Evidence-based Practice/Information Mastery Outcomes

Objectives	Year 1		Year 2		Year 3		Year 4	
I. Prerequisite concepts								
A. Data, Information and Basic Epidemiological Concepts								
1. Define and recognize types of data – nominal, ordinal, interval, continuous. Recognize analytical limitations of each.	PBL 1 (Epi/bio)							
2. Define and recognize sources of variability.	PBL 1 (Epi/bio)							
3. Use basic statistical terminology – Identify and interpret means, medians, variances, standard deviations, p values, confidence intervals, odds ratios, etc. when discussing scientific reports.	PBL 1 (Epi/bio)	PBL I (EBM)						
4. Be able to present and interpret data in different graphical formats (frequency distributions, plots, etc.)	PBL I (EBM)		Int Case based learning					
5. Interpret measures of disease frequency (incidence, prevalence).	PBL 1 (Epi/bio)	PBL I (EBM)	Int Case based learning		Core clerkships		Log/portfolio	
6. Interpret measures of diagnostic certainty (sensitivity, specificity, PPV, NPV, likelihood ratios)	PBL 1 (Epi/bio)	Foundations II						
7. Define and distinguish causality from association.	PBL 1 (Epi/bio)	PBL I (EBM)	Int Case based learning		Core clerkships			
8. Define and distinguish statistical significance and clinical significance.	PBL 1 (Epi/bio)	PBL I (EBM)	Int Case based learning		Core clerkships		Log/portfolio	

9. Describe common types of research studies including RCT, cohort, case-control, prospective, retrospective, cross-sectional, observational, interventional describe their abilities to minimize threats to validity and to generalize to larger populations.	PBL 1 (Epi/bio)		Int Case based learning		Core clerkships		Log/portfolio	
B. Reasoning, Judgment and Decision-making								
1. Describe and apply the methods used by clinicians to make decisions.		PBL I (EBM)	Int Case based learning				Log/portfolio	
2. Describe (define and recognize) sources of uncertainty.			Int Case based learning					
3. Describe sources of bias.			Int Case based learning					
4. Describe the impact of externalities on the judgment process. Describe their effects in one's own judgment process.			Int Case based learning		Core clerkships		Log/portfolio	
5. Describe the impact of differing perspectives on decision-making.			Int Case based learning		Core clerkships		Log/portfolio	
6. Interpret test/treatment thresholds, pre-test and post-test probabilities.	PBL 1 (Epi/bio)	PBL I (EBM)	Int Case based learning		Core clerkships			
7. Describe the differences between screening and diagnostic testing; describe and recognize the impact of each on medical decision-making.		PBL I (EBM)	Int Case based learning				Log/portfolio	
8. Explain the concept of formal clinical decision analysis.		PBL I (EBM)						

9. Be able to interpret clinical information when presented in a decision analysis format.	PBL 1 (Epi/bio)				Core clerkships			
C. Principles and Basic Practices of Evidence Based Medicine								
1. Describe the historical and scientific need for EBM.		PBL I (EBM)						
2. Describe and apply to a clinical case the basic principles of EBM.		PBL I (EBM)	Int Case based learning		Core clerkships		Log/portfolio	
3. Describe how EBM, clinical experience and individual patient issues interact.			Int Case based learning		Core clerkships		Log/portfolio	
5. Describe the interaction of EBM and health care policies.		Soc Beh Med						
D. Information Mastery								
1. Define the usefulness equation**.**		PBL I (EBM)	Int Case based learning		Core clerkships			
2. Identify and apply criteria to determine the relevance of medical information, including POEM (patient oriented evidence that matters) criteria: common or important, patient-oriented evidence that would change practice.		PBL I (EBM)	Int Case based learning		Core clerkships		Log/portfolio	
3. Compare and contrast POEM (patient oriented evidence that matters) and DOE (disease-oriented evidence) information.		PBL I (EBM)	Int Case based learning		Core clerkships		Log/portfolio	
5. Be able to use several sources of point-of-care medical information.	PBL I (EBM)		Int Case based learning		Core clerkships		Log/portfolio	
6. Compare the usefulness of different information sources.	PBL I (EBM)		Int Case based learning		Core clerkships			

7. Identify information sources useful to keep up-to-date.	PBL I (EBM)				Core clerkships			
8. Describe how practice guidelines are developed.	PBL I (EBM)		Int Case based learning		Core clerkships			
9. Identify the barriers to the application of evidence-based medicine and strategies to overcome these barriers.							Log/portfolio	
II. Identification of Clinical Information Needs								
1. Describe how to elicit patients' values and preferences.	PBL II		Foundations IV		Core clerkships			
2. Describe how to elicit the values and preferences of stakeholders.	Soc Beh Med							
3. Recognize and formulate a clinical question using the population-intervention-control-outcome (PICO) format.	PBL I (EBM)		Int Case based learning		Core clerkships			
4. Prioritize clinical information needs on the basis of "clinical importance", risk/benefit to patient, time to effect, time available.		PBL I (EBM)					Log/portfolio	
5. Determine the urgency of a clinical question: whether it needs to be answered during patient care, within a defined period of time, or does not need to be answered.					Core clerkships			
6. Identify previously unrecognized information needs in the clinical encounter.					Core clerkships			
III.Finding Information								
A. Consider all potentially relevant information sources.								

