A Multi-Faceted Approach to Evidence–Based Medicine
Objective Structured Clinical Examination (OSCE) Instruction

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**Goal:** To help students become familiar with and committed to the principles of good searching that they will work toward more effective searching outcomes which identify evidence-based medical information to answer questions about patient care.

Learning EBM (from Centre for Evidence-Based Medicine, Oxford, UK)

1) Ask Answerable Questions
2) Find the Best Evidence
3) Critically Appraise the Evidence
4) Act on the Evidence
5) Evaluate Performance
Library Internal Medicine MSIII Objectives

Orientation Objectives

The librarian introduces the medical students to the class assignment
The librarian familiarizes the medical students with the teaching modules

Patient Objectives

The medical student gathers patient information for their PICO (patient, intervention, comparison and outcome) question
Discusses case with physician

One–on–one Training Objectives

Outline the PICO question format
Describe the search strategy process
Identify the library’s Point–of–Care tools
Demonstrate a literature search using PubMed
Student performs searches in Point–of–Care tools and PubMed on their own

OSCE (Objective structured clinical exam) Objectives

Medical student works through an EBM (Evidence-based medicine) case study
The medical student meets with the librarian to discuss search strategies and results

Debriefing Objectives

Medical faculty meets with the medical student to discuss the previous library EBM training session
The medical student applies the search results to their patient’s case
Welcome to the Evidence-Based Medical Literature component of the Internal Medicine clerkship. The learning activities will give you new and additional skills using many computer-based and mobile based Evidence-Based Medicine information resources.
**ACTIVITIES:**

1) Identify a search question based on a patient you see during the Internal Medicine Rotation.

2) Review the handout "Constructing a Focused, Well-Articulated Question."

3) Complete the PICO Worksheet.

4) Bring your completed PICO worksheet to the library for your one-on-one teaching session. Contact from Internal Medicine will give you the schedule: time, date, place, & name of the librarian to whom you have been assigned.

**OSCE:**

There is an evidence-based medicine resources test station in the OSCE. There will be a total of 30 minutes spent at the EBM station. You will spend 20 minutes searching an assigned clinical question. The next 10 minutes will be spent with a librarian evaluating the information you have found on one or more of the following foreground information point-of-care databases:

- ACP PIER
- Dynamed
- FirstConsult
- Essential Evidence Plus
- PubMed (using MeSH)

You may also want to use the National Guideline Clearinghouse at www.guideline.gov.
What makes a clinical question well built? First, the question should be directly relevant to the problems at hand. Next, the question should be phrased to facilitate searching for a precise answer. To achieve these aims, the question must be focused and well articulated for all 4 parts of its 'anatomy' (known as PICO):

1) the **Patient**, population or problem being addressed
   - What are the characteristics of the patient or population?
   - What is the condition or disease?

2) the **Intervention** being considered which could include:
   - exposure, diagnostic test, prognostic factor, therapy, patient perception or
   - What do you want to do with this patient? Treat, diagnose, observe?

3) the **Comparison** intervention or exposure, when relevant
   - relevant most often when looking at therapy questions
   - What is the alternative to the intervention? Placebo, different drug, surgery?

4) the clinical **Outcomes** of interest
   - What are relevant clinical outcomes of interest to you and your patient?
   - Morbidity, death, complications?

Asking focused, four-component questions takes practice. Doing it well requires that you have insight into what you do not know, coupled with curiosity and a willingness to learn. Also, knowing how questions arise, where they come from, and how to recognize and articulate them can help you refine your skills.

How do clinical questions arise? During a patient encounter, the clinician may be uncomfortable making a decision until more is known. It is recommended that you quiet your emotions while turning your implicit knowledge gaps into explicit questions.

Most clinical questions arise from the following six aspects of clinical work:

1) Clinical evidence: how to gather clinical findings properly & interpret them soundly.
2) Diagnosis: how to select and interpret diagnostic tests.
3) Prognosis: how to anticipate the patient's likely course.
4) Therapy: how to select treatments that do more good than harm.
5) Prevention: how to screen and reduce the risk for disease.
6) Education: how to teach yourself, the patient, and the family what is needed.
How can you recognize and formulate clinical questions as they occur? First, pay careful attention to the questions that spontaneously occur to you. Listen for the 'question behind the question.' Next, try saying your questions out loud or writing them down with all four components included. Then build your question in two steps, starting with the 'location,' such as 'my question is about therapy,' Ask yourself what type of clinical scenario would you like to consider: Therapy? Prognosis? Diagnosis? Harm?

Then, articulate all four PICO components explicitly. See the example below.

What if too many questions arise? Select from the many questions the few that are most important to answer right away. Ask yourself, "What is the most important issue for this patient now? What issue should I address first? Which question, when answered, will help me most?

