FIFTH EDITION

INTRODUCTION TO Research and Medical Literature FOR HEALTH PROFESSIONALS

J. Glenn Forister
J. Dennis Blessing

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Dedication

The fifth edition of this book is dedicated to all of the contributors who have put forth their effort to improve the research capabilities of healthcare professionals, present and future. We further dedicate this book to our friends and colleagues at Jones & Bartlett Learning. They have worked behind the scenes for many years to make us look good.

Ultimately, the contributors and publishers want this to be a successful book that helps every reader in their understanding of research and what it means to the people who benefit from our healthcare efforts.

JGF
JDB

Preface

The editors of and contributors to this book are dedicated teachers, librarians, researchers, administrators, and practitioners in healthcare professions. They have worked tirelessly to make this book readable, understandable, and useful for students and practitioners in healthcare professions. Our intent is to provide a tool that can be the first step in understanding research and, perhaps, the first step in a research career. We hope this book places that first step on a sound footing without intimidation.

Research articles, news flashes, and advertisements bombard us daily. To make sense of it all, we must be able to interpret and apply the information in our patients' best interests. This skill is a critical requirement of clinical practice in today's world, and it requires an understanding of the research process.

Conceptual Approach

We have tried to present our material in stepwise order, beginning with the protection of human subjects and the formation of a research question. Next, we consider different types of literature review and research methodologies. The analysis, results, and discussion sections follow. We also consider the writing and publication process. Finally, a chapter on the interpretation of the literature covers the skills a health professional must develop to be a consumer of the literature.

Ultimately, understanding the research process and interpretation of the research literature are inextricable—this book addresses both at the basic level. Our contributors represent a wide range of healthcare and education professionals with expertise in different aspects of research; however, each contributor has written with the novice researcher or clinician in mind. Prior knowledge of research is not assumed.

Organization and Features

Each chapter begins with a Chapter Overview designed to relate the essential information covered in the chapter. Basic Learning Objectives for the chapter are also provided. The important key terms for each chapter are highlighted in bold font, with definitions provided in the glossary. In most chapters, tables and figures are used to help summarize key information. The overall scheme allows the reader to move naturally through the research process, ending with concepts needed to interpret the research of others.

New to This Edition

The changes in this edition are based on the feedback from readers of the previous edition. A newly revised chapter on the regulatory protection of human subjects provides readers with the historical context and rationale for regulations. The latest updates to the Common Rule have been added. We have updated and replaced prior chapters on literature review and references. New examples and updated references have been added throughout the remaining

chapters. We have left the information most valued by readers. The language in this edition remains accessible while covering a variety of research methodologies, analysis, and writing tasks. We hope this edition is as useful to beginners as the prior editions have been.

Change Highlights

Ch 2 Reviewer-requested historical section on rationale for human subjects protection and IRB
Ch 2 Edits to reflect recent change in the Common Rule for exempt research
Newly written Ch 4 on review of the literature
Newly written Ch 15 on references

Updated examples and references throughout based on reviewer comments

Instructor Resources

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- Test Bank, containing more than 250 questions
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- Sample Syllabus, providing guidance for structuring a course around this text

To gain access to these valuable teaching materials, contact your Health Professions Account Specialist at http://go.jblearning.com/findarep.

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SECTION 1

Getting Started

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CHAPTER 1
Introduction

J. Glenn Forister, PhD, PA-C
J. Dennis Blessing, PhD, PA

CHAPTER OVERVIEW

This chapter is designed to introduce health professionals and students to research. The chapter introduces readers to the basic definitions and sources of research. An outline is offered to aid in the development of a project or research agenda. Each small piece of research that can add to the body of medical knowledge results in improvement in the physical, mental, and social well-being of patients.

LEARNING OBJECTIVES

- Define *research*.
- Describe types of research.
- Describe and discuss the importance of research in the health professions.
- Begin to develop a scientific approach to study and practice.

Introduction

The bottom line is that research determines almost everything that is practiced now and in the future. The word *research* frequently evokes an emotional reaction. Novice professionals may see research as a mysterious process that is difficult to understand and difficult to conduct. Students may not see the impact of a required research assignment on their future careers. Similarly, many clinicians may not connect research to their work. Research, however, provides an opportunity to explore, understand, and explain practice. By mastering research, healthcare professionals can enhance their clinical careers and improve patient outcomes.

