

# Competency Perspective on Teaching

## I. Introduction/Background

Competency-Based Education (CBE) is an approach to instruction and assessment that places primary emphasis on identifying and measuring specific learning outcomes, or competencies. Unlike general goals, competencies are written as real-life abilities that are required for effective professional practice.

In 1999, as one of the steps in its Outcome Project, the ACGME approved six **General Competency domains**. The competencies represent areas of skill and knowledge that residents are expected to demonstrate before graduation. The ACGME identified these six competencies after extensive research and collaboration with a wide array of knowledgeable and interested constituents. The major purposes and components of the ACGME Outcome Project and the six General Competencies are compatible with CBE.

The purpose of this current project is to provide residency directors and faculty with suggestions and examples of teaching methods that are 1) consistent with the characteristics of competency-based education, and 2) useful for providing learning opportunities in the six competencies.

## II. Common Characteristics of CBE

After reviewing four decades of literature on competency-based education, five characteristics stand out as being particularly descriptive of teaching from the perspective of competency-based education. In CBE, teaching and learning are:

1. explicit and clearly aligned with expected competencies;
2. criteria-driven, focusing on accountability in reaching benchmarks and, ultimately, competence;
3. grounded in “real-life” experiences;
4. focused on fostering the learners’ ability to self-assess;
5. individualized, providing more opportunities for independent study.

For many residency programs, the change to teaching from a CBE perspective will require very little adjustment; for others, the change may seem more substantial. Teaching venues will remain the same. Residents will still attend lectures and learn at the bedside, in both the outpatient clinic and operating room; they will continue, as well, to participate in small group clinical conferences and morning report. Some programs, however, may have to identify and communicate sooner the exact learning objectives and the criteria by which they will be assessed, as well as the degree to which additional guided or independent study may be necessary.

Further descriptions of these five characteristics follow.

## 1. Teaching/Learning Is Explicit and Clearly Aligned With Expected Competencies

The “residency experience” is rich in opportunities to learn. Rotations, however, are often hectic, and learning opportunities may be missed because of timing, confusion about learning priorities, and limited contact with patients. Often, especially early in residency training, a rotation is completed before residents recognize where to focus their attention. The same may be true for the didactic curriculum, where general topics and the “disease of the week” are presented to residents, without the outcomes or expected competencies being clearly identified.

- In CBE, teaching and learning are purposeful. They are made so by explicitly stated learning goals, defined in advance and linked with competencies. Faculty, therefore, must consider the six general competencies when planning instructional activities, and must provide clear learning objectives that link the experience with the competency.
- Explicit learning objectives linked to competencies and identified in advance of an instructional event provide focus and direction, and make clear the full breadth of expected performance for purposes of teaching and learning. For example, a competency such as communication skills, that may have been overshadowed in the past in the quest for medical knowledge, can be highlighted and integrated into clinical and didactic teaching.
- In support of CBE, research shows that students learn better when goals, instruction, and outcomes are aligned. Studies in higher education have found that providing learners with early guidance and continuing comment leads to increased learning, higher skill levels, and higher self-esteem.

## 2. Teaching/Learning Is Criteria Driven and Focused On Accountability

With the advent of the ACGME competencies, it is likely that residents as well as practicing physicians will be asked to meet performance-based, competency standards when applying for licensure and re-licensure. Because the accreditation process is now more focused on setting, achieving, and maintaining standards, instruction should be designed in careful alignment with the identified outcomes or competencies. Explicit rather than general instruction should predominate, helping learners to place new information into a form that is useful in practice.

- Although “accountability” is gauged primarily through assessment tools, instruction that provides benchmarks and promotes feedback, self-assessment, consideration of clinical evidence, and the prudent use of practice guidelines leads to an “accountability mindset” in the program and its faculty and residents.
- In a competency-based educational system, residents are measured against clear criteria rather than against one another. This practice reduces subjectivity and competitive pressure. Thus it is easier for residents to work cooperatively and become resources for one another as they strive to meet standards.
- Determining performance criteria will be a challenge since evidence-based gold standards for resident performance in the competency areas generally are not available. Faculty, therefore, will need to use their best judgment, the consensus of their peers, and criteria-like resources that are available, such as evidence-based clinical guidelines.

### 3. Teaching and Learning Grounded in Real-Life Experiences

From the earliest conception of competency-based education in the 1960's, competencies have been framed as the active performance of real-life roles consistent with effective practice. Competencies are composed of more than knowledge and skills; they are knowledge and skills and attitudes synthesized into effective performance. The ACGME competency domains are all essential to the practice of medicine, with their sub-goals framed in performance (click here to review general competencies).