**PICO Example:**

**Patient or Problem:** 65-year-old man with a stroke & moderate carotid stenosis

**Intervention:** ASA (acetylsalicylic acid)

**Comparison Intervention:** Placebo

**Outcome:** Stroke

becomes a

**Focused, Well-Built Question:**

In a 65-year-old man with a stroke and moderate carotid stenosis, can ASA decrease the risk of another stroke compared with no treatment?

**Additional Practice**

If you would like additional practice formulating articulate questions using a web tutorial go to: http://ktclearinghouse.ca/cebm/practise/formulate/

**Answering Clinical Questions**

After the patient care problem(s) has been articulated into a focused, well-built question, the next step is to search the literature. A variety of EBM resources will be explored in the library teaching sessions.

**Taken from:**


**PICO Worksheet**

Name: ______________________________ Date: ______________

**Clinical Question:**

**Select Study category:** therapy diagnosis harm prognosis

**PICO**

**Patient,** population, or problem being addressed
What are the characteristics of the patient or population?
What is the condition or disease?

**Intervention** being considered which could include:
exposure, diagnostic test, prognostic factor, therapy, patient perception
What do you want to do with this patient? Treat, diagnose, observe?

**Comparison** intervention or exposure
Relevant most often when looking at therapy questions.
What is the alternative to the intervention? Placebo, different drug, surgery?

**Outcomes** of interest
What are the relevant clinical outcomes of interest to you and your patient?
Morbidity, death, complications?

**Focused, Well-Built Question:**


Search Question:

Databases:

1 → AND 2 → AND 3 → AND 4

Do you need...?
subheadings
dates

limiters such as:
language
human or animal

age groups
publication types
journal subsets
1) Identify patient question (Set up PICO question format)

P (patient)________________________________

I (intervention)____________________________

C (comparison)____________________________

O (outcome)______________________________

(patient seen during Internal Medicine rotation and pre-approved by IM)

2) Search strategy worksheet - how to strategize a search question with subject concepts and Boolean logic

3) a) DynaMed
e) www.guideline.gov

b) ACP PIER©
f) www.medlineplus.gov

c) Essential Evidence Plus
g) Gold Rush

d) First Consult

4) Foundations of searching PubMed (Hands-on):

MeSH

Boolean Logic (AND OR)

Subheadings

explode feature

MeSH vs. Major topic

Limits and Advanced Search

Publication Types, MeSH Terms, Substances, Grant Support

Abstract format

Clipboard

E-mail

Full-text icons

Type of Article; Subsets: Systematic Reviews

My NCBI (set up Search Filters)

Export (Brief Intro to RefWorks)

5) Mobile Devices: PubMed links – (e.g. PICO, WISER)

6) Print Hand-outs:

a) EXAM MASTER™

b) MICROMEDEX®

c) MedlinePlus

d) Medical Resources for Mobile Devices

e) RefWorks

f) SpringerImages

7) Instructor Evaluation Form
Internal Medicine OSCE

EBM Station Student pages

Scenario (Describe your patient/disease process here)
Student:_________________________  Date:_________________________

1. **ASK** an answerable question

   **PICO**

   **Patient/Problem/Population**

   **Intervention**

   **Comparison**

   **Outcome**

2. **ACQUIRE**  (Remember to answer all parts of multipart question during the exam)

   Check which resources used (Please use at least 2 databases, NOTE where you did not find info)

   - ACP Pier_______  Dynamed_________  Essential Evidence Plus (EE+)_________  First Consult_______
   - Guideline.gov_______  PubMed_______  PubMed’s Clinical Queries_______  MedlinePlus_________

   1) Resource used:_____________ >term(s) used_____________________

   Citation or specific info___________
2) Resource used: __________ > term(s) used __________________

Citation or specific info __________

3) Resource used: __________ > term(s) used __________________

Citation or specific info __________

4) Resource used: __________ > term(s) used __________________

Citation or specific info __________
5) If you use PubMed  
Your search strategy

Limits used

PMID, Source(s) or citation(s)  Attach if you want

3) APPRAISE: Which database(s) was most beneficial in answering your question. Why?

Does/do the source(s) answer the question?

4) APPLY the evidence to the patient

Explain to the librarian in your own words how this info is pertinent to your case. (1-2 sentences  ONLY)
Internal Medicine OSCE

EBM Station Student pages

(How to Use)

Scenario (Describe your patient/disease process here)

My 15 year old daughter is very interested in playing club soccer in the summer and also playing with the Varsity team in her high school during the school year. It seems that many adolescent female soccer players are tearing their knees with anterior cruciate ligament (ACL) tears as well as other knee injuries.

