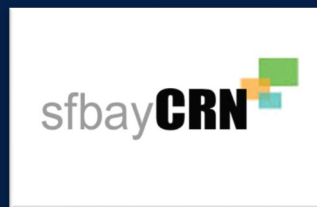




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Developing and Selecting a Research Question

Section 2

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“The research question is the uncertainty that the investigator wants to resolve by performing her study. ... The challenge in finding a research question is defining an important one that can be transformed into a feasible and valid study plan”

Steven R. Cummings, Warren S. Browner, and Stephen B. Hulley.
Chapter 2, Designing Clinical Research, 4th edition

Learning Objectives



Understand the difference between a research interest and research question



Understand characteristics of a good research question



Understand how to develop research questions using the PICO framework described in this lecture

Research Interest vs. Research Question

Research interest: area of study that you are interested in exploring

- e.g. prevention of cardiovascular disease, reducing health inequities, improving the implementation of evidence-based guidelines

Research question: specific inquiry you want to evaluate

- e.g. does motivational interviewing improve adherence to blood pressure medications? Do nursing visits for blood pressure checks improve blood pressure control in patients identifying as Black/African American?

Qualities of a Good Research Question

FINER

- Feasible
- Interesting
- Novel
- Ethical
- Relevant

Qualities of a Good Research Question

FINER

- Feasible: able to be answered within practical limitations, such as available/necessary sample size, technical expertise and resources of investigators, manageable scope
- Interesting
- Novel
- Ethical
- Relevant

Qualities of a Good Research Question

FINER

- Feasible
- Interesting: the answer is of interest to investigator and colleagues
- Novel
- Ethical
- Relevant

Qualities of a Good Research Question

FINER

- Feasible
- Interesting
- Novel: will lead to new findings or confirms, refutes or extends the understanding of prior findings
- Ethical
- Relevant

Qualities of a Good Research Question

FINER

- Feasible
- Interesting
- Novel
- Ethical: involves only acceptable risks to study subjects, including privacy protection
- Relevant

Framing the Question with an Anti-racism Lens

Who stands to benefit from the results of this research?

Who will be burdened by the results of this research?

Whose condition do we hope to improve with this research?

Which populations will be underrepresented or missed with results of this research?

Is there previous research that we are ignoring?

What are the implications of this study if the results are implemented?

Qualities of a Good Research Question

FINER

- Feasible
- Interesting
- Novel
- Ethical
- Relevant: results will impact scientific knowledge, clinical practice or health policy, and may influence the direction of future research

Steps to selecting a Research Question



Step One: Select a Topic



Step Two: Perform a Focused Literature Review



Step Three: Feedback



Step Four: Brainstorm How to Answer Your Question



Step Five: FINER



Step Six: Refine the Research Question

Step 1: Selecting A Topic

- It is important to choose a topic that is clinically relevant and of interest to you.
- What question(s) are you interested in answering?
- E.g. What is known about ways to improve adherence to blood pressure medications?

Step 1: Selecting A Topic

- Start with a searchable sentence on your identified research area of interest.
 - e.g. “What techniques are best for improving patient adherence to blood pressure medications?”
- Write a list of the concepts in your topic area
 - e.g. high blood pressure, medication adherence, reminders, medication supply, medication side effects, medication cost, follow up visits, blood pressure monitoring, counseling, patient experiences, visit time

Step 1: Developing Your Research Question

PICO is a commonly used framework to assist in formulating research questions

- P: population, problem or patient
- I: intervention (or exposure)
- C: control, comparison group
- O: outcome

Step 1: Using PICO

- Use PICO to outline your research question(s)

Example 1:

- Population = patients with high blood pressure
- Intervention = motivational interviewing
- Comparison = standard counseling
- Outcome = adherence to medications

In patients with high blood pressure, does motivational interviewing vs. standard counseling improve medication adherence?

