Lecture 3 · June 10, 2024

Formulating a Research Question

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YSEMA
Introduction to Research
Research Question

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Recap – 2nd Lecture

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Objectives

- **Describe** where research problems originate
- **Define** what constitutes a research problem
- **Develop** a research problem list
- **Identify** a research problem
- **Define and describe** the need to study a research problem
- **Develop** a research question, hypothesis, or null hypothesis for a research problem
- **Write** a research question in PICO format

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Why Identify the Problem?

1- How does a healthcare professional identify a problem for research?

2- Why go through the mental exercise and invest time before beginning a research?

3- What are the origin of research topics / sources of ideas for research?

- Mental exercise that requires **stepwise movement from general to more specific concepts.**
- Determining the right researchable question or statement will define the **problem effectively and accurately.**
- **Not always a simple task!** Why? Does water kills?

TABLE 3.1 The Origin of Research Topics

- Work environment (clinical observations, problems, or challenges)
- Personal interest (medical condition of self, family member, or acquaintance)
- Prior studies (journal articles or reports in medical and lay literature)
- Mentor, preceptor, or teacher interest
- Literature review
- Studies by others
- Graduation requirements

- Without a clear focus, the process is **confusing,** frustrating, time-consuming, and wasteful. Think of the research problem as **the guiding light** that points the investigator in the right direction.

Remember to **Get Started** (From Lecture 1)

Developing a Research Project

1. List interests
2. Prioritize in order of importance/interest
3. Revise list based on your capabilities
4. Revise list based on things important to effort
5. Reprioritize on what is important to society or health
6. Make decisions about what can be accomplished
7. Surviving or central topic is basis of research project
8. Develop timeline for study
9. **Get started**

How to Identify a Research Problem?

Ask **"What is the question to be answered?"**

Questions to help further define the problem:

- Given a problem, what can be done or what approach should be taken to improve it?
- What is known about the problem?
- What is not known about the problem?
- What information or data are needed to improve the situation?

Narrowing the Focus of the Question: Begin broad and become more specific

Common approach:

- Problem statement
- Question (problem converted into a question that can be answered)
- Aim/purpose
- Objective(s) (what the researcher(s) will do to answer the question)

