

# The Purpose and Process of Health Research

*Health research is the process of systematically investigating a single well-defined aspect of physical, mental, or social well-being.*

## ■ 1.1 Types of Health Research

Health researchers help in answering many questions. For example:

- Is an 8-week physical therapy program effective at reducing the risk of anterior cruciate ligament tears in high school athletes?
- Is taking a daily multivitamin associated with a decreased risk of colon cancer?
- What are the most common signs and symptoms associated with multiple sclerosis?
- How common is skin cancer among adults living in California?
- Are statins as effective at lowering cholesterol in women as they are in men?
- According to women receiving mammograms, what factors most influenced their decision to seek out routine breast cancer screening?
- Are the annual incidence rates of bacterial meningitis different in Argentina, Kenya, and Thailand?
- How much does the risk of severe hearing loss increase with age?
- Which factors predict binge drinking behavior in college and university students?

- Did the health department’s campaign to promote flu shots change the opinions and behavior of county residents?

*Research* is the process of systematically and carefully investigating a subject in order to learn or discover new information about the world. Most research focuses on a relatively small population. However, the goal of researchers—especially those who publish their findings in an academic or professional journal—is often to identify trends or to develop new theories or methods that are generalizable or that can be more broadly applied.

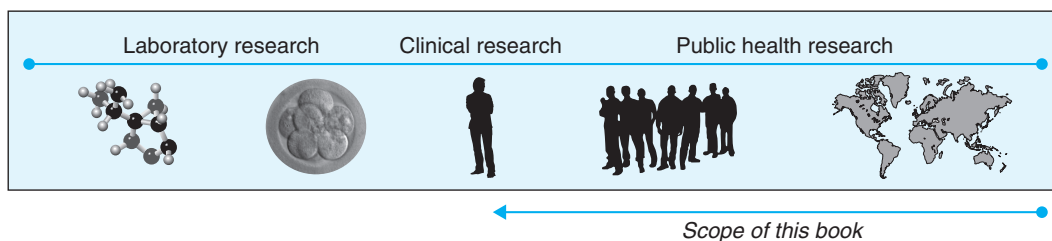
*Health* is a construct that extends over all aspects of physical, mental, and social well-being. *Health researchers* examine the biological, socioeconomic, and environmental factors that contribute to health and to disease, illness, disability, and death. *Health research* encompasses studies ranging from laboratory research (e.g., molecular biology, microbiology, immunology, and genetics), to clinical trials (e.g., studies in surgery, pharmacology, and physical therapy), to broad surveys of global health and public health policy. As the word “laboratory” implies, *laboratory studies* are typically conducted in the controlled environment of a special research facility, whereas the data for *population-based studies* are typically conducted using human subjects (FIGURE 1-1).

This book focuses on population-level health research, which encompasses most clinical and public health research (FIGURE 1-2). Population health research objectives may include, along with many others:

- Identifying and classifying new health problems
- Determining risk factors for disease

Examples of Laboratory Research	Examples of Population Research
<ul style="list-style-type: none"> <li>• Compare tests of air quality in several metropolitan areas</li> <li>• Analyze the biochemical composition of selected foods</li> <li>• Identify biological mechanisms for the emergence of drug-resistant strains of bacteria</li> <li>• Identify genes that might be linked to an increased risk of breast cancer</li> <li>• Develop a new vaccine</li> </ul>	<ul style="list-style-type: none"> <li>• Compare rates of acute lung diseases in several metropolitan areas and see whether the rates of disease are correlated with local air quality</li> <li>• Use a food frequency questionnaire to examine dietary behaviors in a selected population group</li> <li>• Identify the risk factors for acquiring a drug-resistant bacterial infection</li> <li>• Determine whether survival following a breast cancer diagnosis is linked to the presence of certain genes</li> <li>• Conduct a vaccine trial</li> </ul>

FIGURE 1-1 Comparison of Laboratory and Population Health Research



**FIGURE 1-2** The Range of Health Research

- Evaluating the impact of health policies on health outcomes
- Developing and testing new interventions for preventing or treating illness

## ■ 1.2 The Goal of Health Research

The goal of population-focused health research as a whole is to make discoveries that can benefit society, such as:

- The identification of emerging or existing health problems that should be addressed
- The testing of new interventions for preventing or treating diseases
- The contribution of information to the scientific literature that researchers and policymakers use when creating new plans and policies
- The synthesis of existing knowledge so that it can be applied by others

The goal of any one research project is usually modest: to contribute a bit of information that, when pooled with other researchers' information, will provide an evidentiary foundation for change. Research is unlikely to make a researcher rich or famous. It does not offer much in the way of instant gratification because it takes months or years to progress from an initial research idea to the dissemination of findings. Even after the findings are published, few studies lead to immediate changes in health status or health practices. Still, the researcher may enjoy many positive outcomes:

- The acquisition of new skills
- The satisfaction of personal curiosity
- The fulfillment of degree or work requirements
- The opportunity to become a published author
- The possibility that, at some point in the future, the researcher's work will contribute in at least some small way to making at least one person healthier (**FIGURE 1-3**)

This last outcome describes the fundamental reason for conducting health research.

