The Teaching Physician

for those who teach students and residents in family medicine

Volume 4, Issue 2 **April 2005**

POEMs for the Teaching Physician

Two-drug Hypertension Regimen Increases CVD Mortality

Clinical Question: In the treatment of adults with hypertension, which other drug class added to diuretics most effectively reduces adverse cardiovascular events?

Setting: Population-based

Study Design: Cohort (prospective)

Synopsis: Evidence shows that diuretics are equal to or superior to other agents as first-line therapy for most patients with hypertension. More than one drug class, however, is frequently required to control hypertension. It is unclear which other drug classes, added to diuretics, optimally reduce adverse cardiovascular events. The investigators evaluated data obtained from women with hypertension enrolled in the Women's Health Initiative Observational Study, a prospective cohort study of 93,676 women ages 50 to 79 years at baseline. Of these, 94% were followed up for a mean of 5.9 years. Antihypertensive medication was determined from original bottles brought to baseline visits and matched to a pharmacy database. End points were ascertained from mailed questionnaires, direct report, telephone follow-up, medical records, and death certificates. The investigators do not specifically state whether outcomes were assessed by individuals blinded to treatment groups. Among women with hypertension but no history of cardiovascular disease (CVD), monotherapy with calcium channel blockers versus diuretics was associated with an increased risk of CVD death (number needed to treat to harm over 6 years [NNTH/6]=143; 95% CI 59–3,898). In similar patients, a two-drug regimen of a diuretic plus calcium channel blocker was associated with a statistically significant increase in CVD death, compared with both a diuretic plus beta-blocker and a diuretic plus ACE inhibitor (NNTH/6 years=93; CI 34–3,898). Both analyses were adjusted for age, race/ethnicity, smoking, high cholesterol requiring medication, body mass index, physical activity, hormone use, and diabetes.

Bottom line: In women with hypertension and no history of CVD, a regimen of a diuretic plus either a B-blocker or angiotensin-converting enzyme (ACE) inhibitor reduces the risk of CVD mortality, compared with a diuretic plus calcium channel blocker. The evidence continues to mount that calcium channel blockers should be the agent of last resort in the treatment of most patients with hypertension. (LOE=2b-)

Source article: Wassertheil-Smoller S, Psaty B, Greenland P, et al. Association between cardiovascular outcomes and antihypertensive drug treatment in older women. JAMA 2004; 292:2849-59.

Guidelines for the Treatment of Chronic Stable Angina

Clinical Question: In patients with chronic stable angina or those who are asymptomatic but who have evidence of coronary artery disease, what is the appropriate medical management?

Setting: Various (guideline)

Study Design: Practice guideline

Synopsis: The American College of Physicians endorses the American College of Cardiology/American Heart Association guidelines from 2002. The guidelines apply to patients with chronic stable angina who have not had a myocardial infarction (MI) or have undergone revascularization in the past 6 months, as well as patients who are asymptomatic but have demonstrated evidence of coronary artery disease. The strength of the recommendations are characterized as follows: A=several randomized clinical trials with large numbers of patients; B=limited number of randomized trials with small numbers of patients, nonrandomized studies, or observational registries; and, C=expert consensus. In patients with chronic stable angina or in asymptom-

atic patients with evidence of coronary artery disease, the following should be routinely used to decrease the risk of MI or death:

—aspirin 75 to 325 mg daily (strength=A). Clopidogrel (Plavix) should only be used if aspirin is contraindicated (strength=A). Dipyridamole should not be used because of risk of harm (strength=B).

—a beta-blocker to reduce mortality and MI and to control symptoms (strength=A).

—an angiotensin-converting enzyme inhibitor. An angiotensin receptor blocker should not be substituted (strength=A).

—a statin, if cholesterol is above normal (strength=B).

Symptom control should be managed with:

—sublingual nitroglycerin (strength =A)

—a long-acting calcium channel blocker or long-acting nitrate when beta-blockers are ineffective or unsuccessful at controlling symptoms (strength=B).

For follow-up (strength=C):

—the group recommends visits every 4 to 6 months during the first year.

—routine cardiac testing is not useful in the absences of a change in history or physical examination.

