Course Title: Evidence-Based Medicine
Course Number: BMS 6066
Credits: 1
Grading System: P/F or numeric: Numeric

Period: 2
Start Date: April 5th, 2013
End Date: May 24th, 2013

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1. COURSE DESCRIPTION, EXPLANATION, AND TEACHING PHILOSOPHY

Description

This course is intended for students to acquire and develop both the knowledge and the skills for evidence-based medicine (EBM). During this course students will use concepts obtained in previous epidemiology courses as they are applied to help solving clinical problems.

Explanation

Health professionals make numerous decisions when they provide care to patients. These decisions should be informed by the best evidence available from sound clinical research and patients’ values and preferences. Therefore, health professionals need to acquire knowledge and develop skills to determine the validity, the meaning, and the applicability into practice of clinical research evidence findings. Mastering EBM increases the confidence of physicians for decision making, the quality of care, and their abilities to communicate clearly and efficiently with colleagues, other health professionals, and with patients and their families—all key elements of professionalism, which is why this course belongs to the Professional Development strand of the curriculum at FIU HWCOM.

The course covers all steps of EBM: posing the patient’s problem as an answerable set of questions (step 1), searching clinical evidence (step 2), appraising critically the validity and importance of clinical research evidence (step 3), and determining the applicability of evidence into practice (step 4).

Teaching Philosophy

Team based learning (TBL) is the didactic approach used in the course. This educational method allows learners to apply course concepts through thinking and problem solving. It also nourishes life-long learning skills and strengthens interpersonal and team-interaction skills abilities.

Students’ responsibilities and tasks are described below (see 4. Instructional Methods section). Instructors have the following duties: 1) to prepare all materials that are available to the students before each session, as well as the individual and the team Readiness Assurance Tests (iRAT and tRAT); 2) to assess and reply to all appeals posed by students to the iRAT/tRAT answers; 3) to prepare sets of problems for students to solve during the application part of the sessions; 4) to guide class discussions and provide feedback; and 5) to prepare and grade all course assessments (iRATs, tRATs, final exam).

2. COURSE LOCATION

All sessions of the course take place at the same location (AHC2, room 170).
3. COURSE LEVEL LEARNING OBJECTIVES

At the end of the course, students will be able to:

1. Define EBM and describe the steps of the practice of EBM.
2. Enumerate the different purposes for searching the scientific biomedical literature.
3. Describe the difference between background and foreground questions.
4. Rephrase issues arising in patient care as correct clinical questions (PICO questions).
5. Conduct efficient searches of clinical evidence using the most appropriate terms and other tools (filters, operators, and clinical queries) in databases available through the Internet, in accordance with the type of evidence of interest (PubMed, Cochrane Library, National Guideline Clearinghouse).
6. Save and retrieve the full text of materials from evidence searches.
7. Critically appraise the most common types of clinical research papers (interventions, harm, diagnostic tests, and systematic reviews).
8. Apply the evidence to individual patients.

These course objectives contribute to the following FIU HWCOM Educational Program Objectives (EPOs):

- Use Evidence-based medicine to provide quality health care to individuals and populations (course objectives 1 to 8).
- Apply quality scientific research methods (course objectives 4, 5, 7, 8).
- Integrate epidemiologic, socioeconomic, behavioral, cultural and community factors into patient care (course objectives 1 to 8).

4. INSTRUCTIONAL METHODS

As mentioned before, TBL is the didactic approach used in the course. This combines individual study, small teams working to solve problems, and feedback and discussion. Since the objectives emphasize the development of skills, prominence is given to practical activities—those that encourage students to apply the information learned. No lectures will be presented during the sessions. More specifically, the work expected from students includes:

- **Before the sessions.** For each session students receive, at least one week in advance and through the LMS, a set of educational objectives, readings, and lectures or tutorials. **Before** each session, students are expected to work on these materials, individually or in groups, and come to the sessions ready to use the information and be tested on it.

- **During the sessions.** Students:
  - Complete the iRAT.
  - Complete the tRAT.
  - Receive immediate feedback about the iRAT and tRAT questions and answers.
  - Complete (if deemed appropriate) written appeals challenging the instructor’s “correct” answers to the iRAT and tRAT questions. No individual appeals are to be considered. Appeals are expected to be endorsed using the contents of the materials for the session.
  - Work on identical application problems and assignments, and discuss the answers with faculty and their classmates.
5. TEXTBOOK, MATERIALS, READINGS, RESOURCES, TERMINOLOGY

Mandatory Textbook

This course does not have a mandatory textbook. The recommended reference textbooks (see below) and other readings (which will be provided) are the main resources for the course.

