy** and provides examples at each level. In this section, we describe each evidence source, starting at the bottom of the hierarchy because higher levels build on the ones that precede them.

**TABLE 2.1**

**The "6S" Hierarchy of Evidence Sources** [a]

| Evidence Source | Description/Examples | Examples of Resources |
|---|---|---|
| 1. **Systems** ↓ | ▪ Computerized decision support systems | ▪ In some electronic health records systems |
| 1. **Summaries** ↓ | ▪ Evidence-based clinical practice guidelines<br>▪ Online EBP summary resources | ▪ U.S. National Guidelines Clearinghouse<br>▪ Registered Nurses Association of Ontario Best Practices<br>▪ EBSCO Nursing Reference Center; JBI COnNECT+; UpToDate |
| 1. **Synopses of syntheses** ↓ | ▪ Synopses published in evidence-based abstraction journals or compiled by organizations | ▪ *Evidence-Based Nursing*<br>▪ DARE Database of Reviews of Evidence<br>▪ The Centre for Reviews and Dissemination (CRD) |
| 1. **Syntheses** ↓ | ▪ Systematic reviews<br>▪ Rapid reviews | ▪ Joanna Briggs Institute Database<br>▪ Cochrane Database<br>▪ AHRQ Evidence Reports<br>▪ *BMC Systematic Reviews* |
| 1. **Synopses of studies** ↓ | ▪ Brief summaries of single studies, often with commentary on clinical applicability | ▪ *Evidence-Based Nursing*<br>▪ *ACP Journal Club* |
| 1. **Single original studies** | ▪ Not preprocessed, primary studies published in journals | ▪ PubMed (MEDLINE)<br>▪ CINAHL |

[a]The "6S" hierarchy depicting the efficiency of evidence retrieval for different sources was proposed by DiCenso et al., 2009.
AHRQ, Agency for Healthcare Research and Quality; EBP, evidence-based practice.

TIP The 6S hierarchy does not imply a gradient of evidence in terms of *quality*, but rather in terms of ease in retrieving relevant evidence to address a clinical question. At all levels, the evidence should be assessed for quality and relevance.

### Level 6 in the 6S Hierarchy: Single Studies

Reports describing a single original study are at the base of the 6S hierarchy because single studies are not ready for immediate use in making EBP decisions. At a minimum, individual primary studies need to be critically appraised for their rigor and their relevance to clinical problems. Clinicians searching for best evidence for a clinical query would start with a single study *only* if evidence from higher levels was unavailable or was judged to be flawed. We describe the major source of research reports (journal articles) in Chapter 3 and provide guidance in searching for studies in Chapter 5.

### Level 5 in the 6S Hierarchy: Synopses of Single Studies

A synopsis of a study provides a brief overview of the research, often with sufficient detail to understand the evidence. As noted by DiCenso et al. (2009), a synopsis offers three advantages over the original report: (1) the brevity of the synopsis makes it more readily accessible to practitioners; (2) the study was likely chosen for abstraction because an expert believed the study was important; and (3) the synopsis is sometimes accompanied by commentary about the clinical utility of the evidence (i.e., preappraised). Several evidence--based journals include synopses of original studies, including *Evidence-Based Nursing*, *Evidence-Based Midwifery*, *ACP Journal Club*, and *The Online Journal of Knowledge Synthesis for Nursing*.

### Level 4 in the 6S Hierarchy: Syntheses

Evidence-based practice relies on meticulous integration and synthesis of research evidence on a topic. The importance of such syntheses has given rise to many different types of research review (Grant & Booth, 2009), but the best known and most widely respected type of synthesis is the systematic review. A systematic review is not just a literature review, such as ones we describe in Chapter 5. A systematic review is in itself a methodical, scholarly inquiry that follows many of the same steps as those for primary studies and that yields a summary of current best evidence at the time the review was written. Chapter 30 offers guidance on conducting and critically appraising systematic reviews and describes a few other types of synthesis, such as *scoping reviews*, *realist reviews*, and *umbrella reviews*.

Systematic reviewers sometimes integrate findings from quantitative studies using statistical methods, in what is called a **meta-analysis**. Meta-analysts treat the findings from a study as one piece of information. The findings from multiple studies on the same topic are combined and analyzed statistically. Instead of individual people being the **unit of analysis** (the basic entity of a statistical analysis) as in most primary studies, meta-analysts use findings from individual studies as the unit of analysis. Meta-analysis is an objective method of integrating a body of findings and of observing patterns that might otherwise have gone undetected.