Step 1: Using PICO

- Use PICO to outline your research question(s)

Example 2:

- Problem = blood pressure medication non-adherence
- Intervention = 90 day refills
- Comparison = 30 day refills
- Outcome = adherence to medications

Does supplying patients with a 90 days of their blood pressure medication vs. a 30 day supply improve adherence to medications?

Step 2: Perform a Focused Literature Review

- It is important to understand the literature in your area of interest
 - e.g. What is already known? What has already been tried?
- A literature review is a necessary first step to better understand your topic of interest and identify information gaps that you can contribute to, to develop and refine your research question
 - Literature review = brief investigation of research articles that have been published about your topic of interest
 - Systematic review = an extensive and rigorous attempt to understand and aggregate all information available about a proposed research question

Step 2: Preparing a Literature Review

- When you have your list of concepts, what are synonyms or related concepts?
 - e.g. high blood pressure: hypertension, HTN, elevated blood pressure
 - e.g. medication adherence: compliance, adherence
 - e.g. side effects: adverse effects, contraindications
 - e.g. medication cost: insurance coverage, co-pay, transportation to pharmacy
 - e.g. counseling: motivational interviewing, active listening, behavioral therapy
 - e.g. patient experiences: trust in health care team, discrimination/stigma

Step 2: Perform a Focused Literature Review

- Use PICO to create search terms
 - (high blood pressure OR hypertension OR hypertensive)
 - AND ([90 day] OR [3 month])
 - AND ([30 day] OR [month])
 - AND ([medication adherence] OR [compliance])

Step 3: Feedback

Incorporate findings from your literature review and get feedback on your research question

- How does the status of the current literature influence what question you want to ask? What are the gaps in the literature that you can fill?
- Ask for input from faculty mentors, colleagues, patients, community members, and other stakeholders

This is an opportunity to obtain momentum and buy-in around your research

Step 4: Brainstorm How to Answer Your Question

- Consider the various types of research and which method will provide the information you want to contribute to the topic.
- Types of research include:
 - Quality improvement, descriptive, interventional, implementation and/or dissemination
- Take into account what has already been done on your research topic and is already known
- Take into account what you are trying to accomplish and contribute

Step 5: FINER

Review the FINER criteria

- Feasible: Is your question feasible to answer with the time/resources you have?
- Interesting: Is your question of interest to you and the broader community?
- Novel: Will answering the question add to the current literature? How?
- Ethical: Is it ethical to study your research question?
- Relevant: Is answering your research question relevant?

Step 6: Refine the Question

- Further refine your research question based on Steps 1-5
- Seek out additional feedback from stakeholders

Example

A group of hospitalists wanted to find a way to improve the use of lung imaging during the COVID-19 pandemic. Specifically, they are interested in the role of ultrasound in the management of COVID-19.

In patients with respiratory symptoms (P), does lung ultrasound (I), compared to Chest CT scan (C) improve the management of COVID-19 (O)?



Example

The group conducted a literature review using the following terms:

"ultrasound OR POCUS" AND "COVID-19 imaging OR lung CT" AND "[respiratory illness] OR [pneumonia] OR [cough] OR [shortness of breath]" AND "management OR diagnosis OR treatment OR outcome"

They found several articles discussing the benefit of lung ultrasound in diagnosing and managing COVID-19. Other articles discussed the burden of formal lung imaging on hospital flow.

Example

Based on this, the group refined their question to focus on the impact of Lung POCUS training on physician comfort and accuracy in diagnosis of COVID-19.



In patients with respiratory symptoms (**P**), does training physicians in point of care lung ultrasound (**I**), compared to before this training (**C**), improve physician comfort and accuracy in diagnosing COVID-19 (**O**)?

Example



The team decided to do an interventional study.



They propose to do a virtual training of Lung POCUS among emergency and hospital physicians and will document physician comfort and accuracy in diagnosis of COVID-19 pre- and post-receipt of training.



Secondary research aims will evaluate the time to diagnosis with ultrasound compared to traditional imaging modalities.



The proposal was presented to hospital administration who agrees to purchase twelve butterfly ultrasounds dedicated to this research project.



The project will be completed within one year.

Developing your research question

