
CHALLENGES TO IMPLEMENTING AN EVIDENCE-BASED MEDICINE CURRICULUM

Thomas McGinn, MD, MPH, and Lawrence G. Smith, MD

Medical universities and clinical training centers are increasingly developing and implementing evidence-based medicine (EBM) into their curricula. These institutions are challenged not only to find the most efficient and effective means of teaching students, residents, and faculty the skills necessary to become competent and successful EBM practitioners, but also to overcome or avoid the potential barriers that may be encountered along the way. This article discusses 5 barriers to implementing an EBM curriculum and offers recommendations for addressing them.

Educational Settings

EBM may be implemented in formal settings (eg, journal clubs, seminars) as well as informal settings (eg, precepting in clinic, teaching sessions on ward rounds). One may encounter several predictable barriers when attempting to implement EBM teaching programs in these settings. Consider the barriers illustrated by the following scenario:

You are a second-year medical resident given the task of developing a clinical question for an EBM seminar scheduled for the end of the week. The EBM seminar leader instructs you to generate a question pertaining to a patient encounter and to attempt to answer your question by critically appraising 2 original articles.

One approach to introducing EBM in a clinically relevant way is to offer predetermined topics to ensure that the basic concepts of EBM are adequately covered. For example, residents can be given a written case example with a question and articles provided [1]. This streamlines the complex process of forming a clinical question

and searching the literature and keeps learners focused on critical appraisal skills in the basic areas of EBM (ie, diagnosis, treatment, prognosis, harm). This method is most helpful in situations in which seminars or conferences are removed from the clinical setting. However, because this method of teaching EBM is removed from actual practice, it may lose validity among housestaff who are resistant to the EBM paradigm. Introducing EBM within a patient-based setting may help avoid resistance among trainees.

Alternatively, EBM can be introduced in an outpatient setting in which real patient care issues are discussed, such as in the scenario described in this article. Regardless of the method used to introduce EBM, seminar leaders often mistakenly do not restrict questions to basic clinical concepts (eg, diagnosis, treatment). Residents not properly directed may stray into more complex forms of literature (eg, cost analyses) that may be beyond their skill level as well as that of their instructors.

Resident-Faculty Conflicts

Another barrier to implementing EBM is the potential for conflict between resident and faculty and the related problem of modeling appropriate EBM skills in the clinical setting.

The patient you consider for the exercise is a 60-year-old woman you saw today in clinic. The patient has a history significant for diabetes mellitus well controlled on an oral hypoglycemic agent, hypertension well controlled on a low-dose β blocker, and long-standing gastroesophageal reflux disease (GERD) poorly controlled on omeprazole.

Having just read a review article on treatment of Barrett's esophagus, you consider ordering an upper endoscopy to screen your patient for this condition. However, based on clinical experience, the clinic preceptor feels strongly that this patient's mild and chronic symptoms do not require endoscopy. You, however, also feel strongly that the patient should be screened and decide to investigate this question for your EBM seminar. You generate the following clinical question: "What is the best management of a patient with chronic GERD?"

Thomas McGinn, MD, MPH, Clinical Associate Professor, Mount Sinai School of Medicine, Medical Director, Adult Primary Care, Mount Sinai Medical Center, New York, NY; and Lawrence G. Smith, MD, Professor of Medicine, Mount Sinai School of Medicine.

As residents become more skilled in EBM, they are encouraged to question the underlying evidence for common diagnostic tests and treatments. Sometimes, this attitude of inquiry involves questioning the advice of faculty, some of whom may be unfamiliar with the components of EBM or feel threatened by the process. The potential conflicts caused by this role reversal between residents and faculty should be discussed with residents. Having residents role-play how they question authority figures may help them deal with the uncomfortable role of questioning an authority. In our scenario, the clinic preceptor missed a great opportunity to help the resident develop a more appropriate clinical question for the EBM seminar. A more appropriate response might have been the following: "Interesting question, but in my experience these patients do not require endoscopy. However, I'm not very familiar with original literature in this area, so let's turn this into a searchable question. Is this a diagnostic question or a treatment question?"