#### Example of a Meta-Analysis

Zhang and colleagues (2018) conducted a meta-analysis of the effectiveness of psychological interventions for patients with osteoarthritis. Their analysis included findings from 12 randomized controlled trials. They found that psychological

interventions could reduce pain and fatigue and improve self-efficacy, but the researchers concluded that better confirmatory evidence is needed.

Systematic reviews of qualitative studies often take the form of metasyntheses, which are rich resources for EBP (Beck, 2009). A **metasynthesis**, which involves integrating qualitative research findings on a topic, is less about reducing information and more about amplifying and interpreting it. For certain qualitative questions, an approach to systematic synthesis called **meta-aggregation** may be appropriate, as we describe in Chapter 30. Strategies have also been developed for **systematic mixed studies review** (also called *mixed research syntheses*), which are efforts to integrate and synthesize both quantitative and qualitative evidence on a topic (Heyvaert et al., 2017; Sandelowski et al., 2013).

### Example of a Mixed Studies Review

Beck and Woynar (2017) conducted a mixed studies review on posttraumatic stress in mothers while their preterm infants are in the neonatal intensive care unit. They synthesized a total of 37 studies: 25 were quantitative and 12 were qualitative.

Many systematic reviews are published in professional research journals that can be accessed using standard literature search procedures; others are available in dedicated databases. A major example is the Cochrane Database of Systematic Reviews, which contains thousands of systematic reviews. Most Cochrane reviews involve meta-analyses, and most of them relate to healthcare interventions—but the Cochrane Collaboration now also includes qualitative evidence syntheses. Cochrane reviews are done with great rigor and have the advantage of being checked and updated regularly.

In recent years, a type of synthesis called a **rapid review** (or *rapid evidence assessment*) has emerged (Khangura et al., 2012). These streamlined reviews are less rigorous than systematic reviews but are typically completed in a period of weeks, rather than months or years. Rapid reviews are described in Chapter 30.

TIP Many resources are available for finding systematic reviews. For example, the Joanna Briggs Institute in Australia (http://joannabriggs.org/) and the Centre for Reviews and Dissemination at the University of York in England (http://www.york.ac.uk/inst/crd/index.htm) produce useful systematic reviews. We provide links to many of these resources (as well as to other EBP-related websites) in the Toolkit of the accompanying *Resource Manual*.

### Level 3 in the 6S Hierarchy: Synopses of Syntheses

Synopses of systematic reviews make rigorously integrated evidence even more handy for practitioners seeking answers to clinical queries. Many abstract journals mentioned in connection with Level 5 synopses of studies (e.g., *Evidence-Based Nursing, Evidence-Based Midwifery*) also include synopses of selected systematic reviews. The Cochrane Collaboration is working toward making their reviews more accessible by creating plain-language

summaries of systematic review findings. A link to such a summary is included in the Toolkit of the accompanying *Resource Manual*  .

### Level 2 in the 6S Hierarchy: Summaries

For some clinical questions, best evidence may be conveniently available in "Summaries," which include online EBP summary resources and clinical practice guidelines.

Dozens of evidence-based point-of-care resources for healthcare professionals have become available. These web-based resources are designed to provide rapidly accessible evidence--based information (and, sometimes, guidance) that is periodically updated. Campbell and colleagues (2015) undertook a quantitative evaluation of the content, breadth, quality, and rigor of 20 online point-of-care summary resources. Their assessment led them to conclude that the top five were UpToDate, Nursing Reference Center, Mosby's Nursing Consult, BMJ Best Practice, and the Joanna Briggs Institute's COnNECT+. Kwag and colleagues (2016), who focused on evidence summaries for physicians, also came to the conclusion that UpToDate and BMJ Best Practice were two of the best and most reliable resources out of the 23 they evaluated.

Evidence-based **clinical practice guidelines**, like systematic reviews, represent efforts to distill a large body of evidence into a manageable form, but guidelines differ from reviews in a number of respects. First, clinical practice guidelines, which are usually based on systematic reviews, give specific recommendations for evidence-based decision-making. Second, guidelines attempt to address all issues relevant to a clinical decision, including balancing benefits and risks. Third, systematic reviews are evidence-driven—that is, they are undertaken when a body of evidence has been produced and needs to be synthesized. Guidelines, by contrast, are "necessity-driven" (Straus et al., 2011, p. 125), meaning that guidelines are developed to guide clinical practice—even when available evidence is limited or of unexceptional quality. Fourth, systematic reviews are done by researchers, but guideline development typically involves the consensus of a group of researchers, experts, and clinicians. For this reason, guidelines based on the same evidence may result in different recommendations. Differences across guidelines sometimes reflect genuine contextual factors —for example, guidelines appropriate in the United States may be unsuitable in India.