Many clinical practices are becoming involved with clinical trials and quality improvement studies. This involvement makes understanding the scientific process and research a

practice requirement. Beyond the possibility of being directly involved in research, every healthcare professional must understand how to interpret the literature. The decision to incorporate a new treatment modality depends on the ability to assess and understand the research that led to that modality. Additionally, healthcare professionals must be able to evaluate the literature regarding how it relates to patients and to evaluate the best treatment options.

Research and Students in Healthcare Professions

The word *research* sometimes conjures up the following images:

- Individuals hidden away in a lab doing something unrelated to everyday life
- Boring work forced on students
- The pursuit of information that has little application in the real world
- Not something a healthcare professional does in clinical practice

For many people, the research process is difficult to understand. Research often requires the use of formulas and language only other researchers comprehend. Research findings are often contradictory, leaving professionals wondering what to do with the information. Because it can be a confusing endeavor, clinicians and educators may not engage in research. However, research provides the basis for practice. It is the key to the present and future, regardless of one's profession, position, or function in health care. Healthcare practices are based on scientific research. The evidence produced drives artificial intelligence (AI) solutions in healthcare. In the future, healthcare professionals will find research-based, computer-guided recommendations to be part of their day-to-day job.

Practice can only advance by applying evidence of what works.

Research Equals Curiosity

Whether they realize it or not, everyone has researched in something. Seeking an answer to a question is a form of research. Even looking up a word in an online dictionary can be considered a form of research. Curiosity drives investigation. Indeed, much "research" is informal and without the systematic constraints required by formal research, but it occurs every day. Practitioners do research when they investigate the literature for solutions to patients' problems. Students do research as part of their education. Self-study and exam preparation are informal research processes.

Research occurs in the laboratory, classroom, office, and society at large. The results may be directly applicable to a problem or only a small piece of a broader solution. Learning how research works help relieve anxieties and increase the ability to appreciate and enjoy the process. Ultimately, the goal is to improve the lives of patients.

In some ways, research may be more important to the practitioner than to the student, but learning of these skills begins in training. Similarly, what interests a healthcare practitioner or student may be mundane but necessary to the profession or livelihood. For example, an occupational therapist may have little interest in the differences in practice census flows by disability type, but that information may have a significant impact on patient scheduling and clinical assignments. It may or may not require statistical analysis, but it requires the systematic gathering, analysis, and interpretation of information (data).

Another example of research application in practice is patient outcomes. What is the difference in practice outcomes between treatment regimen A and B? There may be a wealth of information in texts and the literature, but what happens in a particular practice setting? Personal research is needed to determine the

answer, whether a formal or informal process is used. The values of informal versus formal research may be equal, but a formal investigation might lead to benefits beyond a single setting.

Research and the Students of Healthcare Professions

For a student, research is part of the task of discovery and learning. Research provides the information needed to build a fund of knowledge that guides what a student will do as a healthcare provider. Every student must become an informed consumer and learn to interpret the medical research and healthcare literature. At a minimum, learning how to interpret research findings is a necessary skill for a professional career. Useful interpretation skills allow healthcare practitioners to deliver an acceptable level of care.

Education in the healthcare professions should be consistent with adult learning theory. All healthcare practitioners should be lifelong learners; the healthcare professional that stops building his or her knowledge base and abilities will not be able to contribute to meaningful change. Experience is part of that knowledge base, but continuing to understand and interpret the literature is the foundation for maintaining, redefining, and increasing that base. Research is one tool that helps practitioners to "learn how to learn" and meet future healthcare challenges.

Research and Healthcare Professionals

The unknowns and seemingly complex methods of systematic research and its processes make some people uncomfortable. Data collection, statistical analysis, and interpretation can be daunting. Because the research world has its jargon, many healthcare professionals want to leave this activity to others. However, at a minimum, healthcare professionals must be able to interpret and apply research as steps in patient care. As healthcare professionals develop, they may find additional roles and responsibilities in the research arena.

