Evidence-Based Medicine Training in Internal Medicine Residency Programs
A National Survey
Michael L. Green, MD, MSc

To characterize evidence-based medicine (EBM) curricula in internal medicine residency programs, a written survey was mailed to 417 program directors of U.S. internal medicine residency programs. For programs offering a freestanding (dedicated curricular time) EBM curriculum, the survey inquired about its objectives, format, curricular time, attendance, faculty development, resources, and evaluation. All directors responded to questions regarding integrating EBM teaching into established educational venues. Of 417 program directors, 269 (65%) responded. Of these 269 programs, 99 (37%) offered a freestanding EBM curriculum. Among these, the most common objectives were performing critical appraisal (78%), searching for evidence (53%), posing a focused question (44%), and applying the evidence in decision making (35%). Although 97% of the programs provided MEDLINE, only 33% provided Best Evidence or the Cochrane Library. Evaluation was performed in 37% of the freestanding curricula. Considering all respondents, most programs reported efforts to integrate EBM teaching into established venues, including attending rounds (84%), resident report (82%), continuity clinic (76%), bedside rounds (68%), and emergency department (35%). However, only 51% to 64% of the programs provided on-site electronic information and 31% to 45% provided site-specific faculty development. One third of the training programs reported offering freestanding EBM curricula, which commonly targeted important EBM skills, utilized the residents' experiences, and employed an interactive format. Less than one half of the curricula, however, included curriculum evaluation, and many failed to provide important medical information sources. Most programs reported efforts to integrate EBM teaching, but many of these attempts lacked important structural elements.

KEY WORDS: evidence-based medicine; residency programs; curriculum; graduate medical education; survey.

Evidence-based medicine (EBM) refers to the conscientious, explicit, and judicious use of the current best evidence in making decisions about the care of individual patients.1 The current advocacy of EBM derives from the growing evidence base supporting many clinical maneuvers,2 and the recognition of physicians’ unmet information needs,3,4 poor information retrieval skills,5 deterioration of up-to-date knowledge after training,6 and practice variations for interventions with established efficacy.7 In response to these needs and recognized curricular deficiencies, the Accreditation Council for Graduate Medical Education8 and the Association of American Medical Colleges9 have called for the introduction of clinical epidemiology, biostatistics, critical appraisal, and medical informatics into medical school and graduate medical education curricula.

In many internal medicine residency programs, this training has traditionally occurred in journal clubs, in which small groups discuss articles chosen for their recency, “landmark” status, or general relevance to a particular specialty. A recent national survey found journal clubs active in 95% of internal medicine programs.10 However, in the majority of published reports of individual journal clubs, their effectiveness is either unexamined or very limited.11,12 Furthermore, these curricula generally focus on clinical epidemiology principles, critical appraisal skills, and “keeping up” with the medical literature, but neglect individual patient decision making.11,13

The practice of EBM, in contrast, begins and ends with an individual patient. In particular, an EBM curriculum must include the acquisition, appraisal, and application of “the evidence” in the context of individual patient decision making. Many internal medicine programs are either initiating new EBM curricula or transforming their traditional journal clubs. The objective of this study was to determine the prevalence and characteristics of EBM curricula in internal medicine residency programs.

METHODS

In July 1998, a written survey was mailed to program directors on the mailing list of the Association of Program Directors in Internal Medicine, which included all U.S.
programs and 12 Canadian programs. A second request was sent 1 month later. They were instructed to complete the survey or designate another faculty member who bears primary responsibility for EBM training.

The survey was developed for this study and revised after pilot testing. General medicine faculty at the author’s institution completed the survey with responses based on the primary care residency program’s EBM curriculum and gave written comments on clarity and content. Most respondents required less than 10 minutes to complete the instrument.

