
Making EVIDENCE-BASED MEDICINE Doable IN EVERYDAY PRACTICE

Finding the evidence you need is getting easier than you ever thought possible.

Brandi White



In the early 1990s, a group of clinicians and epidemiologists at McMaster University in Ontario, Canada, officially coined the term “evidence-based medicine.” From the get-go, the concept faced mixed reviews: excitement from those in the academic and research worlds and suspicion from those in the “real world,” who found EBM impractical in a busy medical office. However, a lot can change in a decade. Today, with the advent of large databases of medical research, a wealth of new evidence-based resources, the rise of “information mastery” and easy access to information via the Internet, evidence-based medicine is finally becoming doable for busy family physicians.

Beyond EBM

The original model of evidence-based medicine presented in 1992 in the *Journal of the American Medical Association*¹ went something like this: A clinical question would arise at the point of care, and the physician would conduct a literature search yielding multiple (sometimes hundreds of) articles. The physician would then select the best articles from the results, evaluate the research, determine its validity and decide



ILLUSTRATION BY DAVE BLACK

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New resources are making evidence-based medicine doable for busy family physicians.



Evidence-based medicine no longer means evaluating original research. Instead, it means using reputable sources that summarize the evidence and make it accessible at the point of care.



Systematic reviews and meta-analyses help summarize the best available evidence on a topic.



EBM is not simply about finding evidence of what works but finding evidence that matters to patients.

what to do – all while the patient waited in the exam room. In reality, “that almost never happens,” says John Ely, MD, associate professor in the Department of Family Medicine at the University of Iowa College of Medicine. “It’s just not practical. Even the original authors of EBM are now saying it isn’t practical.

“Most physicians believe in evidence-based medicine and want to practice in an evidence-based way,” says Ely, “but that no longer means evaluating original research. Instead, it means finding good secondary sources that summarize the literature and give you a useful, actionable bottom line based on the evidence.” (For a list of reputable EBM resources, see page 54.)

According to David Sackett, MD, who was part of the McMaster group that coined the term, EBM is “the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical experience with the best available external clinical evidence from systematic research.”²

Good doctors rely on both their expertise and the evidence, says Sackett. “Without clinical expertise, practice risks becoming tyrannized by evidence, for even excellent external evidence may be inapplicable to or inappropriate for an individual patient. Without current best evidence, practice risks becoming rapidly out of date, to the detriment of patients.”

The key difference between evidence-based medicine and traditional medicine is not that EBM considers the evidence while the latter does not.

Both take evidence into account; however, EBM demands better evidence than has traditionally been used. “Physicians have been using evidence to make medical decisions for over 50 years. The problem was that the research wasn’t always good,” says Robert Flaherty, MD, a family physician at the Montana State University Student Health Service, who teaches courses in evaluating the medical literature. “People tended to assume that, just because something was shown by a research study and published in a journal, it was correct and could be used

KEY POINTS

- The practice of evidence-based medicine requires integrating individual clinical experience with the best available external clinical evidence.
- One of the greatest achievements of evidence-based medicine has been the development of systematic reviews and meta-analyses, which summarize the best available evidence on a topic.
- The easiest way to practice evidence-based medicine is to use EBM resources that continually search, appraise and summarize the literature for you.

in practice. Instead, what we found was that the quality of the information from these studies was quite variable, and we stumbled around for many decades really not knowing the best way to do medical research.”

One of the greatest achievements of evidence-based medicine has been the development of systematic reviews and meta-analyses, methods by which researchers identify multiple studies on a topic, separate the best ones and then critically analyze them to come up with a summary of the best available evidence. “In the last few years, we’ve seen an explosion in the publication of systematic reviews and meta-analyses on useful and practical topics that just weren’t looked at previously,” said Flaherty. “Physicians now have at their disposal a lot of the work already done for them.”

However, EBM is not simply about finding evidence of what works but finding “evidence that matters,” says Kathryn Stewart, MD, medical director for care management at

Sinai Health System in Chicago. “Physicians sometimes forget that simply changing a blood-test level, for example, isn’t the goal we’re after. Just because we can do something doesn’t mean we should. We need to ask, ‘How is this going to change the patient’s overall prognosis and outcome and quality of life?’ If it’s not going to change any of these things, then we shouldn’t be doing it. We need to look at the evidence in the context of the patient and make sure we are doing things that will make a difference.”

“Physicians now have at their disposal a lot of the work already done for them.”