Bottom line: In patients who have either chronic stable angina without a history of myocardial infarction or a revascularization procedure in the past 6 months, as well as in asymptomatic patients with demonstrated coronary artery disease, the following should be routine: aspirin; a beta-blocker; an angiotensin-converting enzyme inhibitor; and a statin, if the cholesterol is above normal. (LOE=1a)

Source article: Snow V, Barry P, Fihn SD, et al. Primary care management of chronic stable angina and asymptomatic suspected or known coronary artery disease: a clinical practice guideline from the American College of Physicians. Ann Intern Med 2004;141:562-7.

LOE—level of evidence. This is on a scale from 1a (best) to 5 (worst). 1b for an article about treatment is a well-designed randomized controlled trial with a narrow confidence interval.

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The Teaching Physician is published by the Society of Teachers of Family Medicine, 11400 Tomahawk Creek Parkway, Suite 540, Leawood, KS 66211. 800-274-2237, ext. 5420. Fax: 913-906-6096.
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STFM Web site: www.stfm.org
Managing publisher: Traci S. Nolte

The Teaching Physician is published electronically on a quarterly basis (July, October, January, and April). To submit articles, ideas, or comments regarding *The Teaching Physician,* contact the appropriate editor:

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Teaching Points—A 2-minute Mini-lecture
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Information Technology and Teaching in the Office

Teaching and Practicing Medicine With New Imaging Studies

By Richard Usatine, MD, University of Texas Health Science Center at San Antonio

New imaging technologies influence the way we practice and teach medicine. Some of the newest and most impressive imaging technologies are:
• PET—positron emission tomography
• MRCP—magnetic resonance cholangiopancreatography
• Helical computed tomography (CT)
• Multidetector CT
• CTA—CT angiography
• MRA—magnetic resonance angiography

Of course, these technologies are also expensive, so they must be used wisely to avoid unnecessary technology expenditures in a health care system that continues to see rapid increases in the costs of health care delivery. By reviewing some of the indications and limitations of these procedures, we can begin to understand their value and avoid technology overuse.

PET scanning is an extension of nuclear medicine, using positron-emitting tracers in place of single photon-emitting tracers. PET cameras are optimized to detect the high-energy photons emitted by these tracers, rather than the lower-energy photons usually associated with nuclear medicine. PET scanning requires a cyclotron to create the tracers, which adds to the cost of this procedure.

Indications for PET scans include the detection of cancer with whole body scans, coronary artery disease, memory disorders of an undetermined cause, and suspected or proven brain tumors. Also, patients with seizure disorders who are not responsive to medical therapy may be scanned as part of their evaluation for surgery.

Fluorodeoxyglucose positron emission tomography (FDG-PET) shows cancer cells that often have increased glucose transport and glycolysis. Detection with FDG-PET depends on tumor metabolic activity and not tumor size. FDG is accurate for staging some tumors because a tumor can be detected in normal-sized lymph nodes. FDG-PET may be useful where anatomical imaging is difficult owing to post-treatment effects.[1,2]

MRCP provides clear visualization of the biliary and pancreatic ducts. While endoscopic retrograde cholangiopancreatography (ERCP) is the gold standard, there are more risks associated with ERCP than MRCP, especially pancreatitis. A meta-analysis of 67 articles found MRCP to be have a sensitivity of 95% and a specificity of 94%. Overall, MRCP is highly accurate in the detection of biliary tract obstruction, with a sensitivity of 92% for stones and sensitivity of 88% for detecting malignant biliary obstructions.[3]

Newer CT technologies include:
• Helical CT or spiral CT
• Multidetector CT (MDCT)
• High resolution CT (HRCT)
• Multislice CT
• CT angiography (CTA)

Helical or spiral CTs perform continuous imaging as the radiographic tube rotates around the moving patient. Conventional CT scanning is a series of 360-degree slices through the stationary patient, producing a stack of two-dimensional slices. The spiral scan is a continuous helix like the Slinky. The advantages of helical CT are that it is faster, it provides more information in the craniocaudal axis, and yields continuous data with less respiratory or bowel motion artifact.

A meta-analysis of randomized controlled trials demonstrated that the noncontrast helical CT is better than the intravenous pyelogram (IVP) at ruling in and ruling out kidney stones. (LOE=1a) Importantly, there is no risk of contrast dye-induced renal failure with the noncontrast helical CT.[4]

Virtual endoscopy models are constructed from helical computed tomographic imaging data. Virtual colonoscopy is the best tested modality at this time.[5]

The advantages of virtual colonoscopy versus real colonoscopy are that it is:
• Fast and noninvasive
• Performed without sedation
• Capable of imaging the entire colon and localizing lesions precisely
• Less technically demanding

Also, the sensitivity is equal to that of colonoscopy for lesions >10 mm in diameter and superior to that of double contrast barium enema.

