CIRHT-UM Webinar Series

Framing a Research Question

Reminder: Insert presenter credentials here

Webinar Objectives

1. Define research
2. Describe how to write a research question
3. Introduce two frameworks for evaluating and refining a research question
   - FINER Criteria
   - PICO framework
4. Complete research question writing exercise

CIRHT-UM Overarching Research Goal

Inspire research culture and build faculty and trainee research capacity at the individual and institutional level.

What is Research?

• A systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge
• Designed for
  (1) generalized knowledge
  (2) requires systematic investigation

What is Research?

• Role is to predict, explain, explore, discover
• Various Research Designs
  • Quantitative
  • Qualitative
  • Mixed Methods

What is a Research Question?

• Provides a framework for conducting an achievable, focused and clinically relevant research study
• Specific topic of the paper
• Uncertainty the investigator wants to resolve by performing their study

Hulley et al. (2014), Anastasiadis et al. (2015)
CIRHT-UM Framework: Research Life Cycle

Sources of Research Questions
- Observations in clinical practice
- Your own research
- Quality improvement activities
- Mentors
- Colleagues
- Scientific conferences
- Scientific literature
- Use your imagination!!!

Characteristics of a Good Research Question
- Clear: Provides enough specifics that the audience can easily understand its purpose without needing additional explanation.
- Focused: Narrow enough that it can be answered thoroughly in the space the writing task allows.
- Concise: Expressed in the fewest possible words.

The Writing Center, 2021

Characteristics of a Good Research Question
- Complex: Not answerable with a simple “yes” or “no,” requires synthesis and analysis of ideas and sources prior to composition of an answer.
- Arguable: Potential answers are open to debate rather than accepted facts.

The Writing Center, 2021

Characteristics of a Good Research Question: FINER Criteria

<table>
<thead>
<tr>
<th>FINER Criteria</th>
<th>Description</th>
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<tbody>
<tr>
<td>Adequate # study subjects</td>
<td>Adequate technical expertise</td>
</tr>
<tr>
<td>Appropriate/adequate technical expertise</td>
<td>Within scope</td>
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<tr>
<td>Within scope</td>
<td>Adequate funding</td>
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FINER: Feasible
FINER: Interesting

• Getting at the truth of the matter is interesting
• Provides the necessary motivation/ intensity of effort for the research process
• Interesting to the researcher
• Others should also find it interesting
  • Mentors
  • Outside experts
  • Funders

FINER: Novel

• A good clinical research question contributes to new knowledge
• Innovative: new
  • Concepts
  • Methods/approaches
  • Interventions
• Does not have to be totally original
  • Replication: confirmatory
  • Different population

FINER: Ethical

• Valuable research question ethically requires validity and rigor in research design and implementation to produce valid, reliable, interpretable, and generalizable results
• Poorly designed research:
  • inadequate power
  • insufficient or sloppy data, or
  • inappropriate or unfeasible methods
    • harmful because human and material resources are wasted and individuals are exposed to risk for no benefit

FINER: Relevant

Significance
• Importance of the problem
• How the project will improve scientific knowledge
• How the result will change:
  • Concepts
  • Methods
  • Clinical practice

So What?
• Should pass the “So what?” Test!

Will the research make a difference?

Roadmap for Framing a Research Question: PICO(T) Framework
- Population (patients)
  • What specific patient population are you interested in?
- Intervention (exposure, diagnostic test, prognostic factor)
  • What is your investigational intervention?
- Comparison group
  • What is the main alternative to compare with the intervention?
- Outcome of interest
  • What do you intend to accomplish, measure or improve?
- Timeframe
  • What is the appropriate follow-up to assess outcome?
Examples of PICO (T) Research Questions

• Among healthy newborn infants in low- and middle-income countries (P), does early skin-to-skin contact of the baby with the mother in the first hour of life (I) compared with drying and wrapping (C) have an impact on neonatal mortality, hypothermia or initiation/exclusivity/duration of breastfeeding (O)?

• In low-birth-weight/pre-term neonates in health facilities (P), are plastic wraps or caps used immediately after birth (I) more effective than conventional care (C) in preventing hypothermia (O)?

World Health Organization, 2012

Examples of PICO (T) Research Questions

• In women experiencing their first pregnancy (P), do pregnancy tracking mobile apps (I) result in fewer unnecessary hospital visits (O) when compared with self-tracking (C) over the course of the pregnancy (T)?

• Are mothers (P) given cesarean sections (I) in their first pregnancy (T) more likely to experience uterine rupture during subsequent pregnancies (O) when compared with first time mothers giving vaginal birth (C)?

McMaster University, 2021

Research Question Writing Exercise

Now it’s your turn to frame a research question. Start by writing down your research topic.

Research Question Writing Exercise: Population

Write down the specific patient population are you interested in.

Research Question Writing Exercise: Intervention

Write down your investigational intervention.

Research Question Writing Exercise: Comparison

Write down your main alternative to compare with the intervention.
Research Question Writing Exercise: Outcome of interest

Write down what you intend to accomplish, measure or improve.

Research Question Writing Exercise: Timeframe

Write down when you will follow-up to assess the outcome.

Research Question Writing Exercise

Put all the components of your PICO(T) framework together and write down your complete research question.

Remember to Consider

- Developing a research question is an iterative process that involves continuously updating and refining ideas at all stages.
- Remain updated on current trends, state-of-the-art research studies, and technological advances in the field of study you are pursuing.
- Be specific and concise as possible to ensure clarity. Avoid using terms that don’t add to the meaning of the research question.

Suggested Exercises at Home

- Look for research papers in your area of interest
- Assess if the research question is explicitly stated
- Use the FINER criteria and the PICO(T) framework to critic the merits of the research question
- Share with your colleagues/mentors
- Visit the NIH RePORT to find funded research projects by your topic of interest

Resources

- CIRHT research guide
  - https://cirht.med.umich.edu/resources/
- NIH webpage
  - Research Portfolio Online Reporting Tools (RePORT) https://report.nih.gov/
- Funded Research Projects from the Contraception Research Branch (CRB) of the Eunice Kennedy Shriver National Institute of Child Health & Human Development (NICHD)
Summary

• A research question: clear, focused, and concise statement that conveys the objectives of the research and its potential findings
• Should be expressed in a simple, straight-forward language
• Framing a research question takes place over time, through consultations with knowledgeable people, published literature, and use of the appropriate criteria (FINER) and format (PICO).

References

• Doody & Bailey, 2016
• Hulley et al. (2014). Designing clinical research. Lippincott Williams & Wilkins.
• The Writing Center, George Mason University. (2021) How to Write a Research Question. https://writingcenter.gmu.edu/guides/how-to-write-a-research-question