What preventive measures can be taken to prevent such injuries?
1. **ASK** an answerable question  
   **PICO**
   
   **Patient/Problem/Population**  
   Adolescent female soccer players
   
   **Intervention**  
   preventive strength training
   
   **Comparison**  
   no training
   
   **Outcome**  
   less injuries

2. **ACQUIRE** *(Remember to answer all parts of multipart questions during the exam)*

   **Check resources used** *(Please use at least 2 databases, note where you did not find info)*
   
   ACP Pier____ 0____  Dynamed___ + ______ Essential Evidence Plus (EE+)____ + _____ First Consult_____  
   Guideline.gov_____ PubMed_____ PubMed’s Clinical Queries_______ MedlinePlus________

1) Resource used:_______ Dynamed____ >term(s) used_______ACL injuries ___

> information found __ YES ___ Citation or specific info:

   plyometric exercises may reduce rate of ACL injury in female athletes  
   *(level 2 [mid-level] evidence)*


   A meta-analysis of the effect of neuromuscular training on the prevention of the anterior cruciate ligament injury in female athletes.
   Yoo JH, Lim BO, Ha M, Lee SW, Oh SJ, Lee YS, Kim JG.

   PMID: 19760399 [PubMed - in process]

   physical exercise program plus education about injury risk may prevent soccer-related knee injuries in teenage girls *(level 2 [mid-level] evidence)*
   Arch Intern Med 2010 Jan 11;170(1):43
Prevention of soccer-related knee injuries in teenaged girls.

Kiani A, Hellquist E, Ahlqvist K, Gedeborg R, Michaëlsson K, Byberg L.

Case-Control, Intervention Studies

2) Resource used: _ _____ EE+ __________________ > term(s) used ___ Anterior Cruciate ligament injury

> information found _____ YES __________ Citation or specific info __________


Study design: Non-randomized controlled trial

3) If you use PubMed: Your search strategy (MeSH terms used)

Search History

Limits used: see above

PMID, Source(s) or citation(s) Attach if you want

Influence of age, sex, technique, and exercise program on movement patterns after an anterior cruciate ligament injury prevention program in youth soccer players.
DiStefano LJ, Padua DA, DiStefano MJ, Marshall SW.
University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA.
Randomized Controlled Trial

3) APPRAISE: Which database(s) was most beneficial in answering your question. Why?

I really like the organization of information in Dynamed. The prevention section had 3 articles that were directly related to preventing injuries in my patient. One of the articles listed specific kinds of exercises as well as those that do not help prevention of ACL injuries in the adolescent female population.
4) **APPLY the evidence to the patient**

Explain to the librarian in your own words how this info is pertinent to your case.

**(1-2 sentences ONLY)**

Specific exercises were listed that were beneficial to my patient. I can now give the mom and her daughter appropriate exercises to prevent injury of this young female athlete.
Internal Medicine OSCE
EBM Station Grading Sheet

Student: ____________________
Date: ____________________

TOTAL POINTS Earned: __________

1. **ASK** an answerable question
   Patient/Problem/Population =

   Intervention =

   Comparison =

   Outcome =

   (possible 10 pts.) ________

2. **ACQUIRE:** Did the student use an appropriate resource to search for evidence?
   a. Database(s) used:

   b. Search strategy used

   c. Extra points for correct use of MeSH, Limits, filters, complex Boolean

   (possible 40 pts.) ________
Internal Medicine OSCE
EBM Station Grading Sheet

Student: _______________
Date: ______________

3. **APPRaise**: Was an appropriate source of evidence obtained?
   a. Source or citation used:

   b. Relevance: Does the source answer the question?

   c. Currency: If a journal reference, does this reflect the most current evidence available?

   d. Validity: If a journal reference, was an appropriate study design used for the research?

   e. Level of evidence: Strong or weak?

   (possible 30 pts.) ________

4. **APPLY**: Did the student correctly interpret and apply the evidence to the patient?
   a. Interpretation of the evidence:

   b. Application of the evidence to the patient:

   (possible 20 pts.) ________

Evaluator: ________________________________  JRice7-13-07
Template for Small Group Discussions at CDIM Workshop
2010 CDIM National Meeting
(part of Academic Internal Medicine Week)
A Multi-Faceted Approach to EBM OSCE Instruction

Where is your institution in this process now? (Have librarian input in OSCE, Don’t have, Are interested in having, Don’t need it...)

Goal/Idea: (Description of course, students to be taught, group or individual teaching sessions)

Persons to contact: (to teach the classes, will you need more than one teacher, why do you need more than one teacher)
**Persons/Departments to contact:** (to set up a new class for your organization)

**Resources needed:** (Databases, Handouts, what expertise is needed)

**Facilities/Locations:** (For each section of the class and what equipment is needed in each location)

**TIME:** (How much time; when should training be given, how long etc)

**How to evaluate student performance:** (pass/fail, grades, ?)

**How to assess class?** (evaluation, survey, etc.)
Selected Resources


Contact Information

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