Research Takes Many Forms

Research takes many different forms (**TABLE 1.1**). Research can be categorized in various ways, including pure research, experimental research,

TABLE 1.1 Types of Research

Type	Description	Example(s)
Pure	Abstract and general, concerned with generating new theory and gaining new knowledge for knowledge sake	Theory development
Experimental	Manipulation of one variable to see its effect on another variable, while controlling for as many other variables as possible and randomly assigning subjects to groups	Double-blind random assignment control groups, response to an intervention

(*continues*)

TABLE 1.1 Types of Research (*continued*)

Type	Description	Example(s)
Clinical	Performed in the clinical setting where control over variables is quite difficult	Drug trials, therapeutic results
Applied	Designed to answer a practical question, to help people do their jobs better	Time use studies, evaluation of different types of interventions with the same purpose
Descriptive	Describing a group, a situation, or an individual to gain knowledge that may be applied to further groups or situations, as in case studies or trend analyses	Surveys, qualitative research, measurement of characteristics, response to phenomena
Laboratory	Performed in laboratory surroundings that are controlled	Basic science research

Data from Bailey DM. *Research for the Health Professional: A Practical Guide*, 2nd ed. Philadelphia, PA: FA Davis; 1997, xxii.

clinical research, applied research, descriptive research, laboratory research,[1] and outcomes research. These forms depend on many factors.

There are many study designs available to beginning investigators.[2] Some research does not require specialized knowledge or skills, such as counting how many patients have a particular diagnosis. Other research requires specialized skills and must follow an exact methodology, such as clinical drug trials (studies of new medications). The recording of experimental results and writing of research have unique requirements that must be learned, practiced, and perfected. For most, research is about phenomena that affect what is done. Research is about observation and interpretation of what is learned to answer the questions posed.

Research can be enjoyable and rewarding. At every level and in every format and design, research should add to knowledge. It is unlikely that any single piece of research will make headlines. However, answering questions and making small contributions to the more substantial body of medical knowledge is very satisfying. Health care at every level continually creates questions that need answers. Society has questions that need answers. Learning the research process offers the highest likelihood of finding those answers. One does not have to be a genius to do research. One does not have to be mathematically gifted. One must only have an interest. It is a process to be learned and used to help healthcare practitioners, patients, students, and others.

Developing a Research Project

If a research project is part of education and training, it may take many forms. Choosing a project and developing its design depend on several factors (1) knowing what is expected, (2) identifying clear parameters, and (3) following organizational guidelines. Many

organizations prescribe a scientific writing format. Student investigators must know which style and style manual is required and should obtain a copy.

Schools or institutions may assign research topics and specific designs to follow. Development of a research project depends on many factors. Some introspection and consideration about time, effort, cost, resources, and ability are required for any project. This introspection must include an assessment of personal attributes, interests, resources, and expectations of self. Part of this assessment must consider strengths as a researcher and abilities to accomplish the project. Students and inexperienced investigators must be able to concentrate their research efforts to develop or use their expertise to the maximum benefit. It is better to be an expert in one small area than somewhat of an expert in several. Every beginning researcher needs mentors and collaborators. Students and beginning investigators should seek out people who have skills in their area of interest and ask for their help. They should explore the possibilities of collaborating with someone on their research as a learning activity. Another key element to a successful research effort is the allotment of adequate time for investigations. For students, time may be limited by schedules, class obligations, planned graduation date, and the like. A timeline for a research project should be created and followed.

Research is a systematic, organized process that goes through some sequential (or near sequential steps (see **FIGURE 1.1**). The first step in developing a research project is brainstorming. This activity should be as expansive as possible by making a list (by hand or on the computer) of everything of interest. Once these ideas are recorded, a short break of a few minutes or a few days should be taken (the key is *not* to think about the project for a short while). Then the list can be refined; new items can be added, and those that do not seem relevant can be eliminated. This process may be repeated more than once before a project is defined. A student, for example, may have an assigned topic, but there may be many ways to approach the assigned project. Once a list of possibilities has been developed, the refining process can be done in this way:

1. Make a list of everything of interest or questions to be answered.
2. Prioritize the list in the order of interests.
3. Make a second ordered list (from the first) of the things that are within the capabilities of the investigator.
4. Make a third ordered list (from the first) of the things that are important to the effort.
5. Make a fourth ordered list (from the first) of the things that are important to society, or health, or the particular profession.
6. Compare the lists. Items that appear at the top of all four lists should be prioritized and merged into a single list.
7. Make decisions about what can and cannot be accomplished. Mark off the things that cannot be done for financial or other reasons.
8. The topic that survives or is central to the lists is the basis of the research project. This topic represents a process of summation that includes challenges that need to be researched; challenges to the capability of the researcher; and challenges that are important to the individual, the program, and the topic of interest. What could be better?
9. Develop a timeline for the study; set aside research time and plan the step-by-step process.
10. *Get started.* Time passes regardless, do not hesitate to get started.

