As you come in...

• Please sit at a table with a faculty member according to where you will be involved with EBM curriculum at your institution
  – Undergraduate Medical Education
  – Graduate Medical Education
Evidence-based Medicine Curriculum Development

Concurrent Session
Matthew Tuck, MD, Med
Carla Lupi, MD
Learning Objectives

• Describe current drivers of EBM curriculum in UME and GME
• Describe the basic process of curriculum design
• Apply these principles to the design of your own learning session(s)
• Discuss curricular successes and challenges you are facing with mentors in a small group setting... speed dating!
WANTING MORE TIME FOR EBM IN YOUR CURRICULUM?
Core Entrustable Professional Activities for Entering Residency
### EPA 7: Form Clinical Questions and Retrieve Evidence to Advance Patient Care

#### Key Functions with Related Competencies

<table>
<thead>
<tr>
<th>Function</th>
<th>Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combine curiosity, objectivity, and scientific reasoning to develop a well-formed, focused, pertinent clinical question (ASK)</td>
<td>KP3 PBL16 PBL11 PBL13</td>
</tr>
<tr>
<td>Demonstrate awareness and skill in using information technology to access accurate and reliable medical information (ACQUIRE)</td>
<td>PBL16 PBL17</td>
</tr>
<tr>
<td>Demonstrate skill in appraising sources, content, and applicability of evidence (APPRaise)</td>
<td>PBL16 KP3 KP4</td>
</tr>
<tr>
<td>Apply findings to individuals and/or patient panels; communicate findings to the patient and team, reflecting on process and outcomes (ADVISE)</td>
<td>IC51 IC52 PBL11 PBL18 PBL19 PC7</td>
</tr>
</tbody>
</table>

#### Behaviors Requiring Corrective Response

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not reconsider approach to a problem, ask for help, or seek new information</td>
<td>With prompting, translates information needs into clinical questions</td>
</tr>
<tr>
<td>Refuses to consider gaps and limitations in the literature or apply published evidence to specific patient care</td>
<td>Accepts findings from clinical studies without critical appraisal</td>
</tr>
<tr>
<td>Does not discuss findings with team or determine or discuss outcomes and/or process, even with prompting</td>
<td>Communicates with rigid recitation of findings, using medical jargon or displaying personal bias</td>
</tr>
</tbody>
</table>

#### Developing Behaviors (Learner may be at different levels within a row)

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>With prompting, translates information needs into clinical questions</td>
<td>Seeks assistance to translate information needs into well-formed clinical questions</td>
</tr>
<tr>
<td>Refuses to consider gaps and limitations in the literature or apply published evidence to specific patient care</td>
<td>Judges evidence quality from clinical studies</td>
</tr>
<tr>
<td>Does not discuss findings with team or determine or discuss outcomes and/or process, even with prompting</td>
<td>Applies findings based on audience needs</td>
</tr>
</tbody>
</table>

#### Expected Behaviors for an Entrustable Learner

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifies limitations and gaps in personal knowledge</td>
<td>Identifies and uses available databases, search engines, and refined search strategies to acquire relevant information</td>
</tr>
<tr>
<td>Develops knowledge guided by well-formed clinical questions</td>
<td>Uses levels of evidence to appraise literature and determines applicability of evidence</td>
</tr>
<tr>
<td></td>
<td>Seeks guidance in understanding subtleties of evidence</td>
</tr>
</tbody>
</table>

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This schematic depicts development of proficiency in the Core EPAs. It is not intended for use as an assessment instrument. Entrustment decisions should be made after EPAs have been observed in multiple settings with varying context, acuity, and complexity with varying patient characteristics.

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<table>
<thead>
<tr>
<th>High-Value Care</th>
<th>Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>10a - Recognizes uncoordinated, wasteful, and unnecessary health care delivery.</td>
<td>10b - Manages the interrelated components of the complex health care systems for efficient and effective patient care. HM-SBP3</td>
</tr>
<tr>
<td>11a - Articulates the ethical case for stewarding resources and cost-conscious care, including the potential impact of clinical decisions on patient affordability.</td>
<td>11b - Considers cost when practicing medicine.</td>
</tr>
<tr>
<td>12a - Recognizes that there are wide variations in health care utilization and care delivery patterns across individuals, health systems, and regions that are not warranted by patient need.</td>
<td>12b - Minimizes unnecessary deviation of practice from recommended guidelines or local standards.</td>
</tr>
<tr>
<td>12c - Contributes to practice and system level changes to reduce unnecessary and unwarranted variation.</td>
<td>11c - Incorporates cost-awareness principles into delivery of complex clinical care.</td>
</tr>
</tbody>
</table>
## ACGME Harmonized Milestone(s)