- Much of residency education occurs as residents are performing patient care activities in the same settings where professional practice will occur. Thus residency education exemplifies this aspect of CBE.
- Learning opportunities provided through lectures, conferences, and independent reading are not as close to “real-life” as the experiential learning that takes place in the clinical setting. Nonetheless, they are consistent with CBE when they focus on the actual problems of patients and their families, as well as on the problems inherent in the delivery of efficient, effective, compassionate health care. These learning opportunities should be based in real or simulated clinical problems, and should be guided by experienced faculty using reflections, questions, assignments, and feedback.

#### **4. Teaching and Learning Strategies are Focused on Fostering the Learners' Ability To Self-Assess**

It is essential that residents become good judges of their own competence. It is generally accepted that individuals learn to judge their own performance in a number of ways, but most often by comparing their own abilities to some external standard and then internalizing that standard. A standard may be written objectives (as in the competencies) or, more powerfully, may be the skilled performance of influential and credible role models.

- By developing learning and performance standards from the competencies, and by communicating those standards to residents, faculty provide a more objective basis for resident self-assessment.
- When residents observe the skilled practice of experienced clinicians, they may or may not understand the thought process that guided that action. When experienced clinicians reflect on their decision making, however, residents are more likely to truly understand the actions of their teachers, to model that behavior, and to eventually establish appropriate standards. Without these types of discussions, residents remain uncertain about their observations and gain less from the interactions.
- By providing feedback to residents and encouraging them to reflect on their own clinical behavior, residents will become better judges of their own abilities. Although the attending physician is the usual source for feedback, nurses, peers and patients through a 360° evaluation can provide other insights into residents' performance and so potentially affect the internal standards set.

## 5. Teaching And Learning Is More Individualized, Providing Opportunities For Independent Study

Throughout its history, competency-based education has been sensitive to the differing backgrounds, learning styles, aptitudes, and abilities of learners. As experienced educators, we know that interns enter residency with different knowledge and skills, and that residents enter new rotations or educational experiences with differing abilities, motivation, and knowledge bases. If all residents are expected to reach competency, it stands to reason that we will have to provide additional resources to those who start out at a disadvantage or who learn best through individual study and practice.

- Individualized study in the form, for example, of portfolio entries, computer-based learning modules, virtual conferences, and interactions with standardized patients provide residents with the options for self-paced study and learning.
- Individualized study can be offered as complementary to other group learning activities or as “stand alone” learning modules. For example, the PowerPoint slides from a lecture could be provided at the residency website for later review, or the presentation, with pre-tests and post-tests could be placed on the website in place of a lecture.
- Although computer-based learning modules provide an efficient means for transmitting certain types of information, and “virtual clinics” do a good job of simulating patient interaction, nothing can replace the advice of a mentor or the real-life interaction with a patient. Electronic media should be integrated with a strong interpersonal approach to learning.

## **Guided Learning Experiences (GLE):**

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Guided Learning Experiences are a family of experience-based teaching methods that use learning guides, such as questions, cues, and published guidelines to direct the attention of learners. By encouraging your residents to respond to meaningful learning guides you can: 1) increase your confidence that residents are learning important concepts; 2) direct residents' attention to areas that may be ignored or overlooked; and 3) broaden residents' view about what is important. The following key characteristics of Guided Learning Experiences are consistent with the characteristics associated with "Teaching from a Competency Perspective."

- In GLE, questions, cues, and guidelines are given to residents prior to the beginning of an experience in order to guide expectations about what will occur. (Explicit)
- Guided Learning Experiences often require residents to reflect on their experience and then draw conclusions. By sharing conclusions and receiving feedback, residents are better able to monitor their own progress. (Self Assessment)
- Questions generated to guide experiences may be drawn from real clinical problems, rotation objectives, and competencies so that all residents may consider important issues. (Explicit and Real World)
- With GLE, assessment is facilitated as residents' ability to answer the guiding questions and effectively use the guidelines can easily be measured and documented. (Accountability)
- Questions generated may be addressed individually and online, as well as part of a group exercise. (Individualized)
- Learning guides may be added to any learning experience, including chart reviews, readings, small group conferences, journal clubs, and/or videotapes.

## Example 1

### Scenario: Using questions to teach critical appraisal, patient care, and medical knowledge in Journal Club.

You are the Associate Residency Director in charge of the journal club for your residency program. Based on the quality of discussion during journal club, you are unsure whether residents have the skills needed to critically appraise the literature as a basis for applying research evidence to patient care.