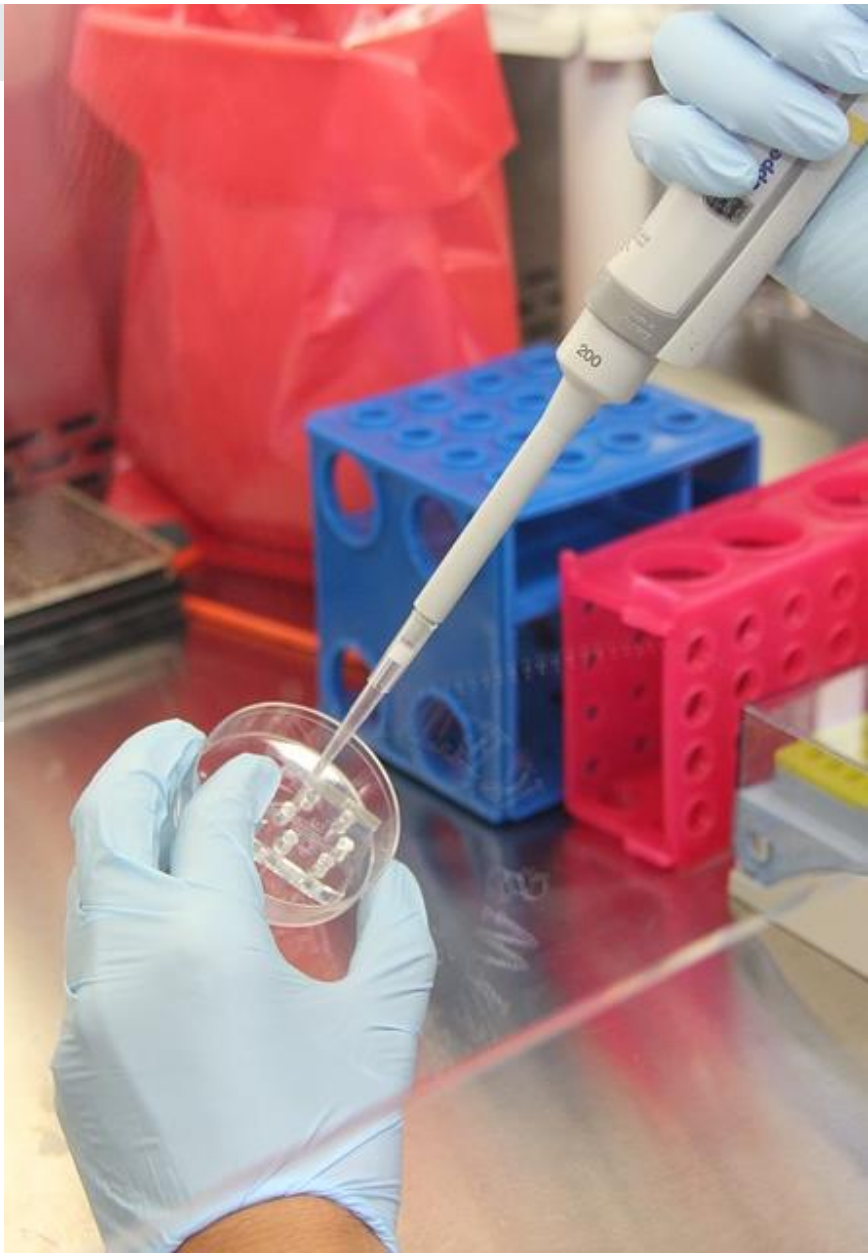
Need for the Study

- Significance in medical, legal, and socioeconomic terms
- Whether the issue has already been addressed
- Acuity or seriousness
- Human, time, and financial costs
- Contribution to knowledge

Must a Study Be Original?

There are many instances where replication may be indicated, valuable, and needed.

- Extend the generalizations of the findings
- Establish credibility
- Reduce errors
- Provide support for developing theories



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Stating the Research Question

A good research question is one that:

- Can be answered using observable data or phenomena
- Includes the relationship between two or more variables
- Is logical

Ways to Frame the Research Question

- **Null hypothesis:** Statement of no relationship or difference between two variables
- **Hypothesis:** Statement of prediction/observation that can be evaluated, measured, or analyzed
- **Research question:** Question that needs to be answered through systematic testing/evaluation/analysis

PICO(T)

Does water kills?

In individuals exposed to extreme water conditions,
does excessive saltwater consumption,
compared to normal water consumption,
result in increased mortality,
during the exposure period of 7 days?

P (Population/Patient/Problem)

Who is the patient or population?

Describe the patient or group of patients of interest.

- Adults with hypertension
- Patients with acute bronchitis
- Children with cancer

I (Intervention or Cause, Prognosis)

What is the intervention or treatment?

Exposure to disease, a diagnostic test, a prognostic factor, a treatment, a risk factor, etc.

- Use of digital health interventions
- Use of antibiotics
- Current treatments

C (Comparison, Control)

Is there a comparison intervention?

No disease, placebo, a different prognostic factor, etc.

- Traditional medication adherence methods
- None (no intervention)
- Listening to tranquil music

O (Outcome)

What are the expected outcomes?

Clinical outcomes, including a time horizon if relevant.

- Improvement in medication adherence rates
- Reduction in sputum production, cough, or days off.
- Management of fever and infection
- Reduction in reported anxiety

Questions

Read

Chapter 5: From Problems to Sources

Chapter 6: Engaging Sources

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"Research is seeing what everybody else has seen and thinking what nobody else has thought.

- Albert Szent-Györgyi

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