Recommended reference textbooks


These two textbooks are the best known and reputed books on how to practice EBM. They are written for clinicians and provide practical but comprehensive guidelines about how to locate, appraise and apply evidence for solving clinical problems.

Teaching materials also include:

- Learning objectives for all of the sessions, provided by the instructors via LMS. These include a list of the most important new terms that students are expected to learn before each session.
- Resources (readings, online tutorials and videos, free-shared software for calculating epidemiological measures) to solve the problems of each session; links to these resources will be posted to the LMS well in advance before each session.
- The TRATs should be considered a learning resource; when students work in teams to answer the test, they have the opportunity to discuss concepts, learning from each other.
- Problems and exercises (clinical vignettes, published papers used during the exercises) in which students apply concepts and develop the skills required for searching and appraising the medical literature efficiently. These problems will be delivered by the instructors during the sessions.

6. EVALUATION, ASSESSMENT, AND GRADING RUBRICS

Grades are obtained based on the following complementary assessments:

- The individual Readiness Assurance Tests (iRAT) answered individually by students in each session. These tests are based on the readings/tutorials that students are expected to review before each session. They provide between 25% and 40% of the final grade. 25%
- The team Readiness Assurance Tests (TRAT) answered by students working in teams of five or six members in each session. These tests are the same that students answered before as iRATs. They provide between 25% and 40% of the final grade. 25%
- A peer assessment of individuals’ “helping behaviors”. Twice along the course each student is going to provide an assessment of every one of her/his team mates. The first peer assessment, to be conducted at course mid-term, is going to be formative (that is, it will be used for feedback but will not provide a grade), while the second provides between 10% and 20% of the final grade. The rubric for peer assessment will be available for the students when
they receive complete instructions at the middle and at the end of the course. In brief, it includes the assessment of peers’ preparation for the sessions, cooperative learning skills and interpersonal skills. 20%

- An individual **final exam** in which students apply course concepts for solving problems. Information from clinical research papers will be presented and students will have to identify PICO questions, critically appraise the validity evidence using the guidelines learned, and assess and analyze the findings reported in the studies. This component provides between 30% and 40% of the final grade. 30%

The specific percentage provided by each one of these four components will be decided by the students during the first session, within the boundaries mentioned above.

7. COURSE POLICIES

**Attendance is mandatory to all sessions.** Due to the course emphasis in developing skills and not only knowledge, the students’ participation in all course activities is critical. During the sessions, students will have the opportunity to apply concepts presented in readings, lectures and tutorials, as well as develop hands-on skills. In addition, the discussion during the sessions will clarify concepts that remain unclear after the lectures and tutorials and help students overcome the practical difficulties in the exercises.

**iRATS and tRATs have no make-up.** Students with sufficient reason for missing a test (please see below) will have no grade for the missed test and their mean grade for tests will be based only on those that they completed. On the other hand, students missing a test without sufficient reason will have a zero as grade for the missed tests, which will be incorporated to obtain the mean grade for their tests and the final grade for the course.

This syllabus is a guide to provide an accurate overview of the course but circumstances and events may make it necessary to modify this syllabus. Students will be promptly communicated when changes to the syllabus need to be made.

Finally, the course adheres to all general HW COM policies (per Herbert Wertheim College of Medicine Medical Student Handbook 2012-2013), as described below.

**Herbert Wertheim College of Medicine Attendance Policy:**
Professionalism is a major component of the HWCOM curriculum. Therefore, medical students as future professionals should conduct themselves appropriately in all curricular activities, including classroom work, laboratory work, and clinical experiences. The professionalism of a medical student includes arriving to educational activities on time, using laptop computers only for course work during the educational activity, and minimizing disruptions to the educational exercise. Students are accountable and personally responsible for attending all educational activities including large and small group sessions and lectures, labs, clinical experiences, examinations, etc. Faculty may establish specific attendance and punctuality requirements for certain courses and clerkships by notifying students of the requirements in the course syllabus or by an alternate means of written communication. Academically successful medical students are expected to attend all educational activities to best prepare them to meet the curricular goals leading to the M.D. degree. Attendance in all clinical activities with patients and for many active-learning exercises is mandatory. Mandatory classroom sessions will be indicated in the course syllabus.