This idea of “patient-oriented evidence that matters” (POEMs) was developed specifically for primary care physicians in 1994 by family physician David Slawson, MD, and Allen Shaughnessy, PharmD. POEMs allow physicians to disregard much of the medical literature and focus only on what’s important, which simplifies EBM. This is the heart of “information mastery,” a concept also developed by Slawson and Shaughnessy.³ It entrusts to experts the complicated, time-consuming task of searching the literature, filtering it for relevance using the POEMs criteria, and determining the validity of clinical studies. It asks individual physicians to focus on finding useful information at the point of care that will assist them in caring for their patients. “Information mastery is the practical application of EBM, just like infectious disease practice is the practical application of microbiology,” explains Shaughnessy. “Knowledge of microbiology is necessary but not sufficient to treat people with infections. In the same way, some EBM knowledge is necessary but not sufficient to practice medicine in this age of information.” (For a free information mastery tutorial, visit <http://www.poems.msu.edu/infomastery>.)

Today, some 30 to 40 POEMs – short synopses of research focusing on patient-oriented evidence that matters – are created monthly and published in a number of clinical journals, including *American Family Physician*, the *British Medical Journal* and the *Journal of Family Practice*. (The entire monthly collection can be obtained by prescribing to the Daily POEMs at <http://www.infopoems.com>.) Additionally, more and more physicians are discovering resources that summarize the literature and make it available at the point of care (see the listing on page 54). All of these developments have helped push EBM in a more practical and useful direction.

Why do we need EBM?

An ever-expanding literature base, the complexity of modern medicine and a limited amount of time and human mental

capacity make clinical uncertainty a reality of medical practice. In a 1999 study, Ely and colleagues looked at how often family physicians faced clinical questions in their practices and what they did to resolve their uncertainty. The researchers found that clinical questions arose 3.2 times for every 10 patients seen, but physicians did not seek an answer 64 percent of the time.⁴ The bottom line, says Ely, is that “most clinical questions don’t get answered, and most of the time that’s because the physician doesn’t pursue an answer. If the physi-

cian does pursue an answer, then about 80 percent of the time they’ll get a reasonable one, according to our research.”

On average, physicians spent less than two minutes seeking an answer to a question. The two most common sources physicians turned to were 1) fellow physicians, pharmacists and other individuals and 2) drug references and textbooks.

“Most physicians depend on relatively low-quality sources of information,” says Flaherty. “Traditional medical journal articles that describe randomized controlled trials may seem credible, but they provide relatively low-quality information when you compare them to what a systematic review on the same topic can provide. Physicians will often read a journal article and then base decisions on that when in fact it’s only a tiny part of the picture.

“We also know that traditional lecture-style continuing education meetings, where an expert describes a few randomized controlled trials and gives a whole lot of opinion about treating or diagnosing a particular medical condition, aren’t the best sources of information,” says Flaherty. The AAFP’s new evidence-based CME criteria designate continuing medical education that delivers specific practice recommendations based on systematically reviewed evidence and that discloses the strength of the evidence. (See <http://www.aafp.org/x932.xml>.) Yet expert opinion and didactic sessions have been among the primary means for educating physicians for generations.

In recent years, physicians such as Flaherty and Paauw⁵ have brought attention to

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The concept of “patient-oriented evidence that matters” (POEMs) allows physicians to disregard much of the medical literature and focus only on what’s important, which simplifies EBM.



In one study, researchers found that clinical questions arose 3.2 times for every 10 patients seen, but physicians did not seek an answer 64 percent of the time.



Expert opinion and didactic sessions are common sources of information, but they are not necessarily evidence-based.



A number of common medical practices have been proven to be myths, often taught in medical school.

EBM RESOURCES

The following table highlights some of the leading EBM resources now available to physicians. Most offer free trial access.