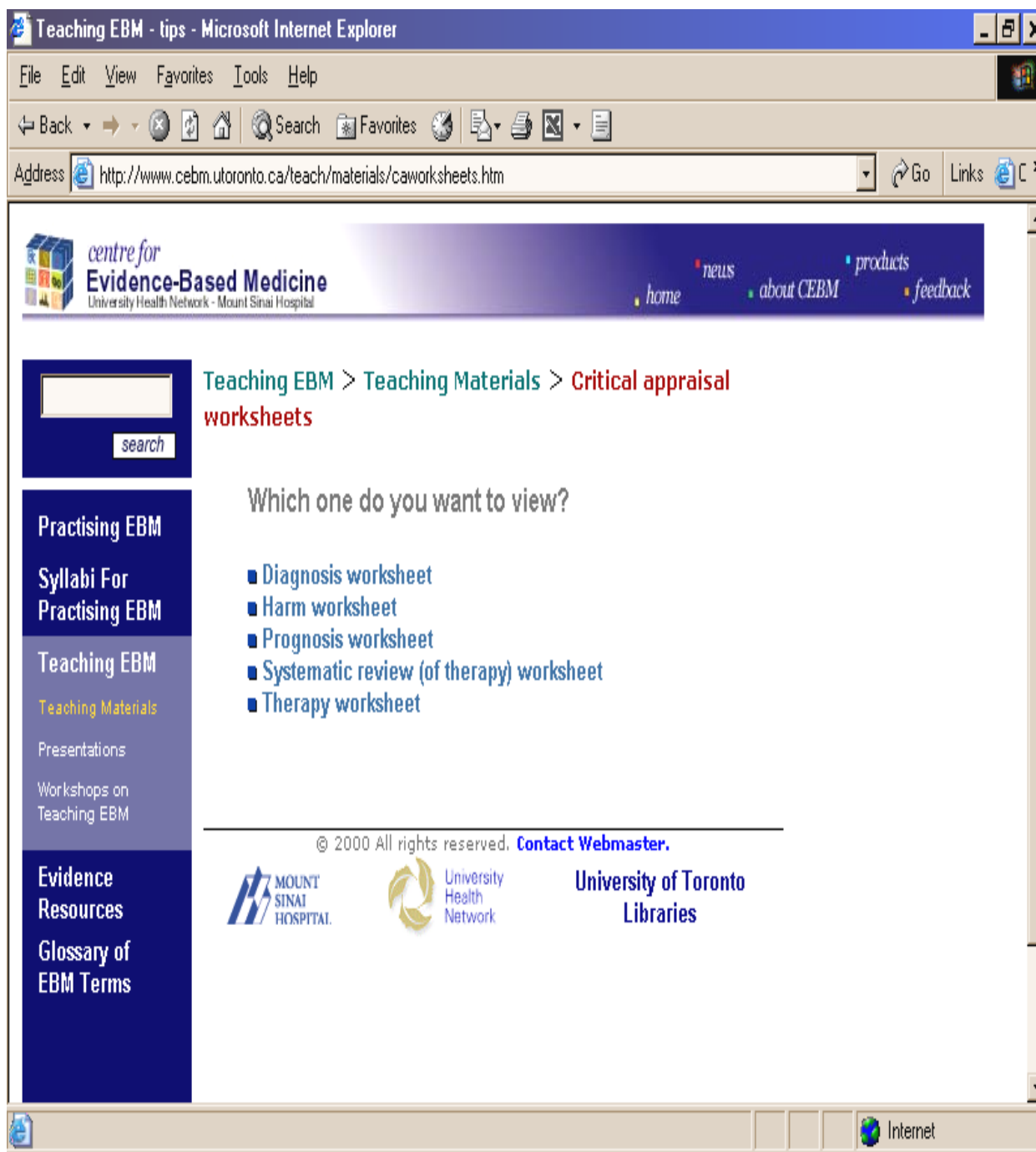
The illustration below describes how you may use questions to address your program's *Practice-Based Learning and Improvement* learning objectives during journal club. The **objectives** are that residents will be able to: (a) conduct an in-depth critical appraisal of published research; and (2) use results of critical appraisal to guide decisions about applying research evidence to patient care.

#### Illustration:

A set of guiding questions, developed internally or obtained from a published text, may be used effectively to guide your residents' critical analysis of the literature. There are several good examples of guidelines in the published literature on Evidence-based Medicine.

