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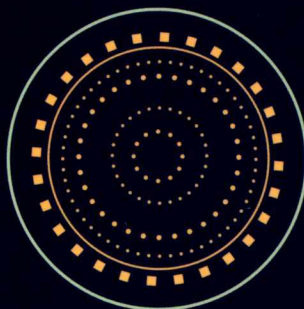
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# NURSING RESEARCH

**Generating and Assessing  
Evidence for Nursing Practice**

**Denise F. Polit  
Cheryl Tatano Beck**

**TENTH EDITION**



 **Wolters Kluwer**

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## Generating and Assessing Evidence for Nursing Practice

*Tenth Edition*

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Tenth edition

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## 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. 392 (or Fisher's exact test) p. 393	McNemar's test  p. 393	$\chi^2$  p. 392	Cochran's $Q$	Phi coefficient (dichotomous) or Cramér's $V$ (not restricted to dichotomous) p. 394
Ordinal (Rank)	Mann-Whitney Test p. 387	Wilcoxon signed ranks test p. 387	Kruskal-Wallis $H$ test p. 391	Friedman's test p. 391	Spearman's rho (or Kendall's tau) pp. 393–394
Interval or Ratio (Continuous)*	Independent group $t$ test pp. 385–386	Paired $t$ test p. 387	ANOVA pp. 388–389	RM-ANOVA pp. 390–391	Pearson's $r$  p. 393
	Multifactor ANOVA for 2+ independent variables p. 389				
	RM-ANOVA for 2+ groups x 2+ measurements over time p. 415				

\*For distributions that are markedly nonnormal or samples that are small, the nonparametric tests in the row above may be needed.

TO

Our Beloved Family: Our Husbands, Our Children (Spouses/Fiancés), and Our Grandchildren

*Husbands:* Alan Janosy and Chuck Beck

*Children:* Alex (Maryanna), Alaine (Jeff), Lauren (Vadim), and Norah (Chris); and Curt and Lisa

*Grandchildren:* Cormac, Julia, Maren, and Ronan



# Acknowledgments

This 10th edition, like the previous nine editions, depended on the contribution 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 35 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 also inspired the inclusion of some new content. Valori Banfi, reference librarian at the University of Connecticut,

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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 not a static enterprise. Even after writing nine editions of this book, we continue to draw inspiration and new material from groundbreaking advances in research methods and in nurse researchers' use of those methods. It is exciting and uplifting to share many of those advances in this new edition. We expect that many of the new methodologic and technologic advances will be translated into powerful evidence for nursing practice. Five years ago, we considered the ninth edition as a watershed edition of a classic textbook. We are persuaded, however, that this 10th edition is even better. 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 will help to shape the future of nursing research.

## NEW TO THIS EDITION

### New Chapters

We have added two new chapters on “cutting-edge” topics that are not well covered in any major research methods textbook, regardless of discipline. The first is a chapter on an issue of critical importance to health professionals and yet inadequately addressed in the nursing literature: the clinical significance of research findings. In Chapter 20, we discuss various conceptualizations of clinical significance and present methods of operationalizing those conceptualizations so that clinical significance can be assessed at both the individual and group level. We believe that this is a “must-read”

chapter for nurses whose research is designed to inform clinical practice. The second new chapter in this edition concerns the design and conduct of pilot studies. In recent years, experts have written at length about the poor quality of many pilot studies. Chapter 28 provides guidance on how to develop pilot study objectives and draw conclusions about the appropriate next step—that is, whether to proceed to a full-scale study, make major revisions, or abandon the project. This chapter is included in Part 5 of this book, which is devoted to mixed methods research, because pilots can benefit from both qualitative and quantitative evidence.

### New 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, but a few deserve special mention. In particular, we have totally revised the chapters on measurement (Chapter 14) and scale development (Chapter 15) to reflect emerging ideas about key measurement properties and the assessment of newly developed instruments.