Clarifying the Clinical Question

Because EBM is patient-based and question-driven, it stimulates clinicians to become efficient and effective life-long learners. In this way, EBM practice lends itself naturally to medical student and resident education [2]. The well-built clinical question is at the heart of evidence-based practice and is critical to the success of most educational exercises [3]. However, practical issues involved in ensuring that residents and students understand how to develop such a question are often overlooked.

You have extensive experience with searches on PubMed and quickly retrieve 5 articles pertaining to your topic, none of which adequately answers your question [4-9]. After spending a frustrating evening pouring over the literature, you decide to ask the EBM seminar leader for assistance.

In our scenario, the resident was instructed to develop a specific patient-based question. Developing a clear and answerable question that lends itself to an evidence-based approach is a complex thought process. Clinicians new to EBM training often have difficulty forming appropriate clinical questions, even after receiving standard instruction regarding question development. Appropriate question development is influenced by many factors, including the learners' experience and background knowledge in the clinical area in question, their previous experience with EBM, their ability to reflect on and articulate what they do not know, and their common sense. Residents and medical students who have some experience with search strategies, par-

ticularly searching with MEDLINE, often tend to develop a question quickly and to begin searching prematurely. However, this may result in faulty searches and may cause learners to become frustrated with the EBM process and to perhaps reject it altogether.

A simple solution to this problem is to assign a faculty mentor to each resident to help with developing a clinical question. Mentors should be familiar with EBM methods and should be available to meet with their resident or student before a literature search is performed. Although these meetings usually are not time consuming, learners with little or no clinical experience struggle the most with developing questions and require the most time and attention. Ten minutes of coaching may help them avoid undue stress later in the EBM process. Such simple investments in time may actually save time in the long run.

Access to the Literature

Quick and easy access to the literature is crucial for the success of any EBM curriculum. Although library-based resources may be used in formal settings in which time is not limited, residents who are unable to efficiently retrieve data during patient care may find such training artificial. Ideally, literature should be available as close to the point of service as possible (eg, handheld computers, computer terminals on wards or in clinics and resident call rooms). Having the data readily available is almost as important as understanding the nature of available resources and how to access them. Many residents perform exhaustive searches when a simple look at an evidence-based resource, such as the Cochrane database, would provide quick and up-to-date answers to their questions. (*See Appendix on page 28 for a list of available resources.*)

Asking residents to develop a "group clinical question" based on a real case may help them develop search skills and increase their understanding of available resources. In this setting, group members are instructed to perform their own searches for evidence to answer the group question. Then, in a follow-up seminar led by a faculty member and medical librarian, the residents share their search strategies and the seminar leaders discuss alternative search strategies and the use of EBM resources.

Nihilism

It has been the authors' experience that at least 1 resident in every small group being introduced to the concepts of EBM will respond with frustration and confusion regarding the evidence available to support clinical decisions. This is particularly true if a resident's first question leads to especially unclear answers, as is the case in our scenario.

After meeting with the faculty member leading the EBM course, you develop a more focused clinical question: "In patients with presumed chronic GERD, are there any clinical predictors for the presence of Barrett's esophagus?" You find 1 article that appears to answer your question [10]. It states that the only predictor of Barrett's esophagus is the duration of a patient's symptoms, but even this is a poor predictor. You end your research by coming to the conclusion that quality evidence to answer your question does not exist.

There are 2 ways to deal with nihilism. The first is to simply reassure residents that there is clear evidence in the literature to support many of the decisions clinicians make. In addition to offering examples, instructors can emphasize the importance of being aware that many interventions are supported by little to no evidence [11]. Alternatively, instructors can overtly direct new learners in formal EBM settings toward questions for which the data are more clear and less frustrating, thus saving the more complex questions for later.