It can be challenging to find clinical practice guidelines because there is no single guideline repository. One approach is to search for guidelines in comprehensive guideline databases. For example, in the United States, nursing and other healthcare guidelines are maintained by the National Guideline Clearinghouse (www.guideline.gov), and similar databases are available in other countries. An important nursing guideline resource comes from the Registered Nurses Association of Ontario (RNAO) (www.rnao.org/bestpractices).

In addition to looking for guidelines in national clearinghouses and in the websites of professional organizations, you can search bibliographic databases such as MEDLINE or EMBASE. Search terms such as the following can be used: *practice guideline, clinical practice guideline*, *best practice guideline*, *evidence-based guideline*, and *consensus statement.* Be aware, though, that a standard search for guidelines in bibliographic databases will yield many references—but often a frustrating mixture of citations to not only the actual guidelines, but also to commentaries, anecdotes, implementation studies, and so on.

#### Example of a Nursing Clinical Practice Guideline

In 2017, the Registered Nurses Association of Ontario (RNAO) published the second edition of a best practice guideline called "*Adult asthma care: Promoting control of*

*asthma*." The guideline is intended for use "by nurses and other members of the interprofessional healthcare team to enhance the quality of their practice pertaining to the assessment and management of adult asthma."

There are many topics for which practice guidelines have not yet been developed, but the opposite problem is also true: the dramatic increase in the number of guidelines means that there are sometimes multiple guidelines on the same topic. Worse yet, because of variation in the rigor of guideline development and in interpretations of the evidence, different guidelines sometimes offer different and even conflicting recommendations. Thus, those who wish to adopt clinical practice guidelines to address a clinical problem are urged to critically appraise them to identify ones that are based on the strongest and most up-to-date evidence, have been meticulously developed, are user-friendly, and are appropriate for local use.

Several guideline appraisal instruments are available, but the one that has gained the broadest support is the Appraisal of Guidelines Research and Evaluation (AGREE) Instrument, now in its second version (Brouwers et al., 2010). This tool has been translated into many languages and has been endorsed by the World Health Organization. Further information about the AGREE II instrument is provided in Supplement A to Chapter 2 on thePoint. A shorter and simpler tool for evaluating guideline quality is called the iCAHE Guideline Quality Checklist (Grimmer et al., 2014). A "mini-checklist" (MICHe) for assessing guideline quality for daily practice use has also been proposed (Siebenhofer et al., 2016).

TIP The U.S. Agency for Healthcare Research and Quality (AHRQ) offers "guideline syntheses" that provide systematic comparisons of agreement and disagreement among selected guidelines on the same topic (https://www.guidelines.gov/syntheses/index).

One final issue is that guidelines change more slowly than original research or syntheses. If a high-quality guideline is not recent, it is advisable to determine whether more up-to-date evidence would alter (or strengthen) the guideline's recommendations. It has been recommended that, to avoid obsolescence, guidelines should be reassessed every 3 years.

TIP In addition to clinical guidelines, evidence-based **care bundles** are being developed. The concept of care bundles, developed by the Institute for Healthcare Initiatives (www.ihi.org), refers to a set of interventions to treat or prevent a specific cluster of symptoms. There is evidence that a bundle of strategies produces better outcomes than a single intervention.

### Level 1 in the 6S Hierarchy: Systems

In a perfect world, evidence-based clinical information systems would link rigorous, up-to--date evidence (e.g., from summaries or syntheses) about a problem with information about a *particular* patient from the patient's electronic health record. Clinicians would then, with best evidence in hand, incorporate their own expertise and patient preferences in arriving at a course of action. Although few current systems match this ideal, some computerized decision support systems have been developed for particular problems, including decisional support tools available on laptops and smartphones. We can expect progress on such systems in the years ahead.

### Example of a Clinical Decision Support Systems

Gengo e Silva and colleagues (2018) described an electronic decision support system in a Brazilian hospital that links nursing diagnoses, outcomes, and interventions performed by nurses caring for medical and surgical patients.