The disadvantages of virtual colonoscopy are that:
• The cost is not reimbursed by insurance companies.
• There is radiation exposure.
• It does not allow biopsy specimens to be taken.
• It cannot visualize polyps <1 cm in diameter.
• It cannot show texture and color details of mucosa.
• Retained feces can be misinterpreted as polyps.

CTA has been revolutionized by MDCT. MDCT has even better resolution than single slice or helical CT. MDCT angiography is a strong competitor to established vascular imaging techniques. It is changing the diagnostic pathways that are being used for studying the vascular system of our patients.[6]

MRA is a good noninvasive alternative to lower extremity arteriography in patients with claudication.[7] (LOE=2a) Also, MRA was found to be more effective than duplex ultrasound (DUS) in ruling in and ruling out severe or total carotid stenosis by one meta-analysis.[8] (LOE=1a-)

In conclusion, there are some exciting new applications of PET scans, MRCP, helical and multidetector CT, virtual colonoscopy, CTA, and MRA. The CT and MR technologies are in standard use today, and there is good

data to support their efficacy. PET scans and virtual colonoscopy are expensive and often not covered by health insurance. Their standard use is yet to be defined. While new technologies may help us take better care of our patients today and in the future, we must stay true to our roots in family medicine and not forget that care needs to be compassionate and humanistic.

The Project Leadership Committee of the Future of Family Medicine adopted the following identity statement: "Family physicians are committed to fostering health and integrating health care for the whole person by humanizing medicine and providing science-based high-quality care. As we continue to look to science and technology to give us better diagnostic and treatment modalities, it is our talent for humane relationship-centered care that is critical to the kind of care that we must teach and deliver."

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LOE—level of evidence. This is on a scale from 1a (best) to 5 (worst). 1b for an article about treatment is a well-designed randomized controlled trial with a narrow confidence interval.

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Preceptor Basic Book List

Suggested Texts for Community Preceptors From the STFM Bookstore

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Clinical Guidelines That Can Improve Your Care

The MacArthur Foundation Initiative on Depression and Primary Care: A Toolkit to Improve Your Care

By Caryl Heaton, DO; UMDNJ-New Jersey Medical School

Most practicing physicians are too busy to worry about staying up on each new guideline as it appears. But, let's say that you and your partners decide to look at improving the quality of care you give for one of the common, yet complicated, conditions in your practice. Let's say you are concerned that patients with mild or moderate depression are not being "picked up" in your office or that you might not be reassessing patients with known depression in any organized or systematic way. Where do you go to find the tools you need? You might want to find useful tools in a good guideline or at a good Web site, instead of heading to the usual review article.

The National Guideline Clearinghouse (www.guideline.gov) will provide 288 hits if you search for "depression." That's usually a good place to start, but who has time to wean down the list? We have talked about the United States Preventive Services Task Force (USPSTF) or the Institute for Clinical Systems Improvement (ICSI): you can't go wrong there. But occasionally, a brief Google search will produce independent, wonderful results. One such search produced The John D. and Catherine T. MacArthur Foundation's Initiative on Depression and Primary Care. I believe my search words were "depression" and "primary care." A brief review of the contributors confirmed that this document was indeed for and by primary care physicians (many of them STFM members). This Web site incorporates the recommendations from the USPSTF[1] but adds important tools for patient education and disease management. In addition to the "how-to" screening video and two useful slide shows, the Web site (www.depression-primarycare.org) includes the Depression Management Toolkit, a truly excellent resource.

There are four parts to what they call the Depression Care Process: (1) recognition and diagnosis, (2) patient education, (3) treatment, and (4) monitoring. The Toolkit has specific tools for each part of the process. The recognition and diagnosis section offers the clinician a basic review of the diagnostic criteria. It also offers the Two Question Screen (Table 1) and the PHQ-9. The PHQ-9 is copyrighted by Pfizer, but it is available for download by clinicians to use in their practice at www.pfizer.com/download/do/phq-9.pdf and also available in the Appendix in the Toolkit (www.depression-primarycare.org/clinicians/toolkits/full/). The PHQ-9 is a shortened version of the PRIME MD,[2] a validated instrument for diagnosis of depression and anxiety in primary care. If either answer to the Two Question Screen is positive, we (clinicians) can give the PHQ-9. Patients can independently take the PHQ-9 (as long as they can read and understand English or Spanish).

