

SELECTING A GENERAL TOPIC

Selecting one workable study topic is the first step toward a successful research project. Many approaches can be used to identify potential research questions.

2.1 Practical Questions

Many research questions in the health sciences arise from observations made during applied practice. Consider the types of questions that different health practitioners might raise about trampoline injuries:

- An emergency room physician: “The trampoline injuries we’ve been seeing include a mix of limb fractures and head/neck trauma. Are the kids who present with trampoline-related arm fractures being screened for concussions? Are they being adequately treated for co-occurring conditions?”
- A physical therapist: “It seems like a lot more of the patients coming in for therapy this year are recovering from trampoline-related injuries. Has the rate of injuries really increased, or am I just noticing them more? Should I be telling my patients not to use home trampolines?”
- A health educator: “I’m working at a fitness center that offers trampoline workouts. Is this an effective way to improve cardiovascular fitness? What can we do to ensure the safety of our clients?”

Questions derived from practice often point toward an unmet demand for needs assessments, program evaluations, and clinical effectiveness studies. Any of these questions might be worth exploring in a new research project, assuming that a review of the literature shows that there is not yet consensus about the answers to these questions. Nonpractitioners looking for research ideas may find it helpful to reach out to clinical colleagues and other health professionals about possible collaborations.

When using practical experiences to frame research questions, remember that a good research question is one that ends in a question mark—that is, it is not a

declaration or a value statement, but a genuine query. A good research question is also testable. **Testability** is present when the research question includes components that can be measured and examined.

2.2 Brainstorming and Concept Mapping

When a suitable research question does not arise from clinical practice, community observations, or personal experience, a **brainstorming** session can be a good starting point for identifying a research topic. The goal of brainstorming is to create a long list of possible research topics. This is not the stage for eliminating ideas because they do not appear feasible, and the ideas do not need to be well formed. The categories in **Figure 2-1** can be used to identify areas of personal interest. It can also be valuable to check with friends and colleagues about their ideas. Internet searches, journals, and books might reveal gaps in knowledge that are worthy of exploration. For example, many research articles end with a call for further research on a particular topic.

FIGURE 2-1 Brainstorming Questions

Area	Questions
Values	<ul style="list-style-type: none"> • What are my interests and personal values? • What research topics are personally meaningful? • Have some understudied conditions that I could explore significantly affected me, my family, my friends, or my patients/clients? • Have certain health issues sparked my passion because they reflect what I consider to be an injustice?
Skills	<ul style="list-style-type: none"> • What knowledge and skills do I already have?
Personal growth	<ul style="list-style-type: none"> • What new skills do I want to develop?
Connections	<ul style="list-style-type: none"> • What source populations and/or data sources might be available to me through professors, supervisors, colleagues, and other personal and professional contacts?
Job and/or course requirements	<ul style="list-style-type: none"> • What does my supervisor or professor want me to study?
Gaps in the literature	<ul style="list-style-type: none"> • What information is not currently available that would make a contribution to the discipline and/or to improving health practices or policies?

A related process is **concept mapping**. Begin by listing several diseases or population groups that might be interesting to study. Identify the related ideas that show up several times on the list and appear to be a central theme. Use circles and arrows to visibly group related topics to clarify the connections. Consider which of those broad areas might be worth exploring.

2.3 Keywords

A next step toward refining the areas of interest identified through brainstorming and topic mapping is compiling a list of related **keywords**. Jot down a long list of words that may help focus the research question. For example, a person who identifies an interest in child health in Africa might then list words like “malaria... children... Africa... bednets... Uganda... measles... vaccination... preschool children... malnutrition... vitamin A deficiency.” A person who identifies an interest in aging might list words like “osteoporosis... falls... bedsores... physical therapy... calcium... bone density... home safety... rehabilitation... healthy aging... prevention.” The goal is to identify a range of potential study foci within the major area of interest.

The **MeSH (Medical Subject Headings)** database, developed by the U.S. National Library of Medicine, can be helpful for identifying the full extent of a research area and also for narrowing the scope of a research area. Suppose, for example, that a potential area of interest is infection. The MeSH database suggests a variety of narrower topics related to infection, such as cardiovascular infections, sepsis, infectious skin diseases, and wound infection. Within the category of skin diseases, the MeSH database lists a variety of narrower topics, such as cellulitis, dermatomycoses (fungal skin infections), and bacterial skin diseases. Within the category of dermatomycoses, the MeSH database lists yet narrower topics, such as blastomycosis, cutaneous candidiasis, and tinea. Within these categories, MeSH offers even more refined points and still more refined points within successive subcategories.