Summary

Whether one loves it, hates it, or would rather not think about it, research is a part of professional life in a healthcare career. Research provides the basis for all that healthcare providers do. Individual

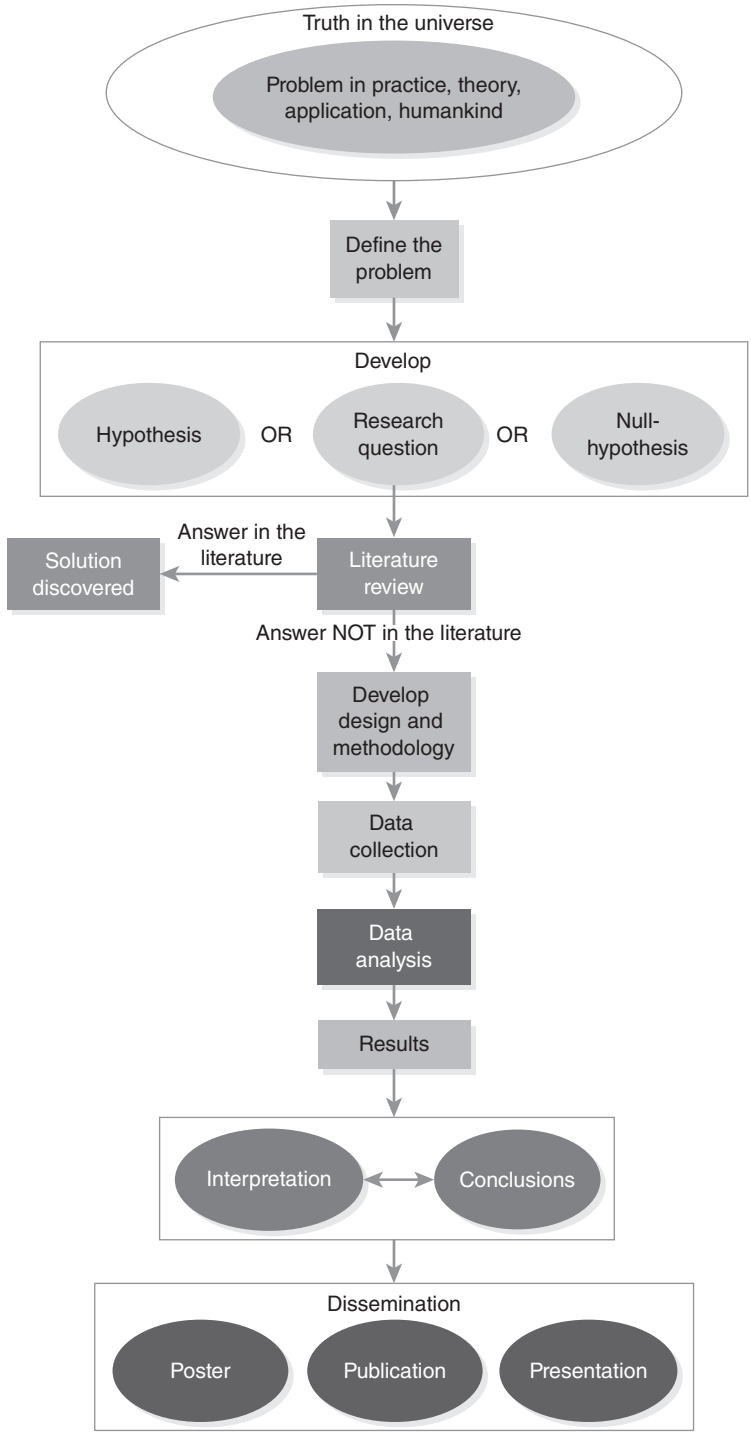

FIGURE 1.1 Outline of the scientific process.

research is unlikely to change the world or win a Nobel Prize; however, each small addition to our knowledge of the world and health care improves them both. Remember is a powerful tool that every healthcare provider must learn to use and master to care for others.

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