The interpretation is simple and quick, and the PHQ-9 can and should be used in follow-up. For example, a PHQ-9 score of 10–14 indicates moderate depressive symptoms; and the guideline suggests watchful waiting or supportive counseling and further treatment if no improvement occurs in 1 month. A PHQ-9 score of 15–19 suggests moderately severe major depression and immediate management with antidepressant and/or counseling. A

Table 1

Two Question Screen

During the past month, have you often been bothered by:

1. Little interest or pleasure in doing things? ❑ Yes ❑ No

2. Feeling down, depressed, or hopeless? ❑ Yes ❑ No

- If the patient's response to ***both*** questions is "no," the screen is negative.
- If the patient responded "yes" to ***either*** question, consider asking more detailed questions or using PHQ-9 patient questionnaire.

Table 2

Useful Contents of the Depression Management Toolkit (Highlights)* (www.depression-primarycare.org)

* Updated to December 2003, but worth putting on a bulletin board

AHCPR (AHRQ)—Agency for Health Care Policy and Research, now the Agency for Healthcare Research and Quality

Table 3

An Example From the Toolkit

Strategies for Managing Antidepressant Side Effects
1. Allow patient to verbalize his/her complaint about side effects
2. Wait and support. Some side effects (ie, GI distress) will subside over 1–2 weeks.
3. Lower the dose temporarily.
4. Treat the side effects (see table).
5. Change to a different antidepressant.
6. Discontinue medications and start psychological counseling.

SIDE EFFECT	*SSRIs and EFFEXOR*	*TRICYCLICs (nortriptyline, amtriptyline, imipramine)*	*BUPROPION*	*MIRTAZAPINE*	*MANAGEMENT STRATEGY*
Sedation	+/-	++	-	+	* Give medication at bedtime. Increase Remeron dose * Try caffeine
Anticholinergic-like symptoms: dry mouth/eyes, constipation, urinary retention, tachycardia	+/-	+++	-	+/-	* Increase hydration * Sugarless gum/candy * Dietary fiber * Artificial tears * Consider switching medication
GI distress	++	-	+	+/-	* Often improves in 1–2 weeks * Take with meals * Consider antacids or H2 Blockers
Restlessness Jitters/tremors	+	+/-	++	-	* Start with small doses, especially with anxiety disorder * Reduce dose temporarily * Add beta-blocker (propranolol 10–20 mg BID/TID) * Consider short trial of benzodiazepine
Headache	+	-	+	-	* Lower dose * Acetaminophen
Insomnia	+	-	+	-	* Trazodone 25–100 mg PO qHS (can cause orthostatic hypotension and priapism) * Take medication in a.m.
Sexual dysfunction	++	-	-	-	* May be part of depression or medical disorder * Decrease dose * Consider a trial of Viagra * Try adding bupropion 100 mg qHS or BID * Try adding buspirone 10–20 mg BID/TID * Try adding cyproheptadine 4 mg 1–2 hours before sex
Seizures	-	-	+	+/-	* Discontinue antidepressant
Weight gain	+/-	+/-	+/-	+/-	* Exercise * Diet * Consider changing medications
Agranulocytosis	-	-	-	+/-	* Monitor for signs of infection, flu-like symptoms * Stop drug, check WBC

Key: - Very unlikely; +/- Uncommon; + Mild; ++ Moderate

BID—twice a day; TID—three times a day; qHS—at bedtime

GI—gastrointestinal
SSRI—Selective Serotonin Reuptake Inhibitor
PO—orally
WBC—white blood count

Table 3 was reprinted with permission from the MacArthur Foundation Initiative on Depression and Primary Care (www.depression-primarycare.org)

score of >20 suggests severe major depression. The Toolkit's Appendix also gives guidance as to what would constitute an adequate response to an antidepressant: a drop of at least 5 points on the PHQ-9 after 4 weeks, or to counseling: a drop of at least 5 points on the PHQ-9 after 6 weeks.

Downloading the Depression Management Tool Kit (www.depression-primarycare.org/clinicians/toolkits/full/) from the site requires that you answer four simple questions, but is worth the trouble. A list of some of the "tools" that are provided in the toolkit is shown in Table 2. On page 17 of the toolkit, you will find the PHQ-9, which can be photocopied and used in your practice. The interpretation of the PHQ is explained on pages 18–19. A Spanish version of the PHQ-9 was a little harder to find on the Web site, but it's there (www.depression-primarycare.org/images/pdf/phq_9_quest_spanish.pdf).