## Evidence Hierarchies and Level of Evidence Scales

The EBP movement has led to a proliferation of different **evidence hierarchies,** which are intended to show a ranking of evidence sources in terms of their risk of bias. (These are distinct from the 6S hierarchy discussed in the previous section, which rank evidence sources in terms of the ease and efficiency of finding answers to clinical questions.) Evidence hierarchies are often presented as pyramids, with the highest ranking sources—those presumed to have the least bias for making inferences about the effects of an intervention—at the top.

The hierarchies form **level of evidence (LOE) scales** that rank order types of evidence. Level I evidence usually is considered the best (least biased) type of evidence, and almost all leveling schemes put systematic reviews at the top level. Some LOE scales have only three levels, while others have 10 or more levels.

Figure 2.2 shows our eight-level evidence hierarchy for Therapy/intervention questions. This hierarchy ranks sources of evidence with respect to the *readiness* of an intervention to be put to use in practice. In our scheme, the Level I evidence source is a systematic review of a type of study called a *randomized controlled trial* (RCT), which is the "gold standard" type of study for Therapy questions. An individual RCT is a Level II evidence source in our hierarchy. Going down the "rungs" of the evidence hierarchy for Therapy questions results in evidence with a higher risk of bias in answering questions about "what works." For example, Level III evidence comes from a type of study called quasi-experiments (The terms in Figure 2.2 are explained later in the book). Of course, there continue to be clinical practice questions for which there is relatively little research evidence. In such situations, nursing practice must rely on other sources, including internal evidence from pathophysiologic data, local projects, and expert opinion (Level VIII). As Straus and colleagues (2011) have noted, one benefit of the EBP movement is that a new research agenda can emerge when clinical questions arise for which there is no satisfactory evidence.

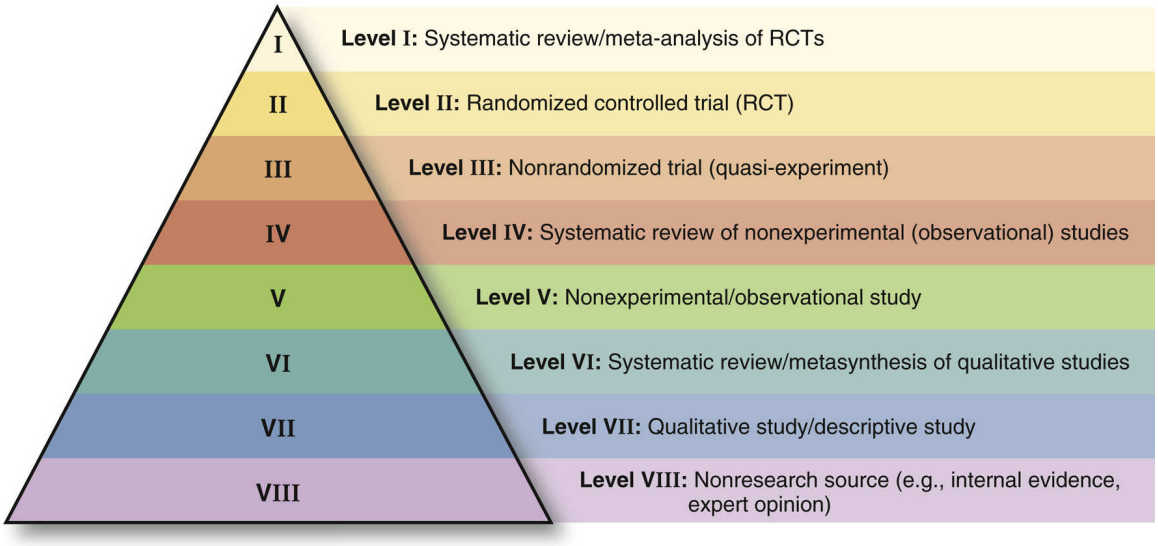


**FIGURE 2.2** Polit–Beck evidence hierarchy/levels of evidence scale for therapy questions.

TIP Several alternative LOE scales that you may want to consider using are presented in the Toolkit in the accompanying *Resource Manual*.

## Hierarchies and Level of Evidence Scales: Some Caveats

Although evidence hierarchies are intended as an EBP resource, considerable confusion exists regarding LOE scales. The fact that there are dozens from which to choose exacerbates this confusion.

