PROFESSIONAL DEVELOPMENT

Education Research: A Primer for Educators in Emergency Medicine

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Abstract

As medical educators strive to adopt an evidence-based, outcomes-driven approach to teaching, education research in emergency medicine (EM) is burgeoning. Many educational challenges prompt specific research questions that are well suited to investigative study, but educators face numerous barriers to translating exciting ideas into research publications. This primer, intended for educators in EM, provides a brief overview of the current scope and essential elements of education research. We present an approach to identifying research problems and conceptual frameworks and defining specific research questions. A common approach to curricular development is reviewed, as well as a fundamental overview of qualitative and quantitative methods that can be applied to educational research questions. Finally, suggestions for disseminating results and overcoming common barriers to conducting research are discussed.

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The field of medical education research is experiencing rapid growth, as the numbers of education research manuscripts and journals dedicated to the investigation of educational outcomes continue to increase.[1–5] However, education researchers face challenges that limit the quality of reporting of medical education studies.[6,7] Such challenges include limited research training, funding, resources, and experience among educators; difficulty navigating the institutional review board process; small sample sizes; and difficulty defining outcomes that are both relevant and measurable.[8] Necessary elements for quality education research include incorporating theoretical frameworks, using rigorous study designs, and selecting meaningful study outcomes.[9–17]

In emergency medicine (EM), interest in education research is flourishing. This is the third annual edition of an *Academic Emergency Medicine* supplement devoted entirely to educational issues and reports. The Council of Emergency Medicine Residency Directors (CORD) has begun to regularly offer the Association of American Medical College's Group on Educational Affairs Medical Education Research Certification (MERC) faculty development opportunity at the CORD Academic Assembly.[18,19] Finally, the topic for the 2012 *Academic Emergency Medicine* consensus conference will be education research. However, the body of high-quality, EM-specific literature to help meet the unique educational challenges in our field is small. Reviews of medical education studies published in 2008 and 2009 that were both rigorous and had outcomes pertinent to teaching and education in EM identified only 12 such publications.[20,21]

The aim of this article is to present EM educators with a general overview of how to begin conducting education research in academic EM. We will discuss approaches to forming a research question, selecting a study design, overcoming barriers, and preparing for dissemination of the results. Each type of study design discussed will be illustrated with examples from the medical education literature.

DEFINING RESEARCH PROBLEMS AND QUESTIONS

The educator's first step when embarking on a research project is to identify a research problem. Research problems can be inspired by current education

controversies, programmatic needs, or personal interests. Educators in EM continually face educational problems, and the majority of these problems are addressed by making curricular changes based on tradition and experience, mandates from guidelines, and emerging educational theories or innovation. Program and clerkship directors rarely have the time or resources to conduct research prior to implementing change. However, the educational problems that inspire or necessitate change are precisely the problems that would benefit from rigorous investigative study. The following scenarios are examples of some of the problems that educators address:

- A program director reviewing annual program evaluations finds that the residents report dissatisfaction with the feedback they receive during clinical shifts. Faculty agree that they feel unprepared to deliver effective feedback and feel that the barriers to giving feedback during shifts are nearly insurmountable.
- A residency education manager is preparing for the next Residency Review Committee (RRC) site visit and is unsure how to approach documenting that the residency program is making data-driven improvements in the curricula and using external measures to verify resident and program performance, in accordance with Phase 3 of the Accreditation Council for Graduate Medical Education (ACGME) Outcome Project.[22]
- A simulation director has had multiple complaints from students that the simulation debriefings are ''too malignant'' and is interested in changing her style in a way that would be most effective educationally and would also be well received by the students.

Once a research problem has been identified, the next step is for the educator to become familiar with what is known about the problem before seeking to frame the specific research question. This process involves reviewing both the medical education literature and the relevant publications in other disciplines. A reference librarian can be helpful in identifying journals and search engines that include work in disciplines outside of medicine. Creating an annotated bibliography during the literature review can be very helpful when writing manuscripts, grants, and future project proposals months after the initial search. The annotated bibliography should include notes about the relevance of the publication to the research problem, as well as specific elements that may be helpful to reference in future manuscripts.