The PHQ-9 was one of a number of useful diagnostic aids for depression that have been found to be of comparable value in clinical care.[3] The video demonstrates how a doctor uses the Two Question Screen with a patient who has somatic complaints. When he gets a positive answer to the screen, he gives the patient the PHQ-9 (leaving the room for a few minutes, presumably to see other patients). He quickly assesses the PHQ-9, makes the diagnosis, and initiates a treatment plan. He provides patient handouts to work with the patient to decide on counseling and/or medication. The process is practical for busy primary care offices. The toolkit includes first-rate patient education materials and useful tables for selecting the most appropriate antidepressant medication. An example of one of these tables is included as Table 3.

Over the past few years, we have become familiar with the concept of guidelines; they are here to stay. I would argue that most guidelines are much more flexible and complex than a "recipe" and that the charge of cookbook medicine is anachronistic. But for many physicians, the concept of an evidence-based, high-quality Web site with a "toolkit" of items to be selected as needed is one that has appeal over the traditional guideline approach. I hope we see will more of them.

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Erratum: In the January 2005 *The Teaching Physician*, "A Look at Two Guidelines on Obesity," page 5, Table 1: "Recommendations From the ICSI Prevention and Management of Obesity," the first row indicates BMI measurements. "Age" was inadvertently inserted and was not applicable in this table.

To download a copy of the article with the corrected Table 1, go to www.stfm.org/teachingphysician/index.htm.

Teaching Points—A 2-minute Mini-lecture

Boy With Asthma Exacerbation

By Donna Kern, MD, Medical University of South Carolina

Editor's Note: The process of the 2-minute mini-lecture is to get a commitment, probe for supporting evidence, reinforce what was right, correct any mistakes, and teach general rules. In this scenario, Dr Kern (Dr K) works with a third-year student (MS3) who has seen a young patient with asthma exacerbation.

MS3: This patient is a little guy, 7 years old, with an asthma attack. He was feeling well until about 4 days ago when he developed mild nasal congestion and a cough. His mother thinks he had a low-grade fever then, but it resolved. And then last night, he started to get short of breath with a dry cough and wheezing. That's about it for the history. His past medical history is significant for asthma. He takes albuterol inhaler when he gets attacks, when there's a weather change, or when he gets a cold. Social history: doing well in second grade. He doesn't smoke (smiles). There's a strong family history of asthma, on his father's side mainly. His pulse is 90, respiratory rate is 20, and temperature is 99.2. On physical examination, he is in mild respiratory distress and has end-expiratory wheezing diffusely.

Dr K: Excellent. What's your assessment?

MS3: I think he has asthma with an acute exacerbation. It's fairly mild.

Dr K: Good. What makes you say "mild?"

MS3: He seems pretty comfortable. He's breathing a little fast, but otherwise his vital signs are normal. And the wheezing is only at end of expiration.

Dr K: That's reasonable. The other thing we should add in are objective measures.

MS3: The oxygen saturation was 95% on room air.

Dr K: Great. Any other measures? The other thing we could check is a peak flow. He might be feeling pretty well but have dangerously compromised air flow. We'll check that, but, assuming it's not too bad, what do you want to do?

MS3: I would recommend he continue the inhaler. I don't know what else I would add—a steroid?

Dr K: That's great. I agree with your thinking. It's a clinical judgment—what to do next. I have a pretty low threshold for giving steroids for an acute exacerbation. Let me look at him and decide based on my own gut feeling, too, about how sick he is. The other issue is long-term management after the acute exacerbation is over. Are there any guidelines that could help us care for this patient in the future?

MS3: Yes, but I don't know them.

Dr K: We can actually use the electronic health record. Our record has standards of care built into the templates. Let's pull up asthma, and look: here are the criteria for mild intermittent and persistent: mild, moderate, and severe. Which does he have?

MS3: Well, he does use the inhaler every other day, but I didn't ask about nighttime symptoms. I think he might have mild persistent because he is using the inhaler every other day, and his asthma seems to be slowing him down when playing soccer. I don't know about the other criteria listed here.

Dr K: So a first-line treatment for mild persistent asthma would be . . .

MS3: It says an inhaled corticosteroid, but isn't that a bit risky?

Dr K: Risky in what sense?