([www.cebm.utoronto.ca/teach/materials/caworksheets.htm](http://www.cebm.utoronto.ca/teach/materials/caworksheets.htm)) Guidelines such as these may be attached to a research article to direct residents' reading and analysis. With the guidelines in place, your residents are clear about what to focus on and the depth of analysis you expect. One residency program supplies guidelines as a "work sheet" to be completed prior to the journal club discussion. Another program assigns a different portion of the paper to groups of two or three residents along with guidelines for analyzing the assigned section (i.e. methods). Each subgroup spends the first ten minutes of the conference discussing their section, and then presents its analysis. Faculty attendance and participation are essential because they bring experience to the discussion and reinforce those who participate.

**Figure 1: Resource of guidelines for critical appraisal published by the Centre for Evidence-Based Medicine cited in Example 1. ([www.cebm.utoronto.ca/teach/materials/caworksheets.htm](http://www.cebm.utoronto.ca/teach/materials/caworksheets.htm))**



**Figure 2: An example of a diagnostic worksheet for critical appraisal from the Centre for Evidence-Based Medicine. ([www.cebm.utoronto.ca/teach/materials/dx.htm](http://www.cebm.utoronto.ca/teach/materials/dx.htm))**

The screenshot shows a web browser window with the address bar displaying <http://www.cebm.utoronto.ca/teach/materials/dx.htm>. The website header features the logo for the Centre for Evidence-Based Medicine, University Health Network - Mount Sinai Hospital, and navigation links for home, news, about CEBM, products, and feedback.

The main content area displays a breadcrumb trail: **Teaching EBM > Teaching Materials > Critical appraisal worksheets > Diagnosis worksheet**. Below this is a search bar and a "download now!" icon. The page title is "Diagnostic worksheet".

A "Citation" section contains a large text input field. Below this is the question: "Are the results of this diagnostic study valid?".

Was there an independent, blind comparison with a reference ("gold") standard of diagnosis?	<input type="text"/>
Was the diagnostic test evaluated in an appropriate spectrum of patients (like those in whom it would be used in practice)?	<input type="text"/>
Was the reference standard applied regardless of the diagnostic test result?	<input type="text"/>
Was the test (or cluster of tests) validated in a second, independent group of patients?	<input type="text"/>

The left sidebar contains a navigation menu with the following items: Practising EBM, Syllabi For Practising EBM, Teaching EBM (with sub-items: Teaching Materials, Presentations, Workshop on Teaching EBM), Evidence Resources, and Glossary of EBM Terms.

Are the valid results of this diagnostic study important?

SAMPLE CALCULATIONS

YOUR CALCULATIONS

		Target Disorder		Totals
		Present	Absent	
Diagnostic test result	Positive <input type="text"/>	<input type="text"/> <b>a</b>	<input type="text"/> <b>b</b>	<input type="text"/> <b>a + b</b>
	Test Negative <input type="text"/>	<input type="text"/> <b>c</b>	<input type="text"/> <b>d</b>	<input type="text"/> <b>c + d</b>
Totals		<input type="text"/> <b>a + c</b>	<input type="text"/> <b>b + d</b>	<input type="text"/> <b>a + b + c + d</b>

Can you apply this valid, important evidence about a diagnostic test in caring for your patient?

Is the diagnostic test available, affordable, accurate, and precise in your setting?	<input type="text"/>
Can you generate a clinically sensible estimate of your patient's pre-test probability (from personal experience, prevalence statistics, practice databases, or primary studies)? <ul style="list-style-type: none"><li>• Are the study patients similar to your own?</li><li>• Is it unlikely that the disease possibilities or probabilities have changed since the evidence was gathered?</li></ul>	<input type="text"/>
Will the resulting post-test probabilities affect your management and help your patient? <ul style="list-style-type: none"><li>• Could it move you across a test-treatment threshold?</li><li>• Would your patient be a willing partner in carrying it out?</li></ul>	<input type="text"/>
Would the consequences of the test help your patient?	<input type="text"/>

Additional Notes

## Example 2

**Scenario:** Using questions to direct residents' attention to important Systems-based Practice, Interpersonal and Communication, and Professionalism issues, and to foster Practice-based Learning and Improvement during a Hospice Rotation.

You are the Associate Residency Director responsible for coordinating a Hospice rotation. Although the residents are given goals and objectives for the experience, some residents have commented that they find the rotation "uncomfortable" and are learning very little.

The illustration below describes how you may use questions to clarify learning objectives for shorter, specialized rotations like the Hospice rotation described below. The **objectives** are that residents will be able to: (1) describe how system policies affect quality of care for the terminally ill (*Systems-Based Practice*); (2) ask about and respond to patients' concerns and preferences (*Interpersonal and Communication Skills; Professionalism*); and (3) analyze and improve residents' performance (*Practice-Based Learning and Improvement*).