The inclusion of two new chapters made it challenging to keep the textbook to a manageable length. Our solution was to move some content in the ninth edition to supplements that are available online. In fact, every chapter has an online supplement, which gave us the opportunity to add a considerable amount of new content. For example, one supplement is devoted to evidence-based



methods to recruit and retain study participants. Other supplements include a description of various randomization methods, an overview of item response theory, guidance on wording proposals to conduct pilot studies, and a discussion of quality improvement studies. Following is a complete list of the supplements for the 31 chapters of this textbook:

1. The History of Nursing Research
2. Evaluating Clinical Practice Guidelines—AGREE II
3. Deductive and Inductive Reasoning
4. Complex Relationships and Hypotheses
5. Literature Review Matrices
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. The RE-AIM Framework
11. Other Specific Types of Research
12. Sample Recruitment and Retention
13. Other Types of Structured Self-Reports
14. Cross-Cultural Validity and the Adaptation/Translation of Measures
15. Overview of Item Response Theory
16. SPSS Analysis of Descriptive Statistics
17. SPSS Analysis of Inferential Statistics
18. SPSS Analysis and Multivariate Statistics
19. Some Preliminary Steps in Quantitative Analysis Using SPSS
20. Clinical Significance Assessment with the Jacobson-Truax Approach
21. Historical Nursing Research
22. Generalizability and Qualitative Research
23. Additional Types of Unstructured Self-Reports
24. Transcribing Qualitative Data
25. Whittemore and Colleagues' Framework of Quality Criteria in Qualitative Research
26. Converting Quantitative and Qualitative Data
27. Complex Intervention Development: Exploratory Questions
28. Examples of Various Pilot Study Objectives
29. Publication Bias in Meta-Analyses

### 30. Tips for Publishing Reports on Pilot Intervention Studies

### 31. Proposals for Pilot Intervention Studies

Another new feature of this edition concerns our interest in readers' access to references we cited. To the extent possible, the studies we have chosen as examples of particular research methods are published as open-access articles. These studies are identified with an asterisk in the reference list at the end of each chapter, and a link to the article is included in the Toolkit section of the *Resource Manual*. We hope that these 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 I—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 offers guidance on utilizing research to build an 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 II—Conceptualizing and Planning a Study to Generate Evidence** 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 sound approaches in doing research (Chapter 7). Chapter 8 provides an overview of important issues that researchers must attend to during the planning of any type of study.