**Tardiness**
Students are expected to attend all scheduled activities on time and ready to begin. It is important that students realize that their absence or tardiness negatively affects a number of other people. Students who expect to be late for a mandatory class, lab, or small group session for any reason (e.g., car trouble, accident, injury or similar unforeseen event) MUST contact the course director BEFORE the start of class. Faculty may deny entrance or participation to a tardy student. Unexcused absences demonstrate unprofessional behavior by the student. Attendance, including tardiness, is part of the evaluation for professionalism, and poor evaluations may result in decreased grades and, in severe cases, referral to the MSEPC.
Emergencies Affecting Attendance
If a student has an emergency that prevents him/her from attending a scheduled class, clerkship, clinical rotation, Emergency Department rotation, Green Family Foundation NeighborhoodHELP™ household visit, or any other required activity, he/she is to call and notify the Office of Student Affairs using the “after hours” emergency phone line 305.348.0696 and inform the course or clerkship director as well as supervising faculty member(s) for that activity. Examples of emergencies include emergency onset of illness, severe injury, death or serious illness of family member, and other serious incidents as determined on a case-by-case basis. If absences also interfere with attendance at the primary care preceptorships and/or household visits, students must also contact the appropriate Medicine and Society faculty. Students with emergencies affecting attendance at scheduled Emergency Department rotations must immediately contact the appropriate emergency room staff and subsequently, the Office of Medical Education as well.

Planned Absences
Students must schedule personal appointments and activities during times when no mandatory activities are scheduled. However, if such conflict is unavoidable, students must request to be excused in advance from such classes and clerkships as early as possible. Students must complete the Excused Absence Approval Form (http://medicine.fiu.edu/) and discuss a plan to complete all missed course work with the faculty course directors as pertinent, which is acknowledged by their signature(s) on this form. The form must be sent to the Office of Student Affairs for final approval by Executive Associate Dean for Students Affairs, or designee. Students must obtain approval prior to registering for conferences and making travel arrangements and thus, should allow sufficient time to provide advance notice to appropriate faculty and the OSA. Students with long-term illnesses must contact BOTH the Office of Student Affairs as well as the course and/or clerkship director. Students will need to provide OSA written documentation of the nature of the illness from his/her personal physician. Students may request permission to participate in professional activities off campus through a process in the Office of Student Affairs; 30 days advance notice is required.

Remediation of Unsatisfactory Performance in Course
A student who performs below the satisfactory level will be notified by the Office of Medical Education to meet with the Course Director for the purpose of developing a remediation plan. Remediation of unsatisfactory performance will proceed with a formal remediation plan established by the course director and the student. The plan will be formalized with a signed agreement titled “Remediation Plan for Unsatisfactory Performance”, a standard document stipulating the expectations for work to be performed, the measures to be used to assess competency, and the time period for the remediation. The student, course director, and the Associate Dean for Curriculum and Medical Education must approve the coursework remediation plan and sign the agreement. Upon satisfactory performance per the agreement the course director will report the satisfactory achievement for the course and a grade of “U/75” will be awarded. Failure to complete the plan for remediation (i.e., work not completed or performed at an unsatisfactory level) will be reported to the E&P Committee for action.

Incomplete Work in a Course
If a student is unable to complete required work in a course, the student may request permission to continue study with an incomplete status for the course. This requires formal notification by the Course Director to both the Executive Associate Dean for Student Affairs and the Associate Dean for Curriculum and Medical Education, providing the information that an incomplete has been given with an explanation for the incomplete. The registrar will enter a grade of “I” on the record.

Make up for Incomplete Course Work
A plan to make up incomplete course work will be created by the Course Director and approved by the student and the Executive Associate Dean for Student Affairs and the Associate Dean for Curriculum and Medical Education. The formal plan (“Plan for Completing Course Requirements”) will describe the activities, assessment and time period to complete the work. When completed, the course director will report the grade earned.
## 8. COURSE OUTLINE AND SCHEDULE

<table>
<thead>
<tr>
<th>Date, times, location</th>
<th>Topics/Themes</th>
<th>Session-Specific Learning Objectives</th>
<th>Attendance</th>
<th>In-Class Assignments</th>
<th>Instructional Format/Type of Learning</th>
<th>After-Class Assignments</th>
<th>Terminology</th>
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| Fri, Apr 5 1 – 3 pm AHC2, 170 | 1. Introduction to Evidence-based Medicine. Posing questions and running searches in PubMed. | • Define evidence-based medicine (EBM) and its steps  
• Describe the difference between background and foreground questions  
• Describe the general strategy for searching the literature: key words, MeSH terms, Boolean operators  
• Formulate correct clinical questions from patients’ problems  
• Identify search terms to use when searching in PubMed  
• Identify abbreviations and synonyms for main terms  
• Match search terms with PubMed MeSH terms  
• Conduct a PubMed search using MeSH and/or keywords | Mandatory | • Creating the course teams  
• Consensus on grades percentages  
• iRAT  
• tRAT  
• Teams’ appeals  
• Application activities | TBL | None | • Evidence-based medicine (EBM)  
• PICO question  
• Team-based learning (TBL)  
• Individual Readiness Assurance Test (iRAT)  
• Team Readiness Assurance Test (tRAT)  
• Medical subject headings (MeSH)  
• Boolean operators |
| Fri, Apr 12 1 – 3 pm AHC2, 170 | 1. Introduction to Evidence-based Medicine. Posing questions and running searches in PubMed. | • The same as for the previous session | Mandatory | • Application activities | TBL | None | • The same as for the previous session |
| Fri, Apr 19 10a–12p AHC2, 170 | 2. How to search the clinical evidence: More on PubMed and | • Identify and apply relevant delimiters to refine PubMed search results  
• Conduct a PubMed search | Mandatory | • iRAT  
• tRAT  
• Teams’ appeals | TBL | None | • Filters  
• Clinical Queries  
• Single citation matcher |
| Fri, Apr 19 1 – 3 pm AHC2, 170 | 2. How to search the clinical evidence: More on PubMed and other resources | other resources | using the Clinical Queries tools
- Verify citations using the Single Citation Matcher tool
- Retrieve full-text papers found in a PubMed search
- Conduct an efficient basic or advanced search in the Cochrane Library
- Conduct an efficient search in the National Guidelines Clearinghouse | • Application activities | Mandatory | Application activities | TBL | None | • The same as for the previous session |