### Illustration:

Carefully-crafted questions may be used to effectively focus your residents' attention on policies and other important issues, as well as their interactions with patients, attending faculty, and staff. Examples of the kinds of questions that you could use to guide learning during a Hospice experience are:

- Examine the pain management policy at the hospice facility and compare it with your own hospital's policy. What are your views about the different patient care practices?
- Keep a daily journal, noting the experiences that made you uncomfortable or sad. Consider, for example, the following questions: What was it about this situation that made you sad? How did your feelings affect your interaction with the patient? How could you look at this situation differently so that you could better serve the patient?

The first question directs residents to examine system policies that affect care delivery (*Systems-based Practice*). The second question addresses *Interpersonal and Communication Skills* and *Professionalism* by directing residents to examine, recognize, and manage their own emotional barriers to caring for the terminally ill. The notebook exercise prompts analysis and improvement of practice. (*Practice-Based Learning and Improvement*.)

### Example 3

**Scenario: Using questions to foster Practice-based Learning and Improvement and Medical Knowledge through a departmental case conference.**

You are an Associate Residency Director at a community-based residency program, and have been asked by the Residency Director to address the issue of patient non-compliance in the Outpatient Clinic. You consider developing a lecture, but decide to use a set of questions to structure a resident chart review.

The illustration below describes how you may use questions to achieve Practice-Based Learning and Improvement and Medical Knowledge learning objectives through a chart review activity and case conference discussion. The **objectives** are that residents will be able to: (a) use a systematic methodology involving chart review, literature review, and reflection to analyze and improve practice (*Practice-Based Learning and Improvement*); and (b) obtain, analyze, and synthesize knowledge, including psycho-social knowledge, to solve patient care problems (*Medical Knowledge*).

#### **Illustration:**

By using carefully-crafted questions to guide residents' reflection on their clinical experiences, you can facilitate their ability to discern practice patterns that may have gone unnoticed. In this illustration, an existing departmental case conference is adapted to include a question-guided chart review. To prepare for these conferences, your residents are required to pull the charts on five patients seen over the last three months and consider a group of guided questions. Examples of questions that you could use to guide the chart review include:

- Is there evidence in the chart that the patient's problem has been resolved?
- Is there evidence in the chart that the patient followed the diagnostic/therapeutic plan?
- For any of the five patients by whom you suspect therapeutic non-compliance, develop a hypothesis concerning the patients' reasons for non-compliance, using the literature, personal knowledge of the patients and patient information in the chart.
- Is there a relationship between patient compliance and the patient's socio-economic status, personal preferences, and lifestyle?

The data and hypotheses are discussed at the conference along with plans for improvement.

## **Tips for using Guided Learning Experiences**

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Learning guides may be added to any learning experience, including chart reviews, readings, small group conferences, journal clubs, and/or videotapes.

1. When choosing guiding questions, look to your objectives or the list of general competencies to direct your choices. If it is not easy for you to think in terms of educational objectives, think about your “intentions” for that educational experience; that is, what do you want the residents to know and be able to do? Then write questions that would lead the resident toward that intention or outcome.
2. The use of existing heuristics or guidelines can be helpful because they may have been validated with a larger group. We often remember particularly useful guides that may have helped us think through a problem or experience. Share those with residents and refrain from use of simple detailed checklists.
3. Write your questions at a “**conceptual** or **principle**” level rather than at the “**fact**” level. Just providing a “laundry list” of issues to consider does not, by itself, provide the same effect.
4. Questions should help residents break down complex problems into sub-tasks.
5. Invest time in listening to residents’ reactions and responses, and provide feedback. Lack of faculty attention to the process decreases the value of the process for residents.
6. Build assessment into the process. Responses to guided questions may be collected in portfolios or used to assess what has been learned and/or experienced.

**Key References (click  here for selected references on this topic)**

# Explanatory Notes

## Guided Learning Experiences - Factual versus Higher-Order Questions

**Factual questions** ask learners to recall “bits” of isolated information (facts) from memory. A factual question might be, “What is Mrs. Jones’ hematocrit this morning?”

A response to a factual question cannot be derived; responders either know the answer or they do not. Since the ability of residents to recite facts is often unrelated to their ability to see relationships between pieces of information or use that information to solve problems, focusing on factual information during a Guided Learning Experience can be counterproductive.

## Higher-Order Questions

**Conceptual questions** require that learners recognize the shared qualities or characteristics of an event, object, or state. A “syringe” would be an example of a simple concrete concept. A learner who understood the concept of “syringe” could identify many different examples of a syringe even if they appeared dissimilar. The ability to classify objects, physical states, or events by their shared characteristics is the cornerstone of medicine. Diagnosing disease depends on physicians’ ability to identify a constellation of signs and symptoms as common to a defined physical state, such as “pneumonia.” By asking conceptual questions, residents learn to recognize concepts and use that knowledge in their interactions with patients.