- **Part III—Designing and Conducting Quantitative Studies to Generate Evidence** presents material on undertaking quantitative nursing studies. Chapter 9 describes fundamental principles and applications 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, including surveys, outcomes research, and evaluations. Chapter 12 presents strategies for sampling study participants in quantitative research. Chapter 13 describes using structured data collection methods that yield quantitative information. Chapter 14 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—change scores (reliability of change scores and responsiveness). Chapter 15 presents material on how to develop high-quality self-report instruments. Chapters 16, 17, and 18 present an overview of univariate, bivariate, and multivariate statistical analyses, respectively. Chapter 19 describes the development of an overall analytic strategy for quantitative studies, including material on handling missing data. Chapter 20, a new chapter, discusses the issue of interpreting results and making inferences about clinical significance.
- **Part IV—Designing and Conducting Qualitative Studies to Generate Evidence** presents material on undertaking qualitative nursing studies. Chapter 21 is devoted to research designs and approaches for qualitative studies, including material on critical theory, feminist, and participatory action research. Chapter 22 discusses strategies for sampling study participants in qualitative inquiries. Chapter 23 describes methods of gathering unstructured self-report and observational data for qualitative studies. Chapter 24 discusses methods of analyzing qualitative data, with specific information on grounded theory, phenomenologic, and ethnographic analyses. Chapter 25 elaborates on methods qualitative researchers can use to enhance (and assess) integrity and quality throughout their inquiries.
- **Part V—Designing and Conducting Mixed Methods Studies to Generate Evidence** presents material on mixed methods nursing studies. Chapter 26 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 27 presents innovative information about using mixed methods approaches in the development of nursing interventions. In Chapter 28, a new chapter, we provide guidance for designing and conducting a pilot study and using data from the pilot to draw conclusions about how best to proceed.
- **Part VI—Building an Evidence Base for Nursing Practice** provides additional guidance on linking research and clinical practice. Chapter 29 offers an overview of methods of conducting systematic reviews that support EBP, with an emphasis on meta-analyses, metasyntheses, and mixed studies reviews. Chapter 30 discusses dissemination of evidence—how to prepare a research report (including theses and dissertations) and how to publish research findings. The concluding chapter (Chapter 31) offers suggestions and guidelines on developing research proposals and getting financial support and includes information about applying for NIH grants and interpreting scores from NIH's new 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 10th 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 need be neither 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 critical points made in the chapter and to sharpen the reader's critical thinking skills. In addition, many research examples are used to illustrate key points in the text and to stimulate ideas for a study. Many of the examples used in this edition are open-access articles that can be used for further learning and classroom discussions.
- **Critiquing Guidelines.** Most chapters include guidelines for conducting a critique of each aspect of a research report. These guidelines provide a list of questions that draw attention to specific aspects of a report that are amenable to appraisal.
- **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.
- **Specific practical tips on doing research.** This textbook is filled with practical guidance 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 suggestions are in recognition of the fact that there is often a large gap between what gets taught in research methods textbooks and what a researcher needs to know to conduct a study.
- **Aids to student learning.** Several features are used to enhance and reinforce learning and to help focus the student's attention on specific

areas of text content, 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; study suggestions at the end of each chapter; a detailed glossary; and a comprehensive index for accessing information quickly.

## TEACHING–LEARNING PACKAGE

*Nursing Research: Generating and Assessing Evidence for Nursing Practice*, 10th edition, has an ancillary package designed with both students and instructors in mind.

- **The Resource Manual** augments the textbook in important ways. The manual itself provides students with exercises that correspond to each text chapter, with a focus on opportunities to critique actual studies. The appendix includes 12 research journal articles in their entirety, plus a successful grant application for a study funded by the National Institute of Nursing Research. The 12 reports cover a range of nursing research ventures, including qualitative, quantitative, and mixed methods studies, an instrument development study, an evidence-based practice translation project, and two systematic reviews. Full critiques of two of the reports are also included and can serve as models for a comprehensive research critique.
- **The Toolkit to the Resource Manual** is a “must-have” innovation that will save considerable time for both students and seasoned researchers. Included on thePoint, the Toolkit offers dozens of research resources in Word documents that can be downloaded and used directly or adapted. The resources reflect best-practice research material, most of which have 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 files that can readily be used in research projects, without requiring researchers to “reinvent the wheel” or tediously retype material from this textbook. Examples include informed consent forms, a demographic questionnaire, content validity forms, and a coding sheet for a meta-analysis—to name only a few. The Toolkit also has lists of 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.

**DENISE F. POLIT, PhD, FAAN**



- **The Instructor’s Resources on thePoint** include PowerPoint slides summarizing key points in each chapter, test questions that have been placed into a program that allows instructors to automatically generate a test, and an image bank.

It is our hope that the content, style, and organization of this book continue to meet the needs of a broad spectrum of nursing students and nurse researchers. We also hope that this 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.