One important issue that is seldom acknowledged is that different types of questions require different hierarchies. An evidence hierarchy for Prognosis questions, for example, is different from the hierarchy for Therapy questions. The concept of evidence hierarchies arose in medicine, with the goal of informing decisions about medical interventions—thus early evidence hierarchies explicitly ranked evidence for Therapy/intervention questions. Few of the currently published hierarchies make this point clear, the major exceptions being the LOE hierarchies created by the Oxford Centre for Evidence-Based Medicine (http://www.cebm.net/ocebm-levels-of-evidence/) and the Joanna Briggs Institute (http://joannabriggs.org/jbi-approach.html). We also provide LOE scales in this book for different types of questions (see Chapter 9). As we noted in Chapter 1, evidence for non--Therapy questions can play a role in EBP, but such evidence does not directly support practice changes.

TIP As an example, if we wanted to know whether drinking alcohol during pregnancy puts the women at higher risk of a miscarriage (an Etiology question), we would not find "best evidence" from a systematic review of RCTs. Pregnant women would never

be assigned at random to a "drinking" versus nondrinking condition to assess whether miscarriage rates are higher in the drinking group.

A second issue is that LOE scales have been used for different purposes. Some writers suggest that LOE scales are similar to the 6S hierarchy—the highest level offers the best starting place in a search for evidence. Others, however, use evidence hierarchies to "level" or grade evidence sources, implying that higher levels provide better quality evidence. As pointed out by Levin (2014), an evidence hierarchy "is not meant to provide a quality rating for evidence retrieved in the search for an answer" (p. 6). The Oxford Centre for Evidence--Based Medicine concurs: the levels in their scheme are "NOT intended to provide you with a definitive judgment about the quality of evidence. There will inevitably be cases where 'lower level' evidence…will provide stronger evidence than a 'higher level' study" (Howick et al., 2011, p. 2). A critical appraisal of each study or evidence source, regardless of level, is needed to make a final determination of the *quality of evidence*.

Related to this second issue is the fact that some LOE scales conflate risk of bias levels with terms implying quality. For example, in Melnyk and Fineout-Overholt's (2019) evidence hierarchy (Box 1.3), Level II is defined as *well-designed* RCTs.

Another word of caution: evidence hierarchies are seldom sufficiently detailed to include the full range of possible evidence sources. Users of LOE scales often must "read between the lines" and use some judgment. For example, in our hierarchy, if a systematic review included both RCTs *and* nonrandomized trials, we would still consider this Level I evidence. However, if a systematic review included several nonrandomized trials but no RCTs, we might consider this to be evidence somewhere between Levels I and II. As another example, in the Melnyk and Fineout-Overholt (2019) hierarchy, there is no level specified for RCTs that are not especially "well-designed."

As noted by Levin (2014), those who wish to use an LOE scale must choose one that matches their needs from the many that exist, keeping in mind that "leveling" a study based on the chosen scale is not a substitute for a critical appraisal of the evidence.

TIP Evidence hierarchies and LOE scales are rather firmly entrenched in the EBP literature, but they are not without controversy. Concern was expressed initially by critics who felt that qualitative evidence was being undervalued. For example, for Therapy questions, qualitative studies are typically near the bottom of the hierarchy. Another criticism of these ranking systems is that they focus exclusively on the risk of certain types of bias, but not on biases that might undermine the applicability of evidence in real-world settings (e.g., Goodman, 2014). We discuss this important concern about EBP in Chapter 31.

### Systems for a Body of Evidence

It is important to note that LOE scales are typically used to "level" an individual piece of evidence, such as a single study. Other systems exist, however, for grading an entire body of evidence with regard to the *strength of evidence*. By far the most widely used system is the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system (Guyatt et al., 2008). The GRADE system involves two components—grading the quality of an overall body of evidence and ranking the strength of recommendations based on that evidence. GRADE is used with increasing frequency in systematic reviews and in the development of clinical practice guidelines. We discuss GRADE at some length in Chapter 30.

## Models for Evidence-Based Practice

Models of EBP are important resources for designing and implementing EBP projects in practice settings. Some models focus on the use of research from the perspective of individual clinicians (e.g., the Stetler Model), but most focus on institutional EBP efforts (e.g., the Iowa Model). Another way to categorize existing models is to distinguish process-oriented models (e.g., the Iowa Model) and models that are explicitly mentor models, such as the ARCC-E (Advanced Research and Clinical Practice Through Close Collaboration in Education) model.