Name	Description	Cost*	Publisher/Sponsor
JOURNALS			
<i>ACP Journal Club</i> http://www.acpj.org	Bimonthly journal that analyzes the content of over 100 clinical journals and summarizes those articles found to have scientific merit and relevance to medical practice.	\$78/year includes print version and online access. 800-523-1546, ext. 2600	American College of Physicians
<i>American Family Physician</i> http://www.aafp.org/afp	Twice monthly clinical review journal that contains evidence-based components, such as POEMs (patient-oriented evidence that matters), Cochrane for Clinicians and Point-of-Care Guides.	Free online access; free print subscriptions are available to family physicians. 800-274-2237 ext. 5168	American Academy of Family Physicians
<i>Bandolier</i> http://www.jr2.ox.ac.uk/bandolier	Monthly journal that searches PubMed and the Cochrane Library for systematic reviews and meta-analyses published in the recent past and summarizes those that "are both interesting and make sense."	Free online; £72/year for print version. maura.moore@pru.ox.ac.uk	Produced from Pain Research at Oxford University with multiple sponsors
<i>The Journal of Family Practice</i> http://www.jfponline.org	Monthly clinical review journal that contains evidence-based components, such as its online archives of POEMs.	Free subscriptions are available to family physicians. 800-707-7040	Dowden Health Media
EVIDENCE SUMMARIES			
Clinical Evidence http://www.clinicalevidence.com	A compendium of systematic reviews, gathered from Cochrane, MEDLINE and other sources, updated and expanded every six months.	Primary care physicians can receive free copies of Clinical Evidence Concise with access to the full text online and on CD-ROM through the United Healthcare Foundation: http://www.unitedhealthfoundation.org/registration.cfm	BMJ Publishing Group
The Cochrane Database of Systematic Reviews http://www.cochrane.org/cochrane/revabstr/mainindex.htm	Arguably the most extensive collection of systematic reviews.	Free online access to abstracts; £140 for full-text online access. +44 (0)1243 779777	The Cochrane Collaboration
DynaMed http://www.dynamicmedical.com	A database of summaries of the evidence drawn from sources such as Clinical Evidence and the Cochrane Library.	\$200/year for online access; a CD version is also available.	DynaMed
FIRSTConsult http://www.firstconsult.com (formerly PDxMD)	A database of evidence summaries drawn from Cochrane, Clinical Evidence, the National Guideline Clearinghouse and others.	\$149/year for online, CD or hand-held computer versions.	Elsevier
InfoRetriever http://www.infopoems.com	A search engine with access to evidence-based sources such as POEMs, Cochrane, clinical rules, a diagnostic test database, practice guideline summaries and Griffith's Five-Minute Clinical Consult; subscribers also receive Daily POEMs via e-mail.	\$249/year for online, CD or hand-held computer versions. orders@infopoems.com.	InfoPOEMs Inc.
SUMSearch http://sumsearch.uthscsa.edu/	A search engine that gathers evidence-based clinical information from MEDLINE, DARE and the National Guideline Clearinghouse.	Free online.	The University of Texas Health Science Center
TRIP Database (Turning Research Into Practice) http://www.tripdatabase.com	A search engine that gathers evidence-based clinical information from MEDLINE, DARE, the National Guideline Clearinghouse and many other evidence-based Web sites.	Free online for the basic version. subs@tripdatabase.com	Gwent, Wales

EBM RESOURCES *continued*

The York Database of Abstracts of Reviews of Effects (DARE) http://www.york.ac.uk/inst/crd/darehp.htm	A collection of abstracts of systematic reviews.	Free online.	Centre for Reviews and Dissemination, University of York
CLINICAL GUIDELINES			
Institute for Clinical Systems Improvement (ICSI) http://www.icsi.org/knowledge/	Guidelines for preventive services and disease management developed by ICSI, an independent, nonprofit collaboration of health care organizations, including the Mayo Clinic, Rochester, Minn.	Free online.	Institute for Clinical Systems Improvement
National Guideline Clearinghouse http://www.guidelines.gov	Comprehensive database of evidence-based clinical practice guidelines.	Free online.	The Agency for Healthcare Research and Quality
U.S. Preventive Services Task Force (USPSTF) Recommendations http://www.ahrq.gov/clinic/uspstfix.htm	Recommendations for clinical preventive services based on systematic reviews by the U.S. Preventive Services Task Force.	Free online.	USPSTF
OTHER			
DailyPOEMs http://www.infopoems.com	Daily e-mail update with approximately 30 POEMs per month; subscription includes InfoRetriever access online or via PDA (above).	\$249/year for online, CD or hand-held computer versions. orders@infopoems.com	InfoPOEMs Inc.

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a number of medical myths that physicians learned in their training were *the* standard way to practice. “For example, when I was in medical school, we were taught to never ever use beta blockers in patients with congestive heart failure,” says Stewart. “So, at the time, I thought that was an absolute truism and I made a mental note that I would never ever prescribe beta blockers for such patients. Well, of course, we now do the exact opposite. We put them all on beta blockers.”

Other myths include “Replacement for vitamin B₁₂ deficiency caused by pernicious anemia must not be done orally” and “Patching the eye improves comfort and healing in patients with corneal abrasions.”⁵ (For more on medical myths, read Flaherty’s online lecture at <http://www.montana.edu/wwwebm/myths/home.htm>.)

“The passing down of medical myths is unfortunately the way most of us learn medicine,” says Stewart. “Even in the face of new information, it’s more comfortable to keep doing what we’ve always done. We then take these medical myths and hand them down from generation to generation of physicians instead of looking at what the current evidence truly shows us we should be doing.”