MS3: Can't the steroid cause suppression of the adrenal glands and other problems like osteoporosis?

Dr K: Or diabetes? Cataracts? Or stunting growth? The simplest answer seems to be that it appears to be safe. This consensus group (*Guidelines for the Diagnosis and Management of Asthma—Update on Selected Topics 2002*, by the National Asthma Education and Prevention Program) recommendation surprised me, too. And it changed my practice. They clearly emphasized using inhaled corticosteroids in children over the age of 5 years, who have at least mild persistent asthma. Their previous report was not as positive as the 2002 update.

Let's say this attack was severe enough that you wanted to give a burst of steroids. How would you do so for an outpatient?

MS3: I think we can give it orally.

Dr K: Right. Oral is as fast-acting as IM or IV, with effects 4–6 hours from first dose. Do you need to taper the dose?

MS3: I have seen it done.

Dr K: I've seen it done, too. But there is no need to taper. Just stop the prednisone after 5 days to 2 weeks.

MS3: Oh, by the way, the mother wants to get a nebulizer machine for home use. She thinks they work better than the puffer.

Dr K: The recommended method of delivery is NOT a nebulizer machine for this age group. A Cochrane review (Cates CJ, Bara A, Crilly JA, Rowe BH. Holding chambers versus nebulisers for beta-agonist treatment of acute asthma. Cochrane Database Syst Rev 2003;3: CD000052) found no evidence that nebulizer machines were better than metered-dose inhalers with space chambers for adults and may have even had worse outcomes for children.

OK, let's go see him and finish up.

Alec Chessman, MD, Medical University of South Carolina, Editor

Excerpted from "For the Office-based Teacher of Family Medicine"

Ambulatory Teaching and Evidence-based Medicine: Applying Classroom Knowledge to Clinical Practice

By Roberto Cardarelli, DO, MPH, Center for Evidence-based Medicine, University of North Texas Health Science Center at Fort Worth; and Mark Sanders, DO, JD, Division of Education and Research, University of North Texas Health Science Center at Fort Worth; and the Department of Family Medicine, Texas College of Osteopathic Medicine (both).

(Fam Med 2005;37(2):87-9.)

Most students and residents have learned the basics of evidence-based medicine (EBM) in didactic sessions. However, a major hurdle in getting learners to use an EBM approach during clinical care is the lack of opportunity for the learners to use the concepts they have learned. As learners learn to perform a meticulous cardiovascular exam by practicing what they learn from didactic sessions, similarly they will learn to use an EBM approach if they apply EBM principles when making clinical decisions for their patients. This paper's purpose was to provide a realistic example of how office-based teachers can help learners practice EBM in the clinical setting based on our experiences at the Department of Family Medicine, University of North Texas Health Science Center at Fort Worth.

Asking an Answerable Question

Most learners are able to formulate a foreground question that reflects their learning needs in regard to a diagnosis or management issue. If the learner has difficulty coming up with a question, you may need to probe and find out what he/she already knows. You also may have the opportunity to help the learner be less vague and more systematic in asking a clinical question by using the PICO (Population, Intervention, ± Comparison, and Outcome) format.[1] For those posing an unclear question, you may find it helpful to ask, "How would you rephrase that question so it will be easier to answer?" If the learner is not sure, you can provide guidance by asking:

(1) Who are you talking about? (Population). Example: "An obese 45-year-old Caucasian female with type 2 diabetes mellitus"

(2) What is the therapy (test, etc) you are asking about? (Intervention). Example: "Metformin."

(3) Are you comparing it to something? (± Comparison) Example: "Diet alone."

(4) What outcome(s) are you interested in? Example: "All-cause mortality."

Our example: A learner and his family medicine preceptor developed the following EBM question after seeing a patient during clinic, "In an obese 45-year-old Caucasian female with newly diagnosed type 2 diabetes mellitus (Population), does taking metformin (Intervention) compared with diet alone (Comparison) affect all-cause mortality (Outcome)?"

We highly suggest using an "EBM educational prescription" to write these questions down during clinic.[2] The prescription lays out the steps for the learner to formulate an answerable question and leaves space for the learner to document the answers he/she finds to different parts of the question. It also serves as a reminder to research the question later on if there is no time to do so at the moment.