The many worthy EBP models are too numerous to list comprehensively, but a few are shown in Box 2.1. Melnyk and Fineout-Overholt (2019) provide a good synthesis of several EBP models, and Schaffer and colleagues (2013) identify features to consider in selecting a model to plan an EBP project. Although each model offers different perspectives on how to translate research findings into practice, several of the steps and procedures are similar across the models. Figure 2.3 shows a diagram of one prominent EBP model, the revised **Iowa Model** of EBP (Buckwalter et al., 2017).

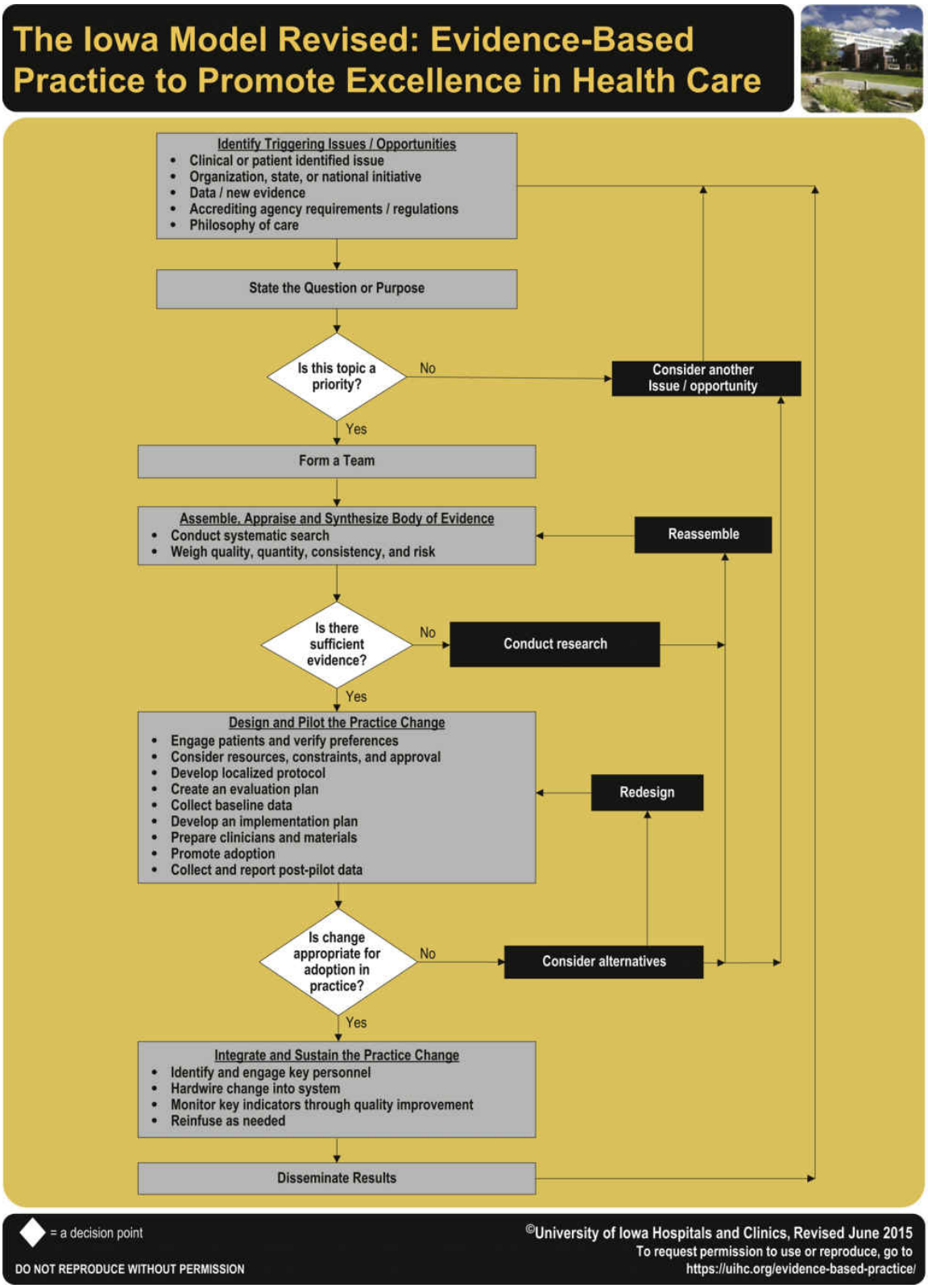


**FIGURE 2.3** Revised Iowa Model of Evidence-Based Practice to Promote Quality Care

Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: revisions and validation. *Worldviews on Evidence-Based Nursing*, 14(3), 175-182. doi:10.1111/wvn.12223. Used/reprinted with