### Examples

1. Compare and contrast the signs and symptoms of pneumonia with those of bronchitis.
2. Among the differences are there any signs or symptoms that are pathognomonic for pneumonia?

**Principle level questions** require that learners understand relationships between concepts. Most often these relationships are stated as principles or “rules.” These “rules” may be absolutes, such as “hot air rises,” or they may describe probable events, such as “Over-consumption of food results in weight gain.” Principles are often presented as “if ... then” statements. By understanding principles, residents are able to predict the physiologic course of disease, probable reactions of disease to specific treatments, and the probable reaction of patients to “bad news.” By asking principle level questions, residents learn to use the absolute principles of science and predict medically-related outcomes with some certainty.

### Examples

1. Explain how differential pressures in the chambers of heart facilitate the movement of blood from the atrium to the ventricle?
2. Describe the strategies you might use to help a patient initially cope with a diagnosis of breast cancer.

## Selected References for Guided Learning Experiences

1. Carlson RC, Lundy DH, Schneider W. Strategy guidance and memory aiding in learning a problem-solving skill. *Human Factors* 1992;34:129-45.
2. Debowski S, Wood RE, Bandura, A. Impact of guided exploration and enactive exploration on self-regulatory mechanisms and information acquisition through electronic search. *Journal of Applied Psychology* 2001;86:1129-41.
3. Evans RC, Omaha Boy, NC. Abandoning the lecture in biology. *Journal of Excellence in College Teaching* 1996;7:93-110.
4. Hummel HGK, Nadolski RJ. Cueing for schema construction: Designing problem-solving multimedia practicals. *Contemporary Educational Psychology* 2002;27: 229-49.
5. Landin DK. The role of verbal cues in skill learning. *Quest* 1994;46:299-313.
6. Matter CA, Speice JA, McCann R, Mendelson DA, McCormick K, Friedman S, Medina-Walpole A, Clark, NS. Hospital to home: Improving internal medicine residents' understanding of the needs of older persons after a hospital stay. *Academic Medicine* 2003;78:793-97.

## **Experience-Based & Integrative Evidence-Based Medicine (EBM)**

Evidence-Based Medicine (EBM) is both a “content area” and a “process” for teaching and practicing medicine. As a content area, residents must learn to become proficient in the basic skills of framing testable questions, searching for best evidence, and critically appraising that evidence. To fully utilize EBM as a method for teaching and practicing medicine, residency faculty must model EBM when treating patients and when discussing patient care with residents during clinical experiences. There have been criticisms of the EBM movement for ignoring both the wisdom of experience and the wishes of the patient. In their second edition, [Sackett et al.](#) defined EBM as an “integration of best research evidence with clinical expertise and patient values.” This definition promotes the use of evidence and “informed opinion” in the unique context of the needs of the individual patient. The following key characteristics of Integrative, Evidence-Based Medicine are consistent with the characteristics of “Teaching from a Competency Perspective.”

- On-line modules and journal club activities can be effective, efficient techniques for teaching the basics of EBM. For EBM to become a part of residents’ approach to practicing medicine, however, it must be integrated into the daily routine of examining and evaluating patients. (Explicit and Real-Life)
- Modeling an evidence-based approach to practicing medicine fosters the critical appraisal of personal assumptions as well as the framing and testing of good clinical questions that ultimately guide practice. (Self Assessment)
- Learning to practice medicine using an EBM approach includes learning how to weigh the value of clinical experience, patient values, and best evidence. It also includes learning what to do when “best evidence” is not very enlightening. (Real-life)
- As defined above, EBM fosters accountability, as the integration of “documented best practice” and expert clinical opinion become the criterion set for patient care. (Accountability)

## Example 1

### Scenario: Focusing a clinical question to teach Practice-based Learning and Improvement on the in-patient service.

You are an associate residency director in a busy Psychiatry residency program and are in charge of teaching residents on the inpatient service. A lecture was given on the topic of “formulating testable questions.” As a follow-up, you want to reinforce this skill in a patient care setting through discussions of newly-admitted patients.

The illustration below describes how you can address this and other *Practice-Based Learning and Improvement* learning objectives on the inpatient service. The **objectives** are that residents will be able to: (a) focus a clinical question, and (b) search the literature and locate evidence that addresses the question.