Without the aid of current best evidence, physicians can easily fall into a “clinical cascade,”⁶ trying to be certain that their clinical decisions are correct. In one study, physicians who were trying to detect liver metastases were asked at what point they would discontinue testing and be satisfied with the likelihood of their diagnosis. In 86 percent of cases, physicians said they would be comfortable with an 80 percent chance of certainty. But when presented with hypothetical situations, 50 percent called for further evaluations even after reaching their stated thresholds.⁷ “Basically, the physicians wouldn’t stop until they had added yet another modality and another modality and so on,” says Stewart. “When you start adding layer after layer of testing, your chances of having a false positive go up astronomically and you don’t improve care.”

One reason physicians mistakenly embark on this path is anecdotal evidence that the worst could happen. “Physicians must refuse to give in to the mentality that ‘I saw it once, and so forevermore I will order this test on every patient like this who I see.’ We cannot practice anecdotally,” says Stewart. ➤

Even in the face of new evidence, it can be difficult to change physicians' practices.

The easiest way to practice evidence-based medicine is to let someone else do the work for you, that is, to rely on reputable EBM resources that search, appraise and summarize the literature.

By getting EBM resources into your exam room, you can answer clinical questions at the point of care.

To decide quickly whether a study warrants attention, read the abstract and follow the PP-ICONS approach.

Getting started

Until recently, practicing EBM was a technical, time-intensive endeavor that few physicians had the skills, time or will to pursue on their own. Today, thanks to new resources and technologies, EBM has become doable even for busy family physicians. Here's how to get started:

1. Know where to look for the answers to your clinical questions.

"The easiest way to practice evidence-based medicine is to let someone else do the work for you," says Flaherty, referring to the wealth of reputable EBM resources now available, which continually search, appraise and summarize the literature for physicians.

To decide which resources suit you best, experiment with those listed on pages 54-55, ask your colleagues for their recommendations as well, and answer the following questions:

- How strong is the evidence, and is it rated? The resources will vary in how systematically they approach the evidence, but they should at least support their statements with references from original research and should supply evidence rankings for any recommendations.
- Is it comprehensive? If the resource answers only 20 percent of your questions, you're not going to find it useful in everyday practice.
- Is the information filtered to focus on the most relevant information that actually addresses patient outcomes?
- Is it easy to use? With some practice, you should be able to find the information you need quickly and easily.
- Does the resource offer a final recommendation? This can be a useful aid in making decisions at the point of care.
 - Is it available at the point of care?
 - Is it regularly updated?
 - Does it take into account the primary care perspective?

2. Get EBM resources into your exam room. The most effective way to learn from clinical questions is to address them at the moment they arise, which requires having EBM resources accessible at the point

of care. While many physicians still prefer paper-based resources (e.g., the print version of Clinical Evidence), computer-based and PDA-based resources are becoming more attractive, particularly for their searching abilities. One option is for physicians to put a computer in their exam room with quick links to EBM Web sites (again, see the resource list on page 54). "I have a computer right in my exam room, and when I'm done

with the exam, it's not unusual for the patient and me to sit down, go to resources like Cochrane, and actually find out what the best information is on a topic," says Flaherty.

With some practice, the searching process takes just a few minutes, so it can be incorporated into even a busy practice. "The key is establishing the habit, developing convenient resources, and not being afraid to look things up in front of the patient," says Flaherty.

In some cases, physicians can save their search until after the patient leaves. The trick is to capture those questions in writing and later follow through with finding an answer.

3. Don't believe everything you read.

As you wade through the medical literature in your in-box each month, be selective and critical in your reading. To decide quickly whether a study warrants attention, Flaherty teaches his students to look at the abstract and answer seven questions (PP-ICONS, for short):

- Problem - Is it a problem I see in my practice?
- Patient population - Does the study's patient population look like my patient population?
- Intervention - What is the intervention, and is it realistic in my setting?
- Comparison - What is the intervention being compared to, and is it a reasonable comparison?
- Outcomes - Would the outcomes matter to my patients?
- Number - How many patients were in the study? "Studies with small numbers, generally less than 400, may be interesting, but not worth applying," says Flaherty. "Wait for the meta-analysis."

"The key is establishing the habit, developing convenient resources, and not being afraid to look things up in front of the patient."

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The number needed to treat is a more helpful statistic than the more commonly used relative risk reduction.



Focus your EBM efforts on the most common and important conditions in your practice, such as low-back pain, headache, asthma and hypertension.



