

Educational Research: Time to Reach the Bar, Not Lower It

I believe that emergency physicians are among the best clinical educators in academic medicine and that a tradition of outstanding clinical education is one of the defining characteristics of our field. Being a great educator, of course, requires knowing not only what to teach but how to teach. When accepted educational methods are systematically studied, however, we sometimes find that they are either less effective than we believed or that alternative methods are more effective. For example, it is now well documented that the traditional didactic lecture on a clinical topic is ineffective for changing postresidency physicians' clinical behavior.^{1,2} Defining the most effective methods for teaching resident physicians is increasingly important as we attempt to fit a larger and larger quantity of medical, scientific, social, and administrative content into residency training. Moreover, the definition of six areas of competency to be achieved by residency graduates in all fields by graduation does little to define practical and effective methods for teaching this material or measuring success.^{3,4}

Our tradition of clinical and educational excellence notwithstanding, the field of emergency medicine is still striving to define and distinguish itself in the realm of research. While tremendous gains have been made in this area, there is still much to be done if we are to gain an equal footing with the traditional core disciplines within academic medicine. Regardless of the quality of our clinical activities, the currency within academic medical centers that most reliably garners respect is research productivity measured by extramural funding. This is unlikely to change in the foreseeable future.

These two factors, our tradition of excellence in clinical education and our need, as a field, to increase the quality and impact of our research activities, result in a key opportunity for our field. Emergency medicine is poised to be the academic specialty at the cutting edge of research into educational methodology—to determine the best methods for training physicians to be effective health care providers in the 21st century. While we may be poised, are we ready to take the lead?

Performing high-quality educational research is hard. The basic rules of educational research are no different than for clinical research—one must have a clearly defined and important hypothesis to be tested that is answerable using reliable and valid measures on a suitable population to which one has access. Care must be taken to ensure that the study design minimizes bias and, when bias is unavoidable, one must

include provisions to estimate its direction and magnitude. Following these rules while conducting clinical research is difficult; while performing educational research it is often much harder. Moreover, establishing a career based on achievement in educational research requires not one or two studies but a pattern of investigation that demonstrates a growth in the sophistication of the hypotheses being tested and of the investigator. Establishing such a pattern requires long-term commitment, both by the investigator and on the part of their department and institution.

Consider, for example, the problem of defining the study population in educational research. There are really two populations: the students or residents being taught and the faculty or other personnel doing the teaching. In order to obtain results that are reliable and externally valid, it is important that both of these populations be large enough and representative of residents and educators at many different institutions. It is virtually impossible to obtain large and diverse enough samples at a single institution. An emergency medicine residency training program may have 20–40 residents and 10–30 faculty. These numbers are really too small to form the basis for a clinical trial. Thus, high-quality educational research must virtually always be multi-institutional.

It is often difficult to define the outcome of interest in an educational study. Many of the skills we are trying to teach are complex and multidimensional and involve the ability of the resident to apply knowledge to a varied and diverse set of patient care problems. Once the skill or knowledge to be taught is defined, there still remains the task of developing measures of the outcome and demonstrating the reliability and validity of those measures. Ironically, much of the educational research currently published, across many fields, is based on outcome measures that would never be deemed reliable or valid enough to be used in an educational testing setting. Consider, in contrast, the extraordinary effort that is devoted to ensuring the reliability and validity of American Board of Emergency Medicine examinations.^{5,6}

Given the obvious importance of obtaining reliable answers to fundamental questions regarding best methods of teaching emergency medicine to our residency trainees, how can we overcome the challenges associated with performing high-quality educational research? First, we must acknowledge that research examining educational methodologies is an important, fundamental, and necessary part of the

career of emergency medicine educators. Any commitment to educational research must be backed up, however, with protected time above and beyond that required to simply administer educational and residency programs to allow the medical educator the time to acquire research skills, set up multi-institutional collaborations, complete the research, and publish the findings. Second, we must raise our expectations regarding the domain expertise of our medical educators. While I believe emergency medicine sets, in general, very high standards regarding clinical knowledge and general teaching skills, we must also expect our educators to have an understanding of modern educational principles and educational research methodology, including principles of psychometric measurement (questionnaire and test development, measuring internal validity, and so on). Third, we must ensure that those devoting the time and effort necessary to produce high-quality educational research receive the professional status and recognition they deserve. Specifically, educational research must be viewed as equally valuable as basic scientific and clinical research in the eyes of academic promotions committees, chairs, and deans. It would be shortsighted to acknowledge the contributions of those who generate the basic scientific and clinical results that form the basis of emergency medical care while devaluing the contributions of those who ensure these advances are incorporated into the practice armamentarium of the next generation of physicians. Lastly, and perhaps most controversially, we should gradually reduce and eventually eliminate the publication in peer-reviewed journals of educational research studies that fail to meet the quality standards required of clinical research studies. Examples of such publications include small, single-center studies in which the number of educators is so small that the results are not generalizable to any other setting. (Consider the generalizability of a study in which all instruction is provided by two or three people.) Similarly, educational concept papers published in the peer-review literature should be required to include data that demonstrate the effectiveness of the educational techniques being discussed. In the

basic sciences and clinical sciences, opinion and concept pieces are usually written by those with long investigative careers who include summaries of results from multiple primary studies to support their analysis or insights. Currently, many educational concept papers are not required to meet this standard for supporting evidence. While I understand this last recommendation will be offensive to some, I believe respect for educational research will only be ensured by raising the bar to a level equivalent to that for other types of research (hence the title of this commentary).

There are great opportunities in educational research. There are opportunities to improve the effectiveness of resident and medical student education, both within emergency medicine and across all clinical disciplines; opportunities to improve the quality of clinical practice of the next generation of emergency physicians; and opportunities to set the standard for investigations into a fundamental part of what we do as academic emergency physicians: teach. It is time to reach the bar.—**Roger J. Lewis, MD, PhD** (roger@emedharbor.edu), *Department of Emergency Medicine, Harbor-UCLA Medical Center, Torrance, CA*
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