Searching for the Evidence

This next step can be challenging in the midst of a busy clinic session. How can you go on-line and locate articles if you are seeing 24 to 30 patients a day? You start by being realistic. First, the learners do not have to create a clinical question for every patient they see, as you do not run to a computer every time a patient comes in for a simple problem such as an upper respiratory infection. Learners can perform some of the searches on their own free time if they are merely looking to enhance their background knowledge, and there is not an urgent decision that needs to be made.

On the other hand, when significant point-of-care decisions need to be made for therapy or diagnostic tests, it is important to know how to efficiently and efficaciously find the evidence that will help the decision-making process. To begin the search for evidence, it is easiest to start at one of the Web sites listed in Table 1. Usually, learners can access these through the medical school's library system or by bookmarking the Uniform Resource Locators listed in Table 1 on their computers.

Our example: The learner and the preceptor used the clinic's computer, and they accessed Ovid MEDLINE through the medical school's library (30 seconds). They chose the "All EBM reviews" database because the learner and preceptor needed to answer their clinical question at the point of care and wanted to find a complete appraisal. Using the search terms "Metformin AND Mortality," they retrieved 35 articles (1 minute). They scanned the titles and found an article that was a good fit to the clinical question (2 minutes): Effect of Intensive Blood-glucose Control With Metformin on Complications in Overweight Patients With Type 2 Diabetes (UKPDS 34). UK Prospective Diabetes Study (UKPDS) Group. Lancet 1998;352(9131):854-65.

Appraising the Evidence

The advantage of using the Web sites listed in Table 1 is that their content includes appraisals of evidence for common clinical situations. Consider

looking through this preappraised evidence to give you an idea on the appraisal process and to save you time in finding answers to common questions for which the evidence has already been appraised. When you and the learner research an issue that has not been appraised by others, you can follow the appraisal process that is used in examples of the *Users' Guides to Evidence-based Practice*.[3] To ensure that the learner learns how to appraise different types of articles, you can give your learner nightly reading assignments from the *Users' Guides to Evidence-based Practice* and review them together the next morning. Patience is initially required, but after learners know how to appraise an article and what is expected from them, they eventually become self-sufficient.

Our example: The learner and preceptor reviewed the outcome of interest and found that patients who were intensively treated with metformin, compared to the conventional group (diet alone), had a risk reduction of 36% for all-cause mortality.

Applying the Evidence to the Patient

This last step is easily applied at the point of care. You should reemphasize to the learner to keep the entire context of the patient in mind prior to making and offering medical decisions. The most important learning point is to incorporate the patient's beliefs, values, and principles into the clinical decision. This reiterates the importance of the patient-physician relationship. You can ask the learner, "So what do you want to do with what you found?" Allow learners to point out the potential obstacles and corresponding solutions and then guide them. With practice, the learners become confident in practicing EBM and applying their findings to the patients they care for.

Table 1

Useful Evidence-based Medicine Web Sites

- Ovid MEDLINE (http://gateway.ovid.com)
- American College of Physicians Journal Club (www.acpjc.org)
- Cochrane Collaboration (www.cochrane.org)
- Database of Abstracts of Reviews of Effects (DARE) (www.york.ac.uk/inst/crd/darehp.htm)
- *Evidence-based Medicine* journal (http://ebm.bmjjournals.com)
- National Guideline Clearinghouse (www.guideline.gov)
- *Bandolier* journal (www.jr2.ox.ac.uk/bandolier)

(All accessed on November 18, 2004)

Our example: Since the findings were significant and the population of the study was similar to their patient, the learner and preceptor felt comfortable applying the evidence and recommending that the patient start on metformin. More importantly, the patient was willing to start this medication since she had family relatives who had died from diabetic complications.

Conclusions

Actively practicing EBM on every patient is not realistic. We have much clinical expertise and the inherent knowledge to handle the majority of the issues we face daily. As it is up to us to ensure that our inherent knowledge stays up to date with sound evidence-based information, similarly it is our responsibility to help learners expand their knowledge base and learn as much evidence-based information as possible.

Learners must master a number of skills, including history taking, doing a careful physical exam, increasing their knowledge base, developing therapeutic relationships with patients, and performing clinical procedures. However, clinical encounters are also an excellent opportunity for learners to apply concepts of EBM when making decisions for their patients. As clinical teachers, we should make efforts to initiate and teach EBM where possible and help learners provide the best care for their patients.

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3 The Evidence-based Medicine Working Group. Users' guides to evidence-based practice. Centre for Health Evidence Web site. www.cche.net/usersguides/main.asp. Accessed November 18, 2004.