While completing the literature review, attention to understanding the conceptual frameworks that have been used to approach the problem is also necessary to frame the research question. Bordage[23] proposed that conceptual frameworks ''represent ways of thinking about a problem or a study, or ways of representing how complex things work the way they do.'' Conceptual frameworks may derive from educational theories (such as deliberate practice), models (for example, Kern's six-step curriculum development framework),[24] or evidence-based practice guidelines, and the framework used to guide the study will determine which

aspects of the problem are illuminated and explored.[24,25] Therefore, well-designed studies will pose the research question in the context of the conceptual frameworks being used. Bordage uses the example of seeking to improve conference attendance. The director initially assumes a change in venue will solve this problem. However, a more informed researcher, considering one possible conceptual framework of social learning theory, will generate several hypotheses as to why attendance is low, such as low attention, retention, or motivation. Readers are referred to the Bordage article for further discussion of conceptual framing.

With an understanding of the conceptual framework, the researcher can begin to craft the research question. Hulley et al.[26] present an approach for developing a clinical research question that is relevant to educational research as well. This approach can be remembered using the mnemonic *FINER*:

F—Feasible

  Are there adequate subjects?
  Do you have the technical expertise to conduct the study?
  Is the study, as designed, affordable and manageable?

I—Interesting to Investigator
N—Novel

  Does this proposed study confirm or refute previous findings?
  Does it extend or provide new findings?

E—Is the study Ethical?
R—Relevant to science, policy, future directions

When addressing relevance, it important to consider both the research context (will this question add to the current knowledge in a meaningful way?) and the policy context (how will the results be applied?). Questions that are relevant from a research context will add to current knowledge in at least one of three ways: 1) by addressing gaps in existing knowledge base, 2) by expanding on what is currently known to new ideas or practice, or 3) by publicizing the voice of new individuals or populations not previously considered in published studies.

STUDY DESIGNS IN EDUCATION RESEARCH

When selecting a study design to address an education research question, it is important to strive for the same scientific standards established in clinical research, while simultaneously considering strengths and drawbacks of applying a specific design to an educational problem. Manuscripts that are published in education journals usually can be categorized as curricular innovations, consensus conference proceedings, or qualitative or quantitative research studies. We will address each of these methods separately.

Curricular Innovations
Many educational problems prompt the development of curricular interventions. Educators aiming to publish new curricula or eventually study the effect of

implementing the intervention on a given outcome should use a rigorous process of curriculum development to lend credibility to their innovation. Kern et al.[24] describe a six-step process of curriculum development that is widely used: 1) problem identification and general needs assessment, 2) targeted needs assessment of the learners, 3) educational goals and objectives, 4) instructional strategies, 5) implementation, and 6) evaluation and feedback.

While various approaches to curriculum development have been described, most advocate addressing each of these steps in a formal fashion when developing new educational interventions.[27–33] When designing outcomes, sustained behavioral or performance outcomes that can be objectively measured are likely to have better validity, broader relevance, and ultimately greater effect than learner satisfaction or confidence outcomes that are subjectively reported. Commonly reported outcomes, listed in ascending effect, are:[24,34] 1) learner satisfaction or self-reported confidence, 2) knowledge outcomes, 3) skills or attitudes, and 4) behaviors or performance outcomes. Readers of a new curricular design want to be assured that the intervention can be successful at their own institution. To this end, multisite studies that show favorable outcomes among a variety of learners at different settings should be considered whenever possible.

Consensus Proceedings

A consensus conference can be a powerful way of identifying and addressing knowledge gaps in important topics in EM education. Translating interactive work accomplished at a conference as a "consensus proceedings" manuscript can be a way to capitalize on the efforts of a group of similarly invested people. However, to be considered as consensus proceedings, advance work is necessary. Institutional review board approval must be sought. Attendants must be tracked and categorized, ensuring that thought leaders and peers are represented. An agenda must be planned, and a formal process for achieving consensus must be described and adhered to, such that all participants accept the outcome. One such process, called the Delphi method, is widely used and accepted; modifications to this method are an option as well (a "modified Delphi process"). In the EM literature, *Academic Emergency Medicine*'s annual consensus proceedings issues offer successful examples of this type of work.

