Refining Research Questions

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Geyman has called research "perhaps the most exciting dimension in the future of family practice. . . ."[1] He suggests a number of issues of fundamental importance to primary care that have intriguing research potential:

1. Are health maintenance and preventive procedures cost effective?
2. Do our diagnostic and therapeutic methods work?
3. What are the functional outcomes of primary care?

These are relevant and challenging questions for the prospective investigator, but there are hazards in seeking the answers. While the questions are important, they are also broad and can seldom be answered in such general form. Many well-intentioned researchers become discouraged at their inability to solve the complex problems they encounter while trying to answer what appear to be straightforward questions.

More often than not the investigator fails to properly translate the research problem into a specific question which has a reasonable chance of being answered with available resources. This very process of refining the question is vital to its solution. In the words of Albert Einstein, "The formulation of a problem is far more often essential than its solution, which may be merely a matter of mathematical or experimental skill."[2]

Simplicity as well as specificity is needed. Scientific progress is made gradually, in small steps, by different investigators over long periods of time. For an individual investigator this means that a small, clearly defined research project is preferable to one that is large and vague. The essential ingredient for any study is a well-defined research question.

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Procedure

One approach to the process of refining a question is outlined here. For simplicity, a series of steps are described, the sequence of which can be altered when desired. The procedure is as follows:

1. State the general research question.
2. Define the population to be studied.
3. Define the period of time for the study.
4. Select the variables to be measured.
5. Change nonspecific variables into specific variables that can be measured.
6. Determine how to measure each variable.
7. Estimate the resources required to measure each variable.
8. Estimate the feasibility of conducting the study by comparing the resources needed with those available.
9. Restate the research question in a refined form that *can* be studied with available resources.
10. Formulate a hypothesis which proposes an explanation for the refined research question.

This procedure is illustrated in Table 1. Stated first is the general research question (step 1), "Is continuity of care beneficial?" This question is obviously important, but is too broad to be studied without refinement. Such terms as "continuity," "care," and "beneficial" need definition. Variables must be found that can be measured. The study population must be identified.

To clarify the research question, an investigator might decide to study only the hypertensive patients in a family medicine group practice (step 2) and observe them for two years (step 3). Since the nonspecific variable (step 4), "continuity of care," cannot be measured as such, the more specific variable (step 5), "return visits to the same physician," is substituted as an indicator of continuity. The term "beneficial" will be interpreted as meaning "beneficial for the patient," which can be considered a nonspecific variable. This, in turn, must be represented by the more specific variable "patient satisfaction," which can be measured.

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Table 1. Example of Refining a Research Question

(1) General Research Question: Is continuity of care beneficial?

(2) Population to be studied	(3) Study period	Variables to be Measured (4) Non-specific	(5) Specific	(6) Methods of Measurement	(7) Resources required	(8) Estimate of feasibility
Hypertensive patients in a family medicine group practice	2 years	Continuity of care	Return visits to the same physician	Enumerate from medical records	Clerical	Little extra expense—*feasible*
		Beneficial for the patient	Patient satisfaction	Questionnaire	Investigation of other questionnaires. Possible consultants. Printing and mailing.	Expensive but *feasible*
		Control of Blood pressure	Blood pressure readings	Medical records	Trained abstractors	Expensive—*not* feasible
		Patient morbidity	List of patient problems	Medical records	Trained abstractors	Expensive—*not* feasible
		Beneficial for the physician	Physician satisfaction	Questionnaire	Same as for first questionnaire (see above)	Expensive—*not* feasible

(9) Refined Research Question: Are hypertensive patients returning to the same physician satisfied with their medical care?

(10) Hypothesis: Hypertensive patients returning to the same physician are satisfied with their medical care.

The method of measurement (step 6) for "return visits" is to count them as recorded in each patient's medical record. Since this can be done with little difficulty by clerical personnel (step 7), it is judged to be feasible (step 8). "Patient satisfaction," on the other hand, will require a questionnaire for measurement. Extensive investigation of existing instruments will be required, and expert consultation may be necessary to develop one appropriate to the present study. Further feasibility of measuring "patient satisfaction" is not as clear as for "return visits." In this study the decision is made to include both variables but to limit the study to these two. Other variables, such as "control of blood pressure," "patient morbidity," and "physician satisfaction" will be omitted because of limited available resources.

The end result of this process is a refined research question (step 9), "Are hypertensive patients returning to the same physician satisfied with their medical care?" The hypothesis chosen (step 10) is "Hypertensive patients returning to the same physician are satisfied with their medical care."

Obviously, by refining the question so extensively, the investigator in this example will only address a very small portion of the issue of continuity of medical care. On the other hand, he or she has at least a reasonable chance of completing the study, answering the research question, and perhaps making a useful contribution to medical science.

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References

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