



Developing research questions that make a difference

Cecilia Maria Patino^{1,2}, Juliana Carvalho Ferreira^{2,3}

BACKGROUND

A clinical research question is defined as an **uncertainty** about a health problem that points to the need for meaningful understanding and deliberate investigation. ⁽¹⁾ For clinicians interested in conducting high-quality clinical research, it is essential to recognize the fact that the research process starts with developing a question about a specific health-related area of interest. This is important because once the research question is defined, it has an impact on every remaining component of the research process, including generating the hypothesis and defining the appropriate study design, as well as the study population, study variables, and statistical approach. However, conceiving a sound research question is not an easy task; it requires having a particular set of personal skills and utilizing structured approaches.

DEVELOPING AND WRITING A RESEARCH QUESTION

Developing a research question starts by identifying a clinical problem that is important to patients, being related to managing and ultimately improving their health. The process requires clinician scientists to be curious about and attentive to day-to-day practice outcomes, as well as to be avid readers of the scientific literature, to participate in scientific activities (e.g., journal clubs), and to have access to a scientific mentor or collaborators interested in clinical research.

The research question itself should meet certain criteria, as summarized by the acronym FINGER, which stands for Feasible, Interesting, Novel, Good (for your career), Ethical, and Relevant (Chart 1). ⁽¹⁾ We recommend going through the FINGER criteria systematically and discussing all issues with

a mentor or colleague before writing the study protocol and conducting a study that will answer the proposed research question.

Once the research question has been defined, it should be written out in such a way that the answer can be expressed as either a number, typical of descriptive research questions (e.g., a prevalence related to disease burden, such as "What is the prevalence of asthma among favela residents in Brazil?"), or as a yes or no, typical of studies about associations between exposures and outcomes (e.g., "Is living in a *favela* in Brazil associated with increased mortality among adults with asthma?"). In addition, if the researcher has a hypothesis about the answer to the research question, ⁽¹⁾ it is important that it be written out using a comprehensive approach, as summarized by the acronym PICOT, which stands for **P**opulation (the population to be included in the study), **I**ntervention (treatment applied to participants in the treatment arm), **C**omparison (treatment applied to the control group), **O**utcome (the primary outcome variable), and **T**ime (follow-up time to measure the outcome). ⁽²⁾

INVESTING THE TIME AND EFFORT TO COME UP WITH A HIGH-QUALITY, WELL-WRITTEN RESEARCH QUESTION IS WORTH IT!

As clinician scientists who train clinicians to become successful researchers, we cannot emphasize enough the importance of investing one's time wisely to develop a high-quality research question. Researchers who conceive and clearly state a research question about an important health-related problem are at an advantage because they are more likely to convince key individuals to provide them with the necessary resources and support to carry out the study, as well as to increase the reporting quality of the paper to be published. ⁽³⁾

Chart 1. Expanded descriptions of the recommended criteria for developing a good research question.

FINGER Criteria	
F <u>Feasible</u>	Access to an adequate number of participants Research team has technical expertise to conduct the study Affordable: costs are reasonable and funding is available Can be completed in a reasonable time period
I <u>Interesting</u>	Results of the study will be of interest to the research community
N <u>Novel</u>	Provides new findings, extends or refutes previous findings
G <u>Good</u>	For your career: fits into your career development plan
E <u>Ethical</u>	Risk to participants is low/acceptable, considered ethical by peers and the Institutional Review Board
R <u>Relevant</u>	To improve scientific knowledge, inform clinicians and health policy, and to impact future research

REFERENCES

- Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing clinical research. 4th ed. Philadelphia (PA): Lippincott Williams and Wilkins; 2013.
- Haynes R. Forming research questions In: Haynes R, Sackett D, Guyatt GH, Tugwell P, editors. Clinical Epidemiology: How to do Clinical Practice Research. Philadelphia, PA: Lippincott Williams & Wilkins; 2006. p. 3-14.
- Rios LP, Ye C, Thabane L. Association between framing of the research question using the PICOT format and reporting quality of randomized controlled trials. BMC Med Res Methodol. 2010;10:11. <http://dx.doi.org/10.1186/1471-2288-10-11>

1. Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA.
2. Methods in Epidemiologic, Clinical and Operations Research (MECOR) Program, American Thoracic Society, New York, NY, USA, and Asociación Latinoamericana de Tórax, Montevideo, Uruguay.
3. Divisão de Pneumologia, Instituto do Coração – InCor – Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo, São Paulo, Brasil.