Qualitative Studies

Once the research problem and question have been clearly defined, the educator must decide whether to use qualitative or quantitative methods (or a combination of both, known as "mixed methods") to design the study. Although the majority of studies published in the EM literature are quantitative studies, qualitative methods have advantages for certain questions and problems and are widely used in the social sciences and other disciplines of education. Both methods are equally rigorous and valid, but each is more likely to lead to meaningful results if the method is appropriately matched to the nature of the problem and question. The two methods can be differentiated by their philosophical foundations, the nature of the research problem, the developmental stage of the research theory, and the type of reasoning used in each method. Table 1 illustrates the differentiating features of the quantitative and qualitative methods. Table 2 lists examples from the medical literature that employ both qualitative and quantitative study designs.

Qualitative research stems from the philosophy of phenomenology, which emphasizes a focus on the subjective experiences of individuals. Qualitative research involves extensive participant–researcher interaction, but requires a smaller sample size and relies on synthesizing non-numeric narrative and visual data. If the aim of the study is to explore and seek to understand a central phenomenon, and the theory does not yet exist or is in early stages, qualitative methods are more likely to accomplish the intended goal of the project. Qualitative research uses inductive reasoning: one starts by recording observations, which then are explored and analyzed to identify patterns and themes, which help to form a tentative hypothesis and eventually inform a theory.

Three commonly used qualitative methodologies in medical education research include interviews, focus groups, and qualitative analyses of free-text responses on surveys. Several approaches to qualitative research in medicine and other disciplines have been previously published and can be used for further reading on planning this type of research.[35–42]

An example of a research problem that could be approached by qualitative methods involves the above program director whose faculty perceive that there are insurmountable barriers to giving resident feedback. If he is beginning this inquiry without any previous knowledge of what potential barriers might be, then a *qualitative* study of his own residents and faculty might be the first step in eliciting possible obstacles to delivering effective feedback in the ED. Once the main barriers are identified, a follow-up *quantitative* study could be planned in which he observes clinical teaching interactions and categorizes the frequency of each type of barrier.

Table 1
Selecting a Quantitative Versus Qualitative Approach

	Quantitative	Qualitative
Philosophical foundation	Positivism	Phenomenology
Research problem	Describe or explain relationship	Explore and understand a phenomenon
Type of data	Numerical	Narrative/visual
Sample size	Larger	Smaller
Participant interaction	Little interaction	Extensive interaction
Relationship to theory	Theory-testing	Theory-building
Reasoning strategy	Deductive reasoning	Inductive reasoning

Adapted from Gay LR, Mills GE, Airasian P. Educational Research: Competencies for Analysis and Applications. Upper Saddle River, NJ: Person Education, Inc., 2006, Table 1.1.

Table 2
Examples of Qualitative and Quantitative Study Designs in the Medical Education Literature

	Citation
Qualitative	Sargeant J, Armson H, Chesluk B, et al. The process and dimensions of informed self-assessment: a conceptual model. Acad Med. 2010; 85:1212–20.
	Williams KN, Ramani S, Fraser B, Orlander JD. Improving bedside teaching: findings from a focus group study of learners. Acad Med. 2008; 83:257–64.
	Thurgur L, Bandiera G, Lee S, Tiberius R. What do emergency medicine learners want from their teachers? A multicenter focus group analysis. Acad Emerg Med. 2005; 12:856–61
	Goldman E, Plack M, Roche C, Smith J, Turley C. Learning in a chaotic environment. J Workplace Learn. 2009; 21:555–74.
Quantitative	
Descriptive	Coates WC, Love JN, Santen SA, et al. Faculty development in medical education research: a cooperative model. Acad Med. 2010; 85:829–36.
	Titus MO, Losek JD, Givens TG. Pediatric emergency medicine fellowship research curriculum: a survey of fellowship directors. Pediatr Emerg Care. 2009; 25:550–4.
	Glaspy JN, Ma OJ, Steele MT, Hall J. Survey of emergency medicine resident debt status and financial planning preparedness. Acad Emerg Med. 2005; 12:52–6.
Analytic	Nonnemaker L. Women physicians in academic medicine. N Engl J Med. 2000; 342:399–405.
	Papadakis MA, Teherani A, Banach MA, et al. Disciplinary action by medical boards and prior behavior in medical school. N Engl J Med. 2005; 353:2673–82.
	Warnecke E, Quinn S, Ogen K, Towle N, Nelson MR. A randomized controlled trial of the effects of mindfulness practice on medical student stress levels. Education. 2011; 45:381–8.
	Cook DA, Thompson WG, Thomas KG. Case-based or non-case-based questions for teaching postgraduate physicians: a randomized crossover trial. Acad Med. 2009; 84:1419–25.
	Wolpaw T, Papp KK, Bordage G. Using SNAPPS to facilitate the expression of clinical reasoning and uncertainties: a randomized comparison group trial. Acad Med. 2009; 84:517–24.