| Fri, Apr 26 1 – 3 pm AHC2, 170 | 3. How to appraise evidence about interventions | other resources | • Describe: random allocation, concealed allocation, “blinding” and “intention to treat analysis” in studies assessing interventions
• Apply guidelines for assessing the validity of a clinical research study that has evaluated the efficacy and safety of a preventive or therapeutic intervention
• Define, calculate and interpret the most common measures of association (relative risk, absolute risk reduction, relative risk reduction, NNT, their 95% confidence intervals) used in clinical trials
• Describe the principles for applying the findings of a clinical research study on | • Application activities | Mandatory | Application activities | TBL | Formative peer assessment (due April 29th, 2013) | • Randomized control trial (RCT)
• Random allocation
• Concealed allocation
• Double-blinding
• Intention to treat (ITT) analysis
• Relative risk (RR)
• Absolute risk reduction (ARR)
• Relative risk reduction (RRR)
• Number needed to treat (NNT)
• P-value
• Confidence intervals |
### Interventions to Individual Patients

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<tr>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Session</th>
<th>Description</th>
<th>Requirements</th>
<th>TBL</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Fri, May 3</td>
<td>1–3 pm</td>
<td>AHC2, 170</td>
<td>4</td>
<td>How to appraise evidence on harm</td>
<td>Mandatory</td>
<td>TBL</td>
<td>None</td>
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<td>• Identify the research designs used in studies assessing harm</td>
<td>iRAT, tRAT</td>
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<td>• Apply guidelines for assessing the validity of a study that assessed harm</td>
<td>Teams’ appeals, Application activities</td>
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<td>• Assess the comparability of cohorts or of cases and controls regarding other prognostic factors</td>
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<td>• Assess the evaluation of the exposure and the outcome</td>
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<td>• Assess the length and the completeness of follow-up</td>
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<td>• Estimate and interpret the strength of the association</td>
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<td>• Describe the principles for applying the findings of a clinical research study on harm to individual patients</td>
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<td>Fri, May 10</td>
<td>1–3 pm</td>
<td>AHC2, 170</td>
<td>5</td>
<td>How to appraise evidence about diagnostic tests</td>
<td>Mandatory</td>
<td>TBL</td>
<td>None</td>
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<td>• Describe: gold standard, “double-blinding” and independence as they apply to studies assessing the accuracy of diagnostic tests</td>
<td>iRAT, tRAT</td>
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<td>• Apply guidelines for assessing the validity of a study that assessed the accuracy of a diagnostic test</td>
<td>Teams’ appeals, Application activities</td>
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<td>• Define, calculate and interpret the most common indicators of a diagnostic test performance (sensitivity, specificity, predictive values, and likelihood ratios).</td>
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<td>• Describe and apply the</td>
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- **Mandatory**
- **TBL**
- **None**
| Fri, May 17 1 – 3 pm AHC2, 170 | 6. How to assess evidence from systematic reviews | * Describe the methodological principles and steps of a systematic review (SR) of the literature.  
* Apply guidelines for assessing the validity of a SR.  
* Assess the quality of the literature search in a SR.  
* Assess the potential for publication bias in a SR.  
* Determine the quality of primary studies included in a SR  
* Assess the reproducibility of a systematic review SR  
* Interpret the finding of a SR (forest plot, pooled measures of association).  
* Describe the principles for applying the findings of a SR to individual patients. | Mandatory | iRAT  
* tRAT  
* Teams’ appeals  
* Application activities | TBL | None  
* Narrative review  
* Systematic review  
* Meta-analysis  
* Publication bias  
* Heterogeneity |