

Defining & Refining Your Research Question

A well-defined research question is the key to developing a good research proposal. The question will determine many subsequent issues in protocol development, such as- who should we study, what should the control be, what outcomes should we measure. If the research question is muddled, the whole project will likewise be muddled.

Sometimes the research question is clear at an early stage - we may have a new technology and wish to know whether it is superior to previous practice. However, research is often triggered by more vague ideas. Looking at clinical practice we find ourselves wondering 'why is this happening or what is the effect of doing that'. At this point we need to focus on the specific question.

You will probably want to consider at some stage whether your question is original and whether it is answerable, but at this stage it is probably best to focus upon whether it is important. A trivial question is not worth wasting time upon.

The greater the burden of disease, the more important the research question is likely to be. This may relate to the prevalence of the disease, e.g. sprained ankle, or the severity of the disease, e.g. major trauma. Alternatively, the importance of a research question can be seen to be related to the potential for improvement in practice. If present practice is highly unsatisfactory, for example diagnosis tests for pulmonary embolism, this is likely to be a fruitful area for research.

What type of question are you asking? This will guide your subsequent methodology. Various types of research questions are outlined below.

Evaluating a therapeutic intervention (clinical trial)

You wish to know whether an intervention will improve outcome in a particular group of patients.

Evaluating a service-level intervention

This is similar to the evaluation of a therapeutic intervention, but in this case the intervention may be a change in the way services are delivered or organised.

Determining the cause of an outcome

You wish to know whether a particular factor, such as a social or environmental factor, causes a specific outcome. You cannot control exposure of individuals to this factor, as you would in a clinical trial, so you need to use observational techniques.

Predicting an outcome

You wish to know whether a future event can be predicted by present features in a defined group of patients.

Evaluating a diagnostic test

You wish to determine whether a test can accurately diagnosis a specific condition in a defined group of patients.

Measuring health

You wish to quantify some aspect of health among a particular group of individuals with a common defining characteristic.

Measuring opinions, beliefs, or attitudes

You wish to elicit the opinions, beliefs, or attitudes of a particular group of individuals with a common defining characteristic.

Most researchers in emergency medicine will be most familiar with quantitative, rather than qualitative, research methods. In quantitative research the question is often phrased as a hypothesis (i.e. a prediction). For example- 'outcome after sprained ankle is improved by physiotherapy' or 'wearing a cycle helmet reduces the likelihood of serious head injury'. The research question is therefore simply- is the hypothesis true?

Alternatively, the question may take the form of a measurement, such as 'What is your probability of survival to discharge home after a cardiac arrest?' or 'How long does it take to recover from a Colles fracture?'

Whatever form the question takes, it needs to be well-defined. One useful way of focussing a research question is to use the PICO approach:

- People, patients or population- who are you asking the question about?
- Intervention- what intervention are you interested in?
- Control or comparison- what are you comparing the intervention to?
- Outcome- what outcome are you interested in measuring?

Although this approach may only seem relevant to clinical trials, with some minor modification it can be applied to studies of causation, diagnostic tests or prediction. Instead of considering the intervention and control, you would need to consider the causal factor(s), the diagnostic test or the predictive feature(s) respectively.

Taking the question 'Is outcome after sprained ankle improved by physiotherapy?', we need to define which patients with sprained ankle we are interested in, what exact physiotherapy they will be given, what the alternative to physiotherapy will be, and what the most important outcome is. Hence, a refined version of this question might be- 'Do patients, with uncomplicated, grade II or III ankle sprains, who receive a course of physiotherapy return to full weight bearing quicker than those with routine instructions'.

This process should not simply consist of choosing the most convenient patients, interventions, and outcomes to study, but should focus on the important patients, interventions, and outcomes. Having chosen an important research topic you must focus on the important issues within that topic.

Some questions do not fit easily into the categories outlined above, particularly if they involve investigation area of health care about which very little is currently know, or if they are concerned with investigating complex psychological, social or cultural issues. In these situations, qualitative research methods may be required and the 'measuring' or hypothesis testing approach outlined here will be inappropriate.

Finally, it is worth considering the relevance of your research question. Some questions are highly relevant to a particular institution or individual but of little relevance outside that setting. Other people are unlikely to be interested in your research findings if they are not relevant to their situation.