Quantitative Studies

Quantitative research is based on a foundation of positivism, a philosophical belief that meaningful knowledge is that which can be verified through direct observations. Accordingly, these rely on statistical analyses of numerical data, collected with little interaction between the researcher and the participant. Large sample sizes are often needed to demonstrate statistical significance. Research questions that seek to describe or explain a relationship, based on existing theory, are best suited to quantitative methods, because quantitative research uses deductive reasoning: one starts with a theory, which guides a research hypothesis, which is then tested based on objective measures and is confirmed with statistical analysis.

In this broad overview we have used an epidemiologic construct to organize quantitative study designs, because the basic research terminology in this construct is more likely to be familiar to early career researchers than education research-specific terminology that has been adopted from other social science disciplines. Knowledge of education research-specific design terminology (e.g., experimental, quasi-experimental, correlational, causal-comparative) and the definitions of the numerous subcategories of each design is of relevance to the experienced education researcher in EM, but a detailed description of this framework is beyond the scope of this article. Quantitative methods defined in medical epidemiology can be adapted and applied to education research. Descriptive studies are those that seek to describe current conditions, while analytic studies aim to explore relationships between variables and establish cause–effect relationships. Figure 1 illustrates the traditional hierarchy of epidemiologic studies, with increasing ability to establish
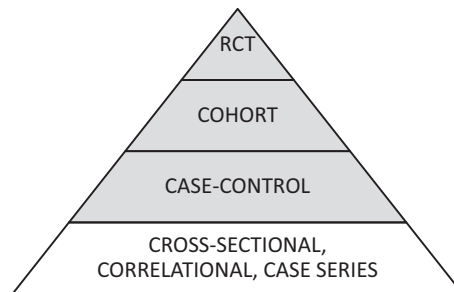

Figure 1. Hierarchy of quantitative study designs. RCT = randomized controlled trial. Shaded areas represent analytic study designs. The figure is from a lecture materials prepared by Dr. Thomas Becker and presented annually during his Clinical Research Design course for the Human Investigations Program at Oregon Health & Science University. Dr. Becker has granted the authors written permission to reproduce this material, which has not been formally published.

causality and generalizability at the top of the pyramid. Although studies that aim to establish cause–effect relationships require an analytic study design, it is important to consider the aim of the study when selecting a study design. Each study design has advantages and disadvantages, and the researcher should select the design that is best suited to answer the specific research question, while also being feasible to implement.

Descriptive Study Designs

The three descriptive study designs are case reports and case series, correlational (ecologic) studies, and cross-sectional studies. Case reports and case series usually refer to a published description of one or several presentations of a rare condition or a rare

presentation of a common condition. In epidemiology, case reports may signal a new epidemic or lead to a new hypothesis. In education research, the corollary to a case report is an educational innovation or description of an educational situation that is so novel and relevant that publication would benefit the greater community of educators. Most often, educational case reports describe new curricula, but case reports of unusual educational problems may warrant publication as well. Educational case reports, like epidemiologic case reports, can further have value in generating interest in planning more robust ways of evaluating the new tool, much as a pilot study would for noneducation research.

