

A More Ambitious Agenda for Medical Education Research

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Given how much is spent annually on medical education, it is quite remarkable how little is invested in research to spur the generation of theories and provide evidence about what works and what does not. In the arena of graduate medical education (GME), we are all familiar with the figure of \$9.5 billion, the amount the Centers for Medicare & Medicaid Services expends annually on direct and indirect medical education payments.¹ However, the actual annual expenditure on residency education, including Veterans Administration funding, the contributions of the states through Medicaid, and the support that hospitals provide to fund residency positions over their cap, is likely closer to \$15 billion. And that's only GME—undergraduate medical education must add at least several billion more each year in direct expenses, to say nothing of the “donated effort” of preclerkship and clinical teachers and educational leaders.

If just one-tenth of 1 percent of this amount were devoted to medical education research, we would have reliable funding of \$20 million per year, but there is no such reliable stream. Such funding that does exist tends to be modest in amount and quite focused on the specific interests of the funder, examples being funding or research on professionalism by the Arnold P. Gold Foundation, methods of assessment by the National Board of Medical Examiners' Stemmler Fund, and interprofessional education and practice by the Josiah Macy Jr. Foundation. The Department of Education formerly operated the Fund for the Improvement of Postsecondary Education, supporting a broad portfolio of education research, including medical education research.² Unfortunately, the Fund for the Improvement of Postsecondary Education program was terminated as a consequence of significantly decreased funding to the Department of Education in the fiscal year 2011 budget.

This makes the fact that we are able to accomplish medical education research at all somewhat remarkable, and the accomplishments of the investigators whose work is reviewed in the reviews by Eaton, Locke, Wohlauer, and

their colleagues are impressive. The authors queried the medical education literature in an effort to discern salient themes being addressed in methodologically sound studies. Two studies focused on GME in internal medicine, and using different approaches of ascertaining and evaluating candidate papers, one study reviewed the surgical literature. All 3 studies sought to discern dominant themes in medical education research in the field.

The Locke et al review³ began as a “year in review” in medical education for general internal medicine GME educators; the authors sought to emphasize methodologically strong papers with findings that could be directly applied by the GME teachers in their intended audience. Therefore, the number of papers they recovered cannot be considered as indicating the flourishing, or lack thereof, of medical education research. Still, it is somewhat discouraging that a hand search of the tables of contents of 15 journals and a PubMed search produced 12 papers during a calendar year. Furthermore, the overall quality of the research is not particularly strong. A total of 7 of the 12 papers featured were single-institution studies, including 3 studies on approaches to learner assessment and all 3 investigations of the impact of and adaptation to duty hour reduction. The other 2 themes identified by Locke et al were learner distress and innovations in teaching.

Eaton and colleagues⁴ did not restrict themselves to papers anticipated to be of interest in a “year in review” format; they conducted a broader search, and consequently came up with a somewhat larger universe of articles: 223 during a 24-month period. Applying a validated instrument assessing the quality of medical education to the papers resulting from their search, they honed in on the 59 papers with quality scores in the top 25% of the score range, examining these for prominent themes. The grouping by Eaton and colleagues resulted in 5 domains: resident well-being; duty hour reduction and workload; career decision-making; simulation; and patient-centered outcomes. Like the Locke et al effort, Eaton et al encountered a number of single-institution efforts and identified study design and validity as pervasive methodologic weaknesses, even in the top group of papers published in this 2-year period.

The third review, a summary by Wohlauer and colleagues⁵ of influential papers in the surgical literature during a decade, selected the most frequently cited articles published in US journals between the years 2002 and 2012. It identified the use of simulation as the dominant theme in

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surgical research, followed by assessment of residents and students, specialty choice, patient safety, team training, measuring clinical competence, and teaching the clinical sciences. Studies primarily used descriptive methods, and the papers in the surgical literature shared some of the methodologic limitations found in the other 2 reviews.

Despite the significant methodologic weaknesses, I admire the perseverance and resourcefulness that were required to produce this body of research. However, I am struck by the relatively constricted universe and the “here-and-now” nature of the themes. This is a time of enormous change in medicine and medical practice, and consequently medical education should be changing as well. First, there is truly an explosion in the volume of information relevant to medical practice. It is said that the medical knowledge base doubles every 6 to 8 years. This exponential rate of increase means, of course, that a clinician who completes training at age 32 and practices until age 67 experiences 5 of these “doublings,” or a 64-fold increase in the information he or she must consider in the course of caring for a patient. Yet despite the lip service given to lifelong learning, we train and assess our residents in a model that emphasizes the knowledge commanded by the individual, rather than his or her ability to rapidly and effectively access and assess resources for patient care in the actual and virtual environments. The underlying capacity, the ability to recognize when outside resources are required, is even more important to address.

Another major development affecting information is its democratization. In the traditional model, the status of professionals depended to a significant degree on their access to and command of specialized knowledge; the professional, whether doctor, lawyer, or member of the clergy, then mediated the relationship of the patient, client, or congregant to that knowledge. First literacy and now the Internet have liberated information, and crowdsourcing makes it possible for ordinary people, individually and collectively, to convert that information into useful knowledge. This will transform the role of physicians and their relationships to patients.

The second development, a direct consequence of the first, is hyperspecialization. Across medicine, specialties are becoming subspecialized, and subspecialties are developing sub-subspecialties. Even generalist physicians are experiencing this phenomenon, with some family physicians preparing to provide first-contact care in underserved areas and many internists focusing on complex patients with multiple comorbidities. A corollary of this hyperspecialization is the need for teams of clinicians to cooperate in patient care. These teams may be actual teams whose

members interact face to face, but increasingly they will be virtual and will require advanced communication and collaboration skills across time and distance. Because of the democratization of information, individuals without professional backgrounds, such as personal trainers, will be proposing diagnoses and suggesting treatments more often. Physicians will need to learn to work effectively with an increasingly diverse set of colleagues.

A third major trend is the increasing prominence of technology in health care, just as its role is increasing in the rest of our lives. Critical moments of human experience—from conception to death—are now technologically mediated or forestalled. Medical education must ensure not only that physicians are prepared to deploy technology skillfully, effectively, and in a manner that adds real value, but also that they, or we, understand the effect on patients and their loved ones of “technologizing” these fundamental elements of human existence. When conception is attempted through the interventions of assisted reproduction or critical illness occurs in an intensive care unit, we must ensure that our trainees respond with deep empathy to the human experience and are not so distracted or fascinated by the technologies that they fail to respond with an attentive presence.

Each of these “mega-trends” suggests a critical research agenda for medical education. It is time for us to be far more ambitious; for too long, medical education research has accepted not only the goals of medical education, but also its fundamental structures and processes. This acceptance of the status quo is already limiting our ambitions; it will only become more costly with time. A more ambitious research agenda for medical education will require a sustained investment in its funding—medical education is simply too expensive an undertaking to proceed without the stimulus of a skeptical, critical, and creative research enterprise.

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