Searching through the MeSH database can help a researcher in several ways. The researcher can move from a vague interest in infections or skin infections to a more focused interest in fungal skin infections or, even more specifically, ringworm infections. Alternatively, the MeSH database can be used to search for broader or related study ideas. A search for preeclampsia, for example, shows that preeclampsia is a type of pregnancy complication. It is related to other forms of pregnancy-induced hypertension, such as HELLP syndrome, which may be an equally interesting study topic for someone with an interest in obstetrics.

Once a list of keywords has been compiled, the researcher looks for the themes that emerge from them. Some topics may be easily eliminated because they do not fit the researcher’s interests (Figure 2-1). Some keywords may stand out as particularly interesting to the investigator.

2.4 Exposure, Disease, Population (EDP)

Once several possible themes have been identified, each should be refined. Many topics in population health research can be expressed with the formula: [exposure] and [disease/outcome] in [population]. **Exposures** (Figure 2-2) and **diseases** (Figure 2-3) can encompass a wide variety of characteristics, some of which are:

- Social and environmental indicators
- Nutritional status
- Infections
- Chronic diseases
- Mental health status
- Quality-of-life measures
- Health service use

For experimental studies, the intervention being investigated is the exposure. The **population** is the group of individuals, communities, or organizations that will be examined (Figure 2-4).

The keywords compiled during brainstorming and concept mapping often fit into exposure, disease, and population categories. To use a “mad libs” style approach to creating a research question, the researcher should divide the keywords into three separate lists:

FIGURE 2-2 Examples of Types of Exposures

Socioeconomic Status	Health-Related Behaviors	Health Status	Environmental Exposures
<ul style="list-style-type: none"> • Income • Wealth • Educational level • Occupation • Age • Sex/gender • Race/ethnicity • Nationality • Immigration status • Marital status 	<ul style="list-style-type: none"> • Dietary practices • Exercise habits • Alcohol use • Tobacco use • Sexual practices • Contraceptive use • Hygiene practices • Religious practices • Use of health care services 	<ul style="list-style-type: none"> • Nutritional status • Immune status • Genetics • Stress • Anatomy and anatomical defects • Reproductive history • Comorbidities (existing health problems) 	<ul style="list-style-type: none"> • Drinking water • Pollution • Radiation • Noise • Altitude • Humidity • Season • Natural disasters • Population density • Travel

FIGURE 2-3 Examples of Types of Diseases

Infectious and Parasitic Diseases	Noncommunicable Diseases (NCDs)	Neuropsychiatric Disorders	Injuries
<ul style="list-style-type: none"> • Candidiasis • Cholera • <i>Escherichia coli</i> • Hookworm • Malaria • Syphilis • Tuberculosis 	<ul style="list-style-type: none"> • Asthma • Breast cancer • Cataracts • Diabetes • Hypertension • Osteoporosis • Stroke 	<ul style="list-style-type: none"> • Alzheimer's disease and other dementias • Autism • Depressive disorders • Posttraumatic stress disorder • Schizophrenia 	<ul style="list-style-type: none"> • Bone fractures • Burns • Crush injuries • Frostbite • Gunshot wounds • Near drownings • Poisonings

- One for exposures or interventions
- One for diseases or outcomes
- One for specific populations

These exposures, diseases (or other health-related **outcomes**), and populations—the “**EDPs**”—can then be combined to form potential study questions using a standard format of “Is [exposure] related to [disease/outcome] in [population]?” For example:

- Are exercise habits [exposure] related to the risk of bone fractures [disease] in adults with diabetes [population]?
- Is reproductive history [exposure] related to the risk of stroke [disease] among women living in rural Ontario [population]?

FIGURE 2-4 Examples of Types of Populations

- Australian children younger than 5 years old
- Women living in rural Ontario
- Adults with diabetes
- Teachers with at least 10 years of classroom experience
- Individuals newly diagnosed with influenza at St. Mary's Hospital in Newcastle
- Nongovernmental organizations working on issues related to HIV/AIDS in Uganda

- Is household wealth [exposure] related to the risk of hospitalization for asthma [disease] in Australian children younger than 5 years old [population]?

A literature review related to the candidate question will assist the researcher in determining what is already known about the topic and what new information a new study could contribute. Chapter 3 describes the literature review process.

2.5 PICOT

An alternative approach to framing a research question uses the acronym **PICOT**:

- What is the *Patient/Population* group that will be studied?
- What is the *Intervention* that will be tested?
- What will the intervention be *Compared* to?
- What is the *Outcome* of interest?
- What is the *Timeframe* for follow-up?

PICOT is especially helpful for addressing clinical research questions and designing intervention studies. One benefit of PICOT is that it points toward the selection of key indicators that would provide evidence for the success of the intervention.