### PBL1: Evidence Based and Informed Practice

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates how to access and use available evidence, and incorporate patient preferences and values in order to take care of a routine patient</td>
<td>Articulates clinical questions and elicits patient preferences and values in order to guide evidence based care</td>
<td>Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients</td>
<td>Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient</td>
<td>Coaches others to critically appraise and apply evidence for complex patients; and/or participates in the development of guidelines</td>
</tr>
</tbody>
</table>

Comments:
DESIGNING A LEARNING SESSION
Start at the End

• What do you want your learners to be able to do by the time they have completed the curriculum?
  – May require needs assessment

• Start with goals of the curriculum
  – Map to learning objectives for individual sessions
  – Develop educational sessions based on these objectives

• Assess learning
  – Should measure learning objectives

• Revise

# Sample Curricular Goals and Objectives


<table>
<thead>
<tr>
<th>Course Length</th>
<th>Learner Level</th>
<th>Goals [This course will...]</th>
<th>Objectives [Learners will be able to...]</th>
</tr>
</thead>
</table>
| Short Course  | Novice (MS, PGY-1) | • Introduce the language of EBM  
• Illustrate question formation, study selection, and the hierarchy of evidence  
• Introduce core EBM definitions for different types of clinical questions  
• Highlight sources of bias in studies  
• Provide resources and references for critical appraisal and model several examples | • List the components of a well-structured question  
• Name the best study design for a clinical question  
• Identify sources of bias in studies on diagnostic testing and therapy  
• Calculate absolute risk reduction, relative risk reduction, number needed to treat  
• Interpret confidence intervals and describe their relationship to precision  
• List resources for evidence-based critical appraisal |
Miller’s Pyramid - Assessment

MILLER'S PRISM OF CLINICAL COMPETENCE (aka Miller's Pyramid)

it is only in the "does" triangle that the
doctor truly performs

Performance Integrated Into Practice
eg through direct observation, workplace
based assessment

Demonstration of Learning
eg via simulations, OSCEs

Interpretation/Application
eg through case presentations, essays,
extended matching type MCQs

Fact Gathering
eg traditional true/false MCQs

KNOWS

KNOWS HOW

SHOWS

DOES

KNOWLEDGE

SKILLS

ATTITUDES

Based on work by Miller GE, The Assessment of Clinical Skills/Competence/Performance; Acad. Med. 1990; 65(9): 63-67
Adapted by Drs. R. Mehay & R. Burns, UK (Jan 2009)
PLHET: A recipe for designing successful sessions

• Prep – What assignments or activities are expected of the learner prior to the session?
• Link – How does this relate to the learners’ prior knowledge?
• Hook – What’s motivating the learner?
• Engagement – What teaching method(s) and format(s) will you use to address different learning styles?
• Transfer – How are learners expected to use the information in the future?

Practice!
Resources

Duke Teaching and Leading EBM
A Workshop for Educators and Champions of Evidence-Based Medicine

Start here
- Teaching and Leading EBM
- Curriculum
- Schedule
- Participant Expectations
- Materials
- Hotel & Transportation
- Registration
- Workshop Directors

Materials

Web Resources
- Duke Medical Center Library Clinical Tools: PubMed, UpToDate, Cochrane Library, etc.
- JAMA Evidence: Rational Clinical Exam series, PPT, Users Guides, etc.
- EBM Guide: links to teaching EBM tips articles, CAT templates, tutorials, etc.

Logistics / Expectations
- Participant Planning Guide
- Examples of presentations for small groups
- Tips for Tutor Trainees
- 6 Ts for Teaching / Feedback

Large Group Presentation Slides (will be added during the Workshop!)

Workshop Manual (participants will receive this on a USB thumb drive as well as a print copy of the Users' Guide to the Medical Literature, 3rd ed.)
- Duke Teaching and Leading EBM Manual

Supplementary Resources
From MedEd Portal:
Good Assessment is Difficult
to find and implement!