Clinical guidelines used to be "mostly junk" because they were based on expert opinion not on the evidence, but today some good clinical guidelines are available.



When applying evidence to the patient sitting in front of you, you must take into account the patient's r factors, comorbidities, preferences, etc.

• Statistics - How does the study present its findings? Most research papers use the relative risk reduction, which tends to emphasize small differences in the research findings. A better statistic, says Flaherty, is the number needed to treat, which is simply the reciprocal of the absolute risk reduction.

"The number needed to treat is the most brilliant statistic that we have devised in the last hundred years," says Flaherty. "It tells you how many patients you need to treat for one patient to benefit. For many of our popular treatments, the NNT is 100, which means our patients have a 1 percent chance of benefiting from it." (For more information on the number needed to treat, see "Understanding the Risks of Medical Interventions," *FPM*, May 2000, page 59-60.)

4. Start with common, important conditions. To make the best use of your time and energy, focus your EBM efforts on the most common and important conditions in your practice. First, you must identify them, and then commit to finding the best information for each one. You could tackle this project as a group, assigning a few conditions to each physician, or you could go it alone. "Any physician could do this," says Flaherty. "Commit to spending a little time after work this month, go to the best resources, such as Cochrane or *Bandolier*, and find out what the best evidence is for treating ear infections, for instance." You can then summarize your findings and print them as a care reminder or encounter form to aid your decision making. (For an example, see page 61 of this issue.)

When Flaherty analyzed his practice, he found that roughly 90 percent of visits dealt with 26 common conditions, including depression, low-back pain, headache, asthma and hypertension.

5. Use evidence-based clinical guidelines – and ignore the rest. "Until a few years ago, clinical guidelines were mostly junk," says Flaherty. "They were consensus-based. They were opinions not backed up by science." Such guidelines earned the

nickname "BOGSATs," says Shaughnessy, "because they were created by a Bunch of Old Guys Sitting Around Talking." In recent years, thanks to EBM's influence on professional bodies, more of them are using scientifically rigorous methods for establishing guidelines versus relying on consensus and expert opinion. Today, there are some good clinical guideline resources out there, such as those from the U.S. Preventive Services Task Force (<http://www.ahcpr.gov/clinic/uspstfix.htm>) and the Institute for Clinical Systems Improvement (www.icsi.org).

"You can tell good guidelines at a glance," says Flaherty, "because they grade the relevance and validity of the recommendations and the quality of the research that they're based on."

6. Don't lose sight of the individual patient. The one step in EBM that remains a do-it-yourself endeavor is integrating the evidence with your clinical expertise and applying it to the patient sitting in front of you. For example, when deciding whether catheterization is appropriate for a patient with chest pain, the physician must not only be aware of the evidence but must take into account the patient's risk factors, comorbidities, preferences, etc. "The likelihood that chest pain is caused by coronary artery disease is vanishingly small in an otherwise healthy 20 year old, but may

exceed 50 percent in an older patient with multiple risk factors. The youth may require only a careful history and reassurance, while for the older patient catheterization may be an appropriate

initial study," says Mark Ebell, MD, MS, deputy editor for evidence-based medicine for *American Family Physician* and a founder of InfoPOEMs. "While having a single diagnostic strategy for all patients with chest pain would be convenient, it would not be good practice."

Old habits die hard

The shift from traditional to evidence-based medicine is doable, but it is not easy. "Change, such as voluntarily finding and employing the best evidence, requires not

"While having a single diagnostic strategy for all patients with chest pain would be convenient, it would not be good practice."



EBM requires not just time and skill but a personal attitude and commitment to change



Taking an evidence-based approach to patient care is intellectually stimulating and leads you down a path of exploration and lifelong learning.

just time and skill but a personal attitude and commitment to change,” says Flaherty. “The trick is not just teaching the use of a tool like EBM but, more fundamentally, fostering the attitude of change. This doesn’t come from external sources, but from internal commitment.”

With time, however, as you develop an “I’ll find out” approach to clinical uncertainty, become familiar with credible EBM resources, and learn to integrate the evidence with patient preferences and your own clinical experiences, the habits of EBM will take hold. And the benefits will begin to unfold.

Ultimately, physicians who practice EBM say it’s not just better medicine for patients, it is also better medicine for physicians. “Taking an evidence-based approach to the care of patients is an intellectually exciting style of practice, which leads you down a path of exploration and lifelong learning,” says Ebell. “It gives you a framework for knowing when to adopt new tests and therapies, when to discard old ones, and how to look for answers to the clinical

questions that arise every day in the care of patients.” **FPM**

Send comments to fjmedit@aafp.org.

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