Correlational (ecologic) studies examine associations between exposures and an outcome with the unit of analysis being greater than the individuals exposed—for example, a geographic region. These studies are advantageous for generating hypotheses but do not provide individual-level information on predictor variables and outcomes. For example, a correlational design could be used to determine if medical schools with more students pursuing an elective rotation in EM have higher rates of students who pursue residency training in EM. If such an association were found, it would be suggestive of an association between taking an EM elective and choosing a residency in EM, but it would not be definitive—because we would not know whether the same students who took the elective chose EM residencies.

Cross-sectional studies rely on observations made at one point in time. Cross-sectional studies are relatively quick and inexpensive to conduct, are easy to understand, and can also be helpful for hypothesis generation. However, the lack of temporal information makes it difficult to establish a cause–effect relationship. While there are several types of cross-sectional study designs, the most common in medical education research are survey studies. Survey studies are interesting to both read and conduct, but are prone to design flaws and errors that can limit the validity of the results. Four types of error that should be considered when conducting survey studies include:

- Coverage error: the sampling frame does not include all the elements of the population being studied. For example, a mailed survey study of medical students conducted at a time when many students are on away rotations may not capture the responses of students who are not at their home mailing addresses.
- Sampling error: the researchers survey only a sample instead of a census, and that sample may not be representative of the greater population. For example, a survey of one program's residents' views on a politically charged issue may fail to account for the fact that applicants with certain political views may have been more attracted to that residency program in the first place, making the conclusions less nationally generalizable.
- Measurement error: the respondent's answer is inaccurate or imprecise or cannot be compared in a useful way to other respondents' answers. For example, a survey assessing students' sleep patterns while on their EM rotation compared with their internal

medicine rotation may be overly reliant on potentially inaccurate recall of their sleeping schedule while on these past rotations. Measurement error can be minimized with rigorous survey design, unambiguous wording, and piloting questions for clarity.
- Nonresponse error: subjects who do not respond are different from responders. For example, respondents may have opinions at each end of the spectrum of emotions about the surveyed issue and be motivated to complete the survey as a result. In this case, the responses collected may be different from those of the entire population.

In addition to considering possible sources of error, it is important to design an instrument that is both reliable (consistent over time) and valid (measures what it intends to measure). It is advisable to pilot the instrument with a sample group of participants and then revise the instrument based on feedback from that group. Furthermore, to generate a sufficient response rate, it is important to realize that surveys are a form of social exchange. The Tailored Design Method of survey development describes three critical elements of social exchange: rewards, cost, and trust.[43] Surveys are more likely to generate high response rates and quality information if subjects perceive that the costs are balanced by the rewards of participation, and they have a relationship of trust with the study investigators. The response rate necessary to draw conclusions from a survey study will vary with the specific goals, sampling procedure, and design of the survey. While there is no agreed-upon standard cutoff for an adequate response rate, a rate that approaches 70% is generally considered optimal for publication in most journals.

Analytic Study Designs

Analytic study designs that can be applied to educational questions include cohort studies, case–control studies, and randomized controlled trials. Cohort studies identify a population at a time prior to development of an outcome of interest and enroll groups of both exposed and unexposed subjects. Prospective cohort studies will then follow these groups over time to compare the rates of the outcome in both groups at a later point in time. An example of a question that could be addressed with a cohort study relates to the effect of early faculty development experiences on the attrition rate and academic productivity of EM faculty. To determine if there is a correlation between fellowship training and academic success, one could enroll two cohorts of newly hired EM faculty: those joining departments directly after residency training and those who had first completed fellowship training in an EM subspecialty. These groups could be followed over time and attrition and promotion rates between the two groups could be compared at a given interval after enrollment.