**CHERYL TATANO BECK, DNSc, CNM, FAAN**



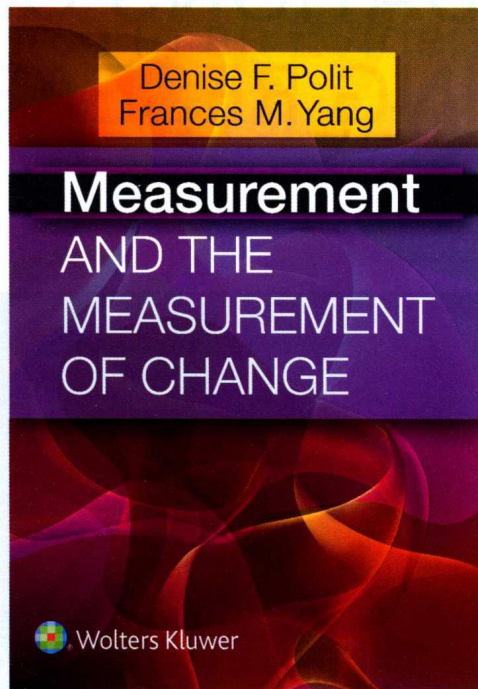


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### Check Out the Latest Book Authored by Research Expert Dr. Polit

If you want to make thoughtful but practical decisions about the measurement of health constructs, check out Dr. Polit and Dr. Yang's latest book, a "gentle" introduction to and overview of complex measurement content, called *Measurement and the Measurement of Change*.

This book is for researchers and clinicians from all health disciplines because measurement is vital to high-quality science and to excellence in clinical practice. The text focuses on the measurement of health constructs, particularly those constructs that are not amenable to quantification by means of laboratory analysis or technical instrumentation. These health constructs include a wide range of human attributes, such as quality of life, functional ability, self-efficacy, depression, and pain. Measures of such constructs are proliferating at a rapid rate and often without adequate attention paid to ensuring that standards of scientific rigor are met.

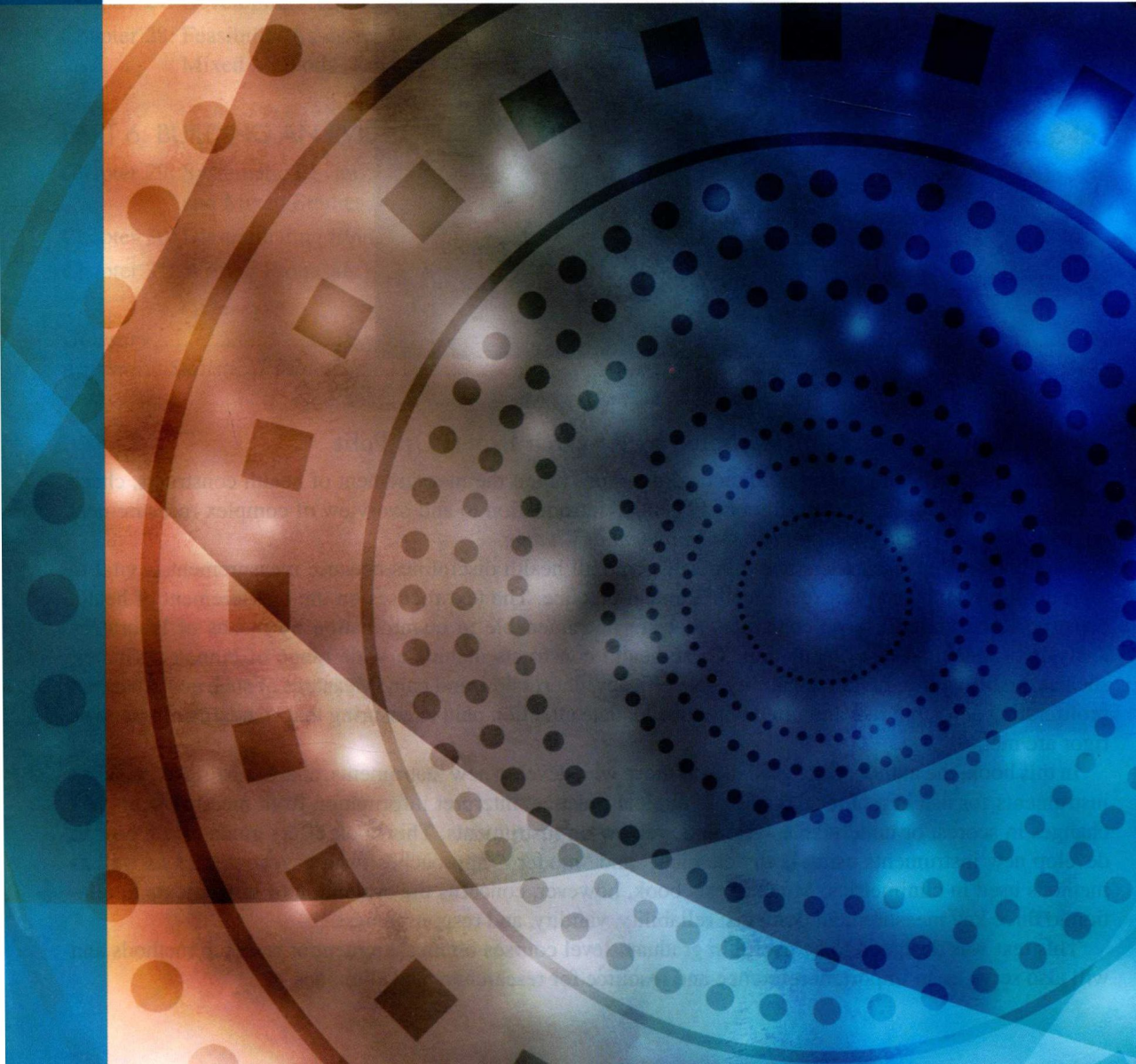
In this book, the authors offer guidance to those who develop new instruments, adapt existing ones, select instruments for use in a clinical trial or in clinical practice, interpret information from measurements and changes in scores, or undertake a systematic review on instruments. This book offers guidance on how to develop new instruments using both "classical" and "modern" approaches from psychometrics as well as methods used in clinimetrics. Much of this book, however, concerns the evaluation of instruments in relation to three key measurement domains: reliability, validity, and responsiveness.