The resident and faculty member begin to look at other questions encountered in clinical practice. For the next EBM session, they compile a list of questions and select 1—a diagnostic question—to investigate. However, both realize that too many questions exist and there is not enough time.

Residents and faculty cannot be expected to critically appraise all the literature for all the questions they encounter. In fact, 1 question may be generated for every 15 patients seen in an outpatient setting or every 1 to 2 patients seen in an inpatient setting [11–13]. However, training clinicians to efficiently use evidence-based resources that have reviewed the literature and summarized the results can help them bring EBM from the seminar to the clinic and bedside. In addition, focusing on the clinical areas in which clinicians spend most of their time can narrow the range of literature to be covered. For example, if EBM is being introduced during an ambulatory care rotation, instructors could focus clinical questions on common primary care conditions (eg, diabetes, hypertension). Focusing the scope of questions enables residents to become familiar with the evidence and to more easily manage and apply it to a patient care situation clinically relevant to them.

Conclusion

The most effective methods for introducing an EBM curriculum are clinically relevant and practical. Although EBM represents a major cultural shift in the teaching and practice of medicine, potential barriers to

implementing an EBM curriculum can be avoided or overcome with time, thoughtful planning, and effective role modeling by faculty. Particularly important facets of any EBM training program are to provide careful mentoring of residents' first experiences with EBM and to help residents choose reasonable, well-formed clinical questions. In addition, learners should be encouraged to view EBM not as a barrier to communicating with experienced faculty but as a means to work more effectively with them.

References

1. Strauss S, Badenoch D, Richardson WS, Rosenberg R, Sackett DL. *Practising evidence-based medicine*. Oxford (England): Radcliffe Medical Press; 1998.
2. Evidence-based medicine. A new approach to teaching the practice of medicine. Evidence-Based Medicine Working Group. *JAMA* 1992;268:2420–5.
3. Sackett DL, Richardson WS, Rosenberg WM, Haynes RB. *Evidence-based medicine: how to practice and teach EBM*. New York (NY): Churchill Livingstone; 1996.
4. Harding SM. Gastroesophageal reflux and asthma: insight into the association. *J Allergy Clin Immunol* 1999;104 (2 Pt 1):251–9.
5. Gastal OL, Hagen JA, Peters JH, Campos GM, Hashemi M, Theisen J, et al. Short esophagus: analysis of predictors and clinical implications. *Arch Surg* 1999;134:633–8.
6. Farrow DC, Vaughan TL. Determinant of survival following the diagnosis of esophageal adenocarcinoma (United States). *Cancer Causes Control* 1996;7:322–7.
7. Agnew SR, Pandya SP, Reynolds RP, Preiksaitis HG. Predictors for frequent esophageal dilations of benign peptic strictures. *Dig Dis Sci* 1996;41:931–6.
8. Tytgat GN. The clinical use of cisapride in gastro-oesophageal reflux disease, with particular focus on the long-term treatment aspects. *Scand J Gastroenterol Suppl* 1995;211:39–43.
9. Kuster E, Ros E, Toledo-Pimentel V, Pujol A, Bordas JM, Grande L, Pera C. Predictive factors of the long term outcome in gastro-oesophageal reflux disease: six year follow up of 107 patients. *Gut* 1994;35:8–14.
10. Lieberman DA, Oehlke M, Helfand M. Risk factors for Barrett's esophagus in community-based practice. GORGE consortium. *Gastroenterology Outcomes Research Group in Endoscopy*. *Am J Gastroenterol* 1997;92:1293–7.
11. Gorman PN, Helfand M. Information seeking in primary care: how physicians choose which clinical questions to pursue and which to leave unanswered. *Med Decis Making* 1995;15:113–9.
12. Richardson WS, Wilson MC, Nishikawa J, Hayward RS. The well-built clinical question: a key to evidence-based decisions. *ACP J Club* 1995 Nov-Dec;123:A12–A13.
13. Covell DG, Uman GC, Manning PR. Information needs in office practice: are they being met? *Ann Intern Med* 1985;103:596–9.