#### Illustration:

Identifying a focused clinical question is the first step in evidence-based medicine. Using the systematic approach developed by [Sackett, et al.](#), you provide the admitting resident with a worksheet outlining the “Patient, Intervention, Comparison, and Outcome” model for building an answerable question. You guide the resident through the list by asking:

- “P” How would you describe a group of patients similar to this patient?
- “I” Which main intervention, prognostic factor, or exposure are you considering?
- “C” What is the main alternative to compare with the intervention? (if appropriate)
- “O” What can you hope to accomplish, measure, improve, effect?

After a few attempts, the resident team arrives at the following question. “In a 15 year-old girl with depression and one episode of suicidal ideation, does admission to an adolescent inpatient unit decrease the incidence of another suicide attempt?” Then using a database such as **(InfoRetriever<sup>R</sup>)** on one of the resident’s pocket PC, you search for new clinical information that may apply to this patient. You find that there are no definitive studies addressing this question. The team discusses the question and decides to expand the search to address all adolescents and all types of treatments. By broadening the search, the team found 21 controlled studies examining issues pertaining to “adolescent,” “suicidal ideation,” and “treatment,” five of which were pertinent to their patient.

## Example 2

### **Scenario: Using a “real-time” EBM approach to teach Practice-Based Learning and Improvement and to increase Medical Knowledge on the in-patient service.**

You are a faculty member in a large pediatric residency program, and have been asked by the director to coordinate the “evidence-based medicine” curriculum. You would like to demonstrate that while actively seeing patients, residents may practice evidence-based medicine. The residents are skeptical that this can be accomplished in the time allotted.

The illustration below describes how you may address *Practice-Based Learning and Improvement* and *Medical Knowledge* learning objectives on the in-patient wards. The **objectives** are that residents (1) will obtain current, evidence-based information about the treatment of common medical conditions (*Medical Knowledge*); and (2) will be able to: (a) formulate a good clinical question; (b) efficiently search for appropriate evidence and guidelines of care; (c) critically appraise the evidence; and (d) decide whether evidence and guidelines apply to the care of a specific patient (*Practice Based Learning and Improvement*).

#### **Illustration:**

During a patient care session in the clinic, you are supervising a resident. His patient is a six-year-old child with recurrent otitis media. Using an EBM approach to teaching, you want to demonstrate that new information on common problems is published every day. You ask the resident the following questions: “What is the most sensitive clinical examination finding for otitis media?” and “When should a child be referred for PE tubes?” The resident is unsure, and together you focus a new question: “What are the indications for PE tubes therapy for recurrent otitis media in a six year-old child?” A computer with Worldwide Web access in the supervision room allows you to search for recent guidelines published on the subject using the **National Guideline Clearinghouse** (NGC) ( [www.guideline.gov/](http://www.guideline.gov/) ) and **Cochrane Database** ( [www.cochrane.org/index0.htm](http://www.cochrane.org/index0.htm) ). The answer was available after a four-minute search of the NGC. You then review the guidelines and the associated grading system, and consider whether the guidelines are relevant for this patient and clinical setting. In another residency setting that does not have ready access to the Worldwide Web, you could use CD ROM materials, which are updated quarterly and may be used to answer common medical questions. By gathering and using these resources, residents learn new knowledge and sharpen their critical appraisal skills while improving the outcomes for patients.

### Example 3

#### **Scenario: Using an experience-based integrative EBM approach to teach Practice-based Learning and Improvement during administrative conferences.**

You are the chief resident in a busy general surgery residency program. You and your residency faculty advisor have been asked to suggest ways to improve teamwork and reduce the number of medical errors attributed to failure of teamwork in the residency program. You remember hearing a presentation at the Surgical Education conference about how improving team communication reduced errors and improved patient satisfaction. You wonder whether communication skill training would help solve these problems in your residency.

The illustration below describes how you may address *Practice-Based Learning and Improvement* learning objectives during administrative conference time. The **learning objectives** are that residents will be able to: (a) search for evidence to answer a focused question; (b) critically appraise the evidence; and (c) incorporate scientific evidence into decisions and plans for improving patient care.

#### **Illustration:**

Although EBM is typically used to help make informed decisions about patient care practices, systematic reviews related to a wide range of topics are also appearing in EBM databases. In this example, you and your faculty advisor decide to use an administrative resident meeting to approach a group practice and communication problem from an EBM perspective. You and your advisor determine that including all residents in this process will increase participation should they find confirming evidence. At the resident administrative meeting, you lead a short discussion on the problem, state the question, and divide the residents into two teams. Using the computers provided, both teams of residents find systematic reviews (**Cochrane Database of Systematic Reviews**) and primary research addressing this subject in less than five minutes. The first of six systematic reviews includes behavior change as well as attitude change as outcomes, and presented 12 studies that met criteria as controlled studies. From this evidence, the residents agreed that communication training across the health care team was worth pursuing. You and your faculty advisor take the recommendation to the Residency Director.

