

CIRHT-UM Framework: Research Life Cycle



Figure 6. Research Milestones to Build a Core of Independent Investigators at Partner Schools. Bece et al., 2018. The UM-CIRHT Framework

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 2.1 FINER CRITERIA FOR A GOOD RESEARCH QUESTION AND STUDY PLAN

Feasible
Adequate number of subjects
Adequate technical expertise
Affordable in time and money
Manageable in scope
Fundable
Interesting
Getting the answer intrigues the investigator and her colleagues
Novel
Provides new findings
Confirms, refutes, or extends previous findings
May lead to innovations in concepts of health and disease, medical practice, or methodologies for research
Ethical
A study that the institutional review board will approve
Relevant
Likely to have significant impacts on scientific knowledge, clinical practice, or health policy
May influence directions of future research
Hulley et al. (2014)

FINER: Feasible

- Adequate # study subjects
- Appropriate/adequate technical expertise
- Within scope
- Adequate funding

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

FINER: Relevant

So What?

- Should pass the “So what?” Test!

Will the research make a difference?

Roadmap for Framing a Research Question: PICO(T) Framework

- P**-Population (patients)
 - What specific patient population are you interested in?
- I**-Intervention (exposure, diagnostic test, prognostic factor)
 - What is your investigational intervention?
- C**-Comparison group
 - What is the main alternative to compare with the intervention?
- O**-Outcome of interest
 - What do you intend to accomplish, measure or improve?
- T**-Timeframe
 - What is the appropriate follow-up to assess outcome?

Haynes, 2006

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.

Maxwell, 2013; guide2research, 2021

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

Maxwell, 2013; guide2research, 2021

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)
 - <https://www.nichd.nih.gov/about/org/der/branches/crb/projects?fy=2008>

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).

Doody & Bailey, 2016



Thank You

Questions?



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