This text was designed to be useful in graduate-level courses on measurement or research methods and will also serve as an important reference and resource for researchers and clinicians.

# PART 1

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## FOUNDATIONS OF NURSING RESEARCH





# 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 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) in making patient care decisions, and “best evidence” typically comes from research conducted by nurses and other health care professionals.

### What Is Nursing Research?

**Research** is systematic inquiry that uses disciplined methods to answer questions or solve problems. The ultimate goal of research is to develop and expand knowledge.

Nurses are increasingly engaged in disciplined studies that benefit nursing and its clients. **Nursing research** is systematic inquiry designed to generate trustworthy evidence about issues of importance to the nursing profession, including nursing practice, education, administration, and informatics. In this book, we emphasize **clinical nursing research**, that is, research to guide nursing practice and to improve the health and quality of life of nurses’ clients.

Nursing research has experienced remarkable growth in the past three decades, providing nurses with a growing evidence base from which

to practice. Yet many questions endure and much remains to be done to incorporate research innovations into nursing practice.

#### Examples of Nursing Research Questions:

- How effective is pressurized irrigation, compared to a swabbing method, in cleansing wounds, in terms of time to wound healing, pain, patients’ satisfaction with comfort, and costs? (Mak et al., 2015)
- What are the experiences of women in Zimbabwe who are living with advanced HIV infection? (Gona & DeMarco, 2015)

### The Importance of Research in Nursing

Research findings from rigorous studies provide especially strong evidence for informing nurses’ decisions and actions. Nurses are accepting the need to base specific nursing actions on research evidence indicating that the actions are clinically appropriate, cost-effective, and result in positive outcomes for clients.

In the United States, research plays an important role in nursing in terms of credentialing and status. The American Nurses Credentialing Center (ANCC)—an arm of the American Nurses Association and the largest and most prestigious credentialing organization in the United States—developed a Magnet Recognition Program to acknowledge health care organizations that provide high-quality nursing care. As Reigle and her colleagues (2008) noted, “the road to Magnet Recognition is paved