Original Publication

Triple-Jump Assessment Model for Use of Evidence-Based Medicine

Monica Bhutiani, William M. Sullivan, MD, MEd, Sandra Moutsios, MD, Elizabeth Ann Yakes, MD, Jennifer K. Green, MD, MPH,
Published: April 4, 2016 | 10.15766/mep_2374-8265.10373
Resources
Resources

• Tips for Teachers of Evidence-based Medicine
• Maggio, Lauren; MS, MA; Cate, Olle; Irby, David; OBrien, Bridget
  Designing Evidence-Based Medicine Training to Optimize the Transfer of Skills From the Classroom to Clinical Practice: Applying the Four Component Instructional Design Model. *Academic Medicine.* 90(11):1457-1461, November 2015.
Common Challenges to Implementing an EBM Curriculum

• Balancing “required” (e.g. USMLE) with necessary (e.g. needed to practice) content
• Recruiting and retaining core faculty
• Buy-in of stakeholders
• Teaching in clinical environments
• Experiential learning
• Evaluating curricula and demonstrating benefit
• Sustainability
Speed Mentoring!
Table 1 Examples of Evidence-Based Medicine (EBM) Training Activities Based on the Four Component Instructional Design (4C/ID) Modela

<table>
<thead>
<tr>
<th>Component</th>
<th>Preclerkship level</th>
<th>Clerkship level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning tasks</td>
<td>For whole-task content, learners are:</td>
<td>For whole-task content, learners:</td>
</tr>
<tr>
<td></td>
<td>• Provided with a written patient case derived from real-life practice that focuses on a single, familiar condition.</td>
<td>• Identify a patient case from their own clinical experience or adopt a patient case identified by a preceptor in morning rounds.</td>
</tr>
<tr>
<td></td>
<td>For whole-task format, learners are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Provided with a set of clinical questions and asked to complete the remaining EBM steps.</td>
<td></td>
</tr>
<tr>
<td>Supportive information</td>
<td>Prior to the activity, learners:</td>
<td>Prior to the activity, learners:</td>
</tr>
<tr>
<td></td>
<td>• Read an article on critically appraising diagnostic articles.</td>
<td>• Watch a short video of a physician thinking aloud through her EBM reasoning process.</td>
</tr>
<tr>
<td></td>
<td>• Listen to a librarian describe her thought process for selecting a database to find diagnostic articles.</td>
<td></td>
</tr>
<tr>
<td>Procedural information</td>
<td>During the activity, learners are:</td>
<td>During the activity, learners are:</td>
</tr>
<tr>
<td></td>
<td>• Provided with a step-by-step handout to guide question formulation.</td>
<td>• Offered an online checklist to guide the critical appraisal of articles.</td>
</tr>
<tr>
<td></td>
<td>• Offered over-the-shoulder feedback from novice teachers while working on a search or appraisal task.</td>
<td></td>
</tr>
<tr>
<td>Part-task practice</td>
<td>During the activity, learners are:</td>
<td>During the activity, learners:</td>
</tr>
<tr>
<td></td>
<td>• Provided data on four screening modalities and challenged to calculate the likelihood ratio for each test.</td>
<td>• Do not engage in part-task practice if they have achieved mastery of the recurrent elements of EBM.</td>
</tr>
</tbody>
</table>

aIdeally, throughout medical school, learners engage in multiple EBM activities organized from simple to complex, depending on their level.
bBased on a patient case, learners are asked to perform the steps of EBM (ask, acquire, appraise, apply) to propose the best next step for further investigation or treatment of the patient case.

A useful breakdown of how to package EBM skills learning for earlier medical school, and then latter med school. You’ll recognize some of these approaches from the Duke workshop!
Kolb: Learning Styles

Taken from Kolb Learning Style Inventory, p10
Teaching to Learning Styles

- **Active or Reflective**
  - Active learners learn by direct interaction with the material; prefer group communication.
  - Reflective learners like to think about the material; prefer individual or very small group communication.

- **Visual or Verbal**
  - Visual learners are better able to remember images they have seen (charts, graphs, pictures).
  - Verbal learners are better able to remember written or spoken words.

- **Sensing or Intuitive**
  - Sensing learners are detail-oriented and practical with a preference for concrete facts and real-world applications.
  - Intuitive learners have a creative disposition and are drawn to the theoretical and abstract.

- **Sequential or Global**
  - Sequential learners prefer learning linearly, with logical steps.
  - Global learners prefer a holistic approach and seem to learn almost randomly by fitting pieces together into a big picture.

Taken from: *Kolb Learning Style Inventory.*
The AAMC GQ (2017) (all graduating medical students...)

How did your study of biostatistics and epidemiology prepare you for clinical clerkships and electives?

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results</td>
<td>6.7%</td>
<td>23.7%</td>
<td>43.3%</td>
<td>26.6%</td>
</tr>
</tbody>
</table>

And standard 6.3 – information-seeking skills