Societal Benefits	Personal Benefits
<ul style="list-style-type: none"> <li>• Identification of health concerns and/or methods for promoting health and preventing disease and disability</li> <li>• Acquisition of evidence for improving clinical and public health practices and policies</li> <li>• Expansion of the scientific literature that sets the foundation for future research, policies, and practices</li> </ul>	<ul style="list-style-type: none"> <li>• Attainment of new knowledge by systematically investigating a topic</li> <li>• Development and/or refinement of a new skill set (and possible fulfillment of the requirements of an educational program or employer)</li> <li>• Satisfaction of exploring an area of interest and seeing a project through to completion</li> </ul>

**FIGURE 1-3** Societal and Personal Benefits of Health Research

Health research is not a value-neutral activity. Many health scientists are passionate about promoting health and preventing disease in individuals and populations. Health research does not require detachment from the topic under investigation. Health researchers may appropriately express an enthusiasm for making new discoveries and for helping people. Personal passion can be reflected in the chosen research topics and in the way research is conducted—in study designs, in interactions with research participants, and even in the careful analysis of data and written reports.

This is not to say that values trump science. Health scientists must demonstrate respect for those who might be impacted by their research in at least several very important ways. They must conduct methodologically sound, scientifically rigorous, and culturally appropriate research. Also, they must honestly report the methods used and the results observed, even if the results are not the ones they had hoped for at the start of the study. Because personal values and professional ethics are such an integral part of health research, this book incorporates the themes of research ethics and virtues into all its parts. The book does not confine these themes to the specific chapters on research ethics and research ethics committees.

Anyone who is committed to seeing a new and valid project through to completion can contribute to advancing health science. Health research does not require a license. It does not require a doctorate or a master's degree. It does not even require coursework in research methods, although that is certainly helpful. The best way to learn about health research is to do actual research and to learn firsthand how the research process works and what it requires:

- Patience
- Carefulness
- Attention to detail
- Perseverance

- The willingness to learn all the background knowledge and skills that are required
- The ability to criticize and revise one's own work and writing

## ■ 1.3 The Research Process

This book is intended to serve as a handbook for population health researchers. The chapters are organized according to the five steps of the research process. Regardless of the goals of a research project or the approach for achieving them, the steps are pretty much the same (FIGURE 1-4). First, identify a study question, and, second, select a general study approach. These two steps require a back-and-forth mind-set because the approach selected may require the refinement of the study question. Once the objectives and approach are set, the last three steps are to design the study and collect data, to analyze the data, and to write a report about the findings. These steps apply to every health research project, whether it is an investigation of an outbreak of gastroenteritis following a company picnic in London, a systematic review of the published literature intended to identify environmental risk factors associated with cataracts, or the analysis of data from thousands of participants in a drug trial.

This guidebook is not meant to be a compendium of everything that health researchers know about study design, data collection, and statistical analysis. Instead, it provides a comprehensive overview of the entire process. As a research project unfolds, most researchers benefit from consulting specialized references. These references can take the form either of advanced textbooks and other library resources or of human experts: professors, supervisors, colleagues, coauthors, librarians, statistical consultants, and others. Chapter 5 provides some suggestions on how to assemble a research support team. Also, many excellent books and online resources contain the advanced technical information required for complex study designs and analytic techniques.

Health research is both a scientific and a social process. Most research projects necessitate many, many hours of independent (and often isolated) work. However, health research, at its core, is about health-related issues affecting individuals and communities—issues that cannot be addressed in isolation. Health scientists communicate with one another primarily through published articles and, to a lesser degree, via presentations at professional conferences. Research that is not published or disseminated in some way will never shape the policies and practices that make people healthier. Thus, every

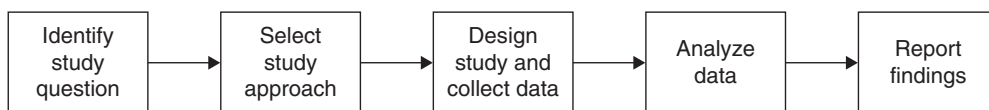


FIGURE 1-4 The Research Process

person initiating a new research project should write up the results and consider submitting them to a professional journal for consideration. This is not to say that all research will be published. Publication depends on:

- The appropriateness of the research topic for a wide audience
- How well designed the study is and whether it uses valid methods
- How compelling and well written the manuscript is

The final section of this book provides tips about writing and editing strategies, as well as a step-by-step guide for preparing a manuscript for review and publication. If the goal is to publish the findings of a study—and it often should be—then the researcher must prepare for publication at every step of the process.