The survey instructions included specific definitions of journal clubs, EBM, and EBM curricula, and distinguished freestanding from integrated EBM curricula. Evidence-based medicine refers to the conscientious, explicit, and judicious use of the current best evidence in making decisions about the care of individual patients and involves 4 steps: (1) convert information needs into answerable questions, (2) efficiently acquire the best evidence, (3) critically appraise the evidence for its validity and usefulness, and (4) interpret the results for an individual patient. The main goal of an EBM curriculum is to improve residents’ skills and behaviors in integrating “the evidence” into their decision making for individual patients. An EBM curriculum may be freestanding, with dedicated curricular time, or may be integrated, with organized efforts to teach and exemplify EBM in “real time” in various venues. This is in contrast to journal clubs, which consist of group discussions of articles chosen for their recentness, landmark status, or general interest. The goals of a journal club are usually to improve generic critical appraisal skills and facilitate “keeping up” with emerging literature.

The survey first inquired about the existence of a freestanding EBM curriculum and, if offered, its objectives, format, attendance, faculty development, resources, and evaluation. With the exception of objectives, which required free text responses, the other questions were yes/no, multiple choice, or numeric. Prior to distribution, the author generated a list of potential objectives for coding, which ultimately represented 85% of the responses. Four new variables were added post hoc to capture the remaining 15%. There was little ambiguity in coding the responses for the objectives, but a reliability analysis was not done to confirm this.

Whether or not they offered a freestanding curriculum, respondents were asked about organized efforts to integrate EBM teaching into established educational and clinical activities, including bedside rounds, attending rounds, resident report, continuity clinic, and the emergency department. For programs attempting this integrated EBM teaching, the survey inquired about site-specific electronic medical information, faculty development, and documentation of resident EBM behaviors.

Frequencies and means were determined for descriptive data. For comparisons, \( \chi^2 \) tests and \( t \) tests were used for categorical and continuous variables, respectively.

### RESULTS

Out of 417 programs, 269 returned the questionnaire (response rate, 65%). Three of the respondents indicated that their program had either been discontinued or merged with another program, leaving 266 programs for analysis. Thirty-seven percent (\( n = 99 \)) of the programs offered a freestanding EBM curriculum, which was equally common in university-based programs (39%, 45 of 116) and community-based programs (37%, 54 of 146) (\( p = .80 \)). The frequencies of learning objectives, curriculum characteristics, and medical information resources offered are listed in Table 1. The mean curricular time was 20 hours per year and the mean resident attendance per session was 17 (SD ± 11).

Of the 99 programs offering a freestanding EBM curriculum, 36 (36%) conducted an evaluation, which was equally common in university-based programs (33%, \( n = 15 \)) and community-based programs (39%, \( n = 121 \)) (\( p = .50 \)). The outcomes measured in the curriculum evaluations are listed in Table 2.

Whether or not they offered a freestanding EBM curriculum, most of the responding programs undertook organized efforts to integrate EBM teaching in real time in one or more venues, including attending rounds (84%, \( n = 218 \)), resident report (82%, \( n = 214 \)), continuity clinic (76%, \( n = 199 \)), bedside rounds (68%, \( n = 177 \)), and emergency department (35%, \( n = 90 \)). For the programs attempting this integrated EBM teaching, Table 3 lists the structural elements provided for each site.

### DISCUSSION

Recognizing the limitations of journal clubs, many internal medicine programs are developing EBM curricula or transforming their traditional journal clubs, but few curricula have been reported.\(^{14,15} \) This national survey found that 37% of programs dedicate curricular time to a freestanding EBM curriculum. The 4 most commonly cited objectives exactly conform to the 4 steps in evidence-based decision-making.\(^{16} \) This represents an advance over journal clubs, which consistently target critical appraisal but rarely focus on the other 3 steps.\(^{11,13} \)

As adult learners, residents should thrive in curricula informed by adult learning theory.\(^{17} \) Learners, in this paradigm, must understand why they need to learn something, take responsibility for their learning, exploit their experience as a resource, and link their readiness to learn with the exigency of real-life situations. The characteristics of the EBM curricula in this survey reflect attention to adult learning theory in their development. In most of the curricula, residents chose the cases, which often represented real clinical scenarios involving their actual patients. The seminars were usually interactive and 58% of the time were directed or codirected by the residents. The effectiveness of this approach has been confirmed in a controlled trial.\(^{15} \)