Case–control studies, if conducted rigorously, can approximate the results of a cohort study in determining the chance that a given exposure will lead to a certain outcome. In a case–control study, the view is retrospective—the researcher starts with a defined source population and identifies both the group that have the desired outcome (cases) and those who do not

(controls) in the same population. The researcher then looks back in time to assess exposure to variables of interest, and the exposure status of cases and controls can be compared to estimate the relative risk of developing the outcome in the exposed population. To return to the faculty development example, an approach using a case–control design would involve identifying a group of faculty 10 years out from being hired and identifying those who have achieved promotion (cases) as well as those who have not (controls). ''Exposure'' to prior fellowship training could then be measured in both groups, and relative risk (odds ratio) can be estimated. A benefit of case–control studies is that the effect of multiple exposures can be estimated in the same study, so in addition to assessing prior fellowship training, the presence of other exposures such as participating in formal mentoring, receiving annual performance reviews, and being supported with protected time could also be assessed in the same study to see if any of these exposures increased the likelihood of promotion.

Randomized, controlled trials (RCTs) are difficult to conduct in educational settings, but these true experiments represent the strongest method of establishing cause–effect relationship and producing results that can be applied to a broad population (i.e., having ''external validity''). RCTs test a new intervention versus a standard intervention and allow for controlling of confounding variables through randomization. Drawbacks include the time and expense required to conduct these labor-intensive studies and difficulty ensuring compliance among learners when implementing educational interventions. Residencies often lack the sample size necessary to power RCTs appropriately, but multicenter studies can allow investigators to pool resources and sample sizes and overcome these challenges.

SUCCESSFUL DISSEMINATION OF RESULTS

Many a successful project has languished in the manuscript preparation and publication phase. However, with attention to selecting a good fit for a target journal, chances for an acceptance can be maximized. Table 3 lists conferences and journals with a medical education mission.

Before choosing a journal, one should ensure that it has a record of accepting papers similar to the one being submitted. For example, some journals regularly accept case reports, while others rarely do. These policies, along with other essential information, can often be found in each journal's ''instructions for authors'' section. Attention to this portion of the journal's website is a must, since adherence to formatting rules, word count, and section headings is a critical first step in garnering the editor's support for the paper. The website can also be a source of valuable information regarding acceptance rates and average decision time, which the author can use to inform target journal selection.

Many new authors are daunted by the idea of communicating with journal editorial staff, yet the section editors can be valuable resources for advice when deciding if a journal is a good fit for an author's

manuscript. It is perfectly acceptable to communicate with a journal editor prior to formal submission.

OVERCOMING BARRIERS

Although many educators may be interested in conducting education research studies, there are both real and perceived barriers that prevent good ideas from being developed into well-designed studies that result in publication. Commonly voiced barriers include:

- Lack of time to pursue research. Because most clinician-educators juggle full-time clinical duties with residency or medical school educational leadership and administration roles, it may seem difficult to carve out time for research. One suggestion to overcome this is to ''make it count twice'' or design projects around curricular interventions or teaching experiments already being conducted. Collaborating with colleagues at other institutions and in other medical specialties or social science disciplines can also increase efficiency. Finally, funding opportunities for educational projects are increasing (Table 4), and it may be possible to buy down clinical time by attaining grant funding for research proposals.

Table 3
Selected Journals and Conferences Dedicated to Reporting Research and Issues in Medical Education

Journals dedicated to reporting research and issues in
  medical education
    Academic Medicine
    Academic Emergency Medicine (including the Education
      Supplement)
    Advances in Health Sciences Education
    American Journal of Surgery
    BMC Medical Education
    British Medical Journal (BMJ)
    Canadian Medical Education Journal
    The Clinical Teacher
    Education for Health
    Focus on Health Profession Education
    International Journal of Clinical Skills
    International Journal of Medical Education
    Journal of the American Medical Association
    Journal of Continuing Education in the Health Professions
    Journal of General Internal Medicine
    Journal of Graduate Medical Education
    Medical Education
    Medical Science Educator
    Medical Teacher
    New England Journal of Medicine
    Teaching and Learning in Medicine
Organizations hosting conferences at which education
  research is presented
    American Academy on Communication in Healthcare
    American Association of Medical Colleges
      (AAMC)—including the General Educational Affairs
      conference and the Research in Medical Education
      conference
    American Educational Research Association (AERA)
    Accreditation Council for Graduate Medical Education
      (ACGME)
    Council of Emergency Medicine Residency Directors (CORD)
    Royal College of Physicians and Surgeons of Canada
    Society for Academic Emergency Medicine (SAEM)
    International Association of Medical Science Educators