## Tips for Using Experience-Based, Integrative Evidence-Based Medicine (EBM)

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Teaching with an EBM approach fosters development of the skills needed to bring the most current information to the real-time practice of medicine. With the advent of reliable, evidence databases that provide screened meta-analyses and systematic reviews, a residency director might wonder which skills are most needed and most practical. Do residents need to be able to perform a systematic review of the primary research, or should they instead focus attention on learning to access already-prepared systematic reviews and integrate “best evidence” into the care of their patients? Unfortunately, there is little evidence in the literature to help us answer this question. Residency Directors do not need to make this choice, however, because both methods may be learned during a three-year residency program. The educational research examining the implementation of EBM curricula suggests the following:

1. There is little evidence to support that the conclusion that learning EBM as a “content area” through didactics alone (or even through journal clubs) encourages residents to use EBM in their practices. EBM must be integrated into clinical practice on the wards and in the clinics.
2. Faculty members need both to embrace the EBM approach to teaching medicine and to model its use in their own practice. Some ways to do this might be to:
  - cite systematic reviews when lecturing and expect residents to do the same when presenting;
  - keep an updated file of systematic reviews in your area of practice, update it quarterly, and use it while precepting; (Residents may also be responsible for updating a “practice database.”)
  - use computer resources (both online and CD-ROM) on site;
  - expect “evidence” to be part of morning report, ambulatory rounds, work rounds, etc.;
  - model integrating “best evidence” with expert opinion and the specific needs of patients; and
  - model “communicating best evidence” with patients.

**Key References** (Click ► here for selected references list on this topic)

## Rollover Definitions/Descriptions

1. InfoRetriever<sup>R</sup>: A commercially-available database for handheld PDA's that provides a system of filtered, synopsisized, evidence-based information.
2. National Guideline Clearinghouse (NGC): A public resource for evidence-based clinical guidelines sponsored by the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services, in partnership with the American Medical Association and the American Association of Health Plans-Health Insurance Association of America.
3. Cochrane Collaborative: An international, non-profit organization that produces and disseminates systematic reviews of healthcare interventions through the Cochrane Library. This library includes the following databases:
  - Cochrane Library of Systematic Reviews
  - Database of Abstracts of Reviews of Effects
  - The Cochrane Central Register of Controlled Trials
  - The Cochrane Methodology Register
  - The NHS Economic Evaluation Database
  - Health Technology Assessment Database
  - Cochrane Database of Methodology Reviews

## Experiential and Integrative Learning and EBM Bibliography

1. Badgett RG, O'Keefe MO, Henderson MC. Using systematic reviews in clinical education. *Annals of Internal Medicine* 1997;126:886-91.
2. Bazarian JJ, Davis CO, Spillane LL, Blumstein H, Schneider SM. Teaching emergency medicine residents evidence-based critical appraisal skills: A controlled trial. *Annals of Emergency Medicine* 1999;34:148-54.
3. Edwards KS, Woolf PK, Hetzler T. Pediatric residents as learners and teachers of evidence-based medicine. *Academic Medicine* 2002;77:748.
4. Epling J, Smucny J, Patil, A, Tudiver, F. Teaching evidence-based medicine skills through a residency-developed guideline. *Family Medicine* 2002;34:646-48.
5. Geyman JP, Deyo RA, Ramsey, SD. *Evidence-based clinical practice. Concepts and approaches*. Boston: Butterworth-Heinemann, 2000.
6. InfoRetriever. The Clinical awareness system. [www.infoPoems.com](http://www.infoPoems.com) , 2003.
7. Kellum JA, Rieker, JP, Power, M, Powner DJ. Teaching critical appraisal during a critical care fellowship training: A foundation for evidence-based critical care medicine. *Critical Care Medicine* 2000;28:3067-70.
8. Korenstein D, Dunn A, McGinn T. Mixing it up: Integrating evidence-based medicine and patient care. *Academic Medicine* 2002;77:741-42.
9. Ozuah PO, Orbe J, Sharif I. Ambulatory rounds: A venue for evidence-based medicine. *Academic Medicine* 2002;77:740-41.
10. Pursley HG, Kwolek DS. A women's health track for internal medicine residents using evidence-based medicine. *Academic Medicine* 2002;77:743-44.
11. Sackett DL, Straus, SE, Richardson WS, Rosengurg W, Haynes RB. *Evidence-based medicine: How to practice and teach EBM (2<sup>nd</sup> Edition)*. Churchill Livingstone, Edinburgh, London. 2000.