Table 4
Funding Sources for Education Research Projects

Funding Source Name	Website	Mission
NBME (National Board of Medical Examiners)∕Edward J Stemmler, MD Medical Education Research Fund	http://www.nbme.org/research/stemmler.html	To provide support for research or development of innovative assessment approaches that will enhance the evaluation of those preparing to, or continuing to, practice medicine.
Arthur Vining Davis Foundation	http://www.avdf.org/	To fund grants in health care on ''caring attitudes.'' Particular areas of interest include projects that promote caring attitudes through: interprofessional collaboration within the health care team, training of health care providers in patient-centered care, and improving the culture of physician education at both the undergraduate and the graduate levels.
Josiah Macy Jr. Foundation	http://www.josiahmacyfoundation.org	Dedicated to improving the health of the public by advancing the education and training of health professionals.
Arnold P. Gold Foundation for Humanism in Medicine	http://www.humanism-in-medicine.org	To perpetuate the tradition of the caring doctor by emphasizing the importance of the relationship between the practitioner and the patient.
Robert Wood Johnson Foundation	http://www.rwjf.org/index.jsp	To improve the health and health care of all Americans.
William Randolph Hearst Foundations	http://hearstfdn.org	To ensure that people of all backgrounds have the opportunity to build healthy, productive, and inspiring lives.
CORD Education Research Grant	http://www.cordem.org	To support the advancement of educational research, specifically as it relates to emergency medicine education.

However, this can lead to the unintended consequence of taking the best educators away from clinical teaching.

- Lack of experience or research training. Faculty development opportunities in research methods can offer a payoff in career success and satisfaction. Many institutions have research certificate training programs, formal master's degrees (such as Master of Public Health, Masters of Clinical Research, Master of Health Professions Education, or Master of Science in Health Services), or educators' curricula that may include specific education research training. Local graduate schools of education often have education research methods classes that can be audited or taken on a quick-entry track. Within EM, the CORD preday session of MERC courses offers participants the opportunity to work toward a research certificate in a mentored environment that encourages present and future collaborations.
- Difficulty identifying a research problem. Educators may have research ideas that interest them, but still find themselves unsure where to start in defining the research problem. A good first step is to start by becoming an enthusiastic consumer of the medical education literature. Reviewing issues of medical education journals in other fields to see what the ''hot topics'' are, and attending poster and oral presentation sessions at national meetings can help researchers identify what next steps are necessary in the field, and allow participants the chance to see modeled successful research projects and network to

find potential collaborators. Attending an education-specific conference that is outside of EM, or multidisciplinary, can be a valuable experience as well. Within EM, this annual educational supplement provides a good overview of current issues in EM education research. Finally, in May 2012, the *Academic Emergency Medicine* consensus conference being held at the SAEM Annual Meeting will be ''Education Research in Emergency Medicine: Challenges, Opportunities, and Strategies for Success.'' This summit of EM educators and stakeholders, facilitated by the involvement of national and international leaders in medical education research, will stimulate the development of a coordinated initiative within EM aimed at advancing effective and validated educational techniques at all levels by informing the research agenda in education science for the next decade. Attendants at this conference will shape the next phase of education research in EM.

CONCLUSIONS

Although conducting research may seem daunting to educators, becoming active consumers of and contributors to the EM-specific education research literature is the most effective way for educators to advance the science in our field. Raising the bar for education research in EM will benefit faculty in achieving career goals, will benefit learners participating in curricula that have been rigorously developed and are evidence-based, and

has the potential to improve the ultimate outcome of our educational efforts: patient care. The combination of increasing interest in education research, expanding faculty development offerings, and programmatic mandates to adopt outcome-driven, evidence-based curricula have resulted in unparalleled opportunities for education researchers. Each educational problem represents an opportunity for scholarship, and each educator has the opportunity to affect a broad population of learners by joining the ongoing efforts to improve the way we train doctors.

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