1. Define and apply criteria (items specific to the question (population, intervention, outcomes, etc.), specific to the patient (concomitant disorders or drugs), local factors (what is feasible and available locally) to medical information to determine relevance. Apply to searching activities.					Core clerkships		Log/portfolio	
2. Identify, read and refer to a variety of sources of medical information, including journals, textbooks, newspapers, newsletters, literature search sources, literature summary sources, CME sources, pharmaceutical representatives, colleagues, consultants. Use sources appropriately for different purposes: “hunting,” “foraging,” and “retracing.”					Core clerkships		Log/portfolio	
4. Prioritize more useful sources of information (such as evidence-based secondary sources) over less useful sources					Core clerkships		Log/portfolio	
B. Determine efficient strategies for using available information sources.								
2. Describe where and how to look for information to answer different types of clinical questions at the point of care (when answers are needed quickly).		PBL I (EBM)			Core clerkships		Log/portfolio	
3. Describe where and how to look for answers to different types of clinical questions when clinical decisions can wait.	PBL I (EBM)				Core clerkships			

4. Develop and apply an overall search strategy (i.e. which sources to search).	PBL I (EBM)		Int Case based learning		Core clerkships			
5. Demonstrate when and how to work with information specialists such as medical librarians.	PBL I (EBM)							
C. Search individual indexed databases systematically.								
1. Apply basic search terminology and processes (e.g. Boolean search).	PBL I (EBM)							
2. Describe MeSH organization.	PBL I (EBM)							
3. Use keywords.	PBL I (EBM)							
4. Access MEDLINE via PubMed.	PBL I (EBM)							
5. Develop and refine search strategies for MEDLINE.	PBL I (EBM)							
D. Search non-indexed and crudely indexed sources purposively , including colleagues, consultants, Web search engines, textbooks, etc.			Int Case based learning		Core clerkships			
IV. Evaluating Information								
A. Distinguish relevant from irrelevant evidence.								
1. Define and apply criteria to medical information to determine relevance when answering clinical questions.					Core clerkships		Log/portfolio	
B. Understand the principle of "hierarchy of evidence".								
1. Describe a hierarchical approach to levels of evidence specific to types of conclusions.			Int Case based learning		Core clerkships		Log/portfolio	
C. Determine methodologic quality of evidence.								

1. Assess the following types of studies for validity (identify important threats to validity and identify critical flaws in study design): a study of a therapy, a study of prognosis, a study of a diagnostic test, a practice guideline, a meta-analysis, and a decision analysis.		PBL I (EBM)						
D. Determine the clinical significance of evidence.								
1. As it applies to a specific patient, clinically interpret the results of an RCT, including concepts of RRR vs. ARR, how to determine NNT, p values, confidence intervals, risk/benefit analysis, and balancing NNT and NNH.			Int Case based learning		Core clerkships		Log/portfolio	
2. As it applies to a specific patient, calculate and interpret pre-test and post-test probabilities, (sensitivity, specificity, PPV, NPV, likelihood ratios), test/treatment thresholds.			Int Case based learning		Core clerkships		Log/portfolio	
4. Describe criteria for what makes a good screening test and apply the criteria to screening tests for a specific disorder.			Int Case based learning		Core clerkships		Log/portfolio	
V. Implementing Evidence								
A. Communicate evidence to patients.								
1. Explain common cognitive biases that occur during decision making.		PBL I (EBM)						
2. Describe how one's own values can introduce appropriate and inappropriate biases into patient-physician communications.	Foundations I		Int Case based learning		Core clerkships		Log/portfolio	
VI. Information Technology								
A. Computer literacy and basic skills								

1. Computer basics: Perform basic and advanced functions to create professional documents such as reports, scientific presentations, lecture presentation visual aids and handouts, etc., and to manage one's work using word processing, spreadsheet, and presentation software.								
2. Use e-mail appropriately to send, reply to, and forward messages, demonstrating an understanding of appropriate content and e-mail etiquette.					Core clerkships		Log/portfolio	
3. Use the Internet to find information using search engines.					Core clerkships		Log/portfolio	
G. Describe why patient confidentiality should be guarded and how to protect confidential information.			Int Case based learning		Core clerkships			
VII. Use Medical Reference Sources Effectively								
A. Demonstrate a knowledge and use of key medical references, including evidence-based sources, their content, and the information needs that they can address.			Int Case based learning		Core clerkships		Log/portfolio	
B. Information Retrieval								
1. Perform database searches using logical (Boolean) operators, in a manner that reflects understanding of medical language, search terminology and the relationships among medical terms and concepts.			Int Case based learning		Core clerkships		Log/portfolio	
2. Refine search strategies to improve relevance and completeness of retrieved items.			Int Case based learning		Core clerkships		Log/portfolio	

3. Identify and acquire full-text electronic documents.			Int Case based learning		Core clerkships		Log/portfolio	
4. Describe and practice local and national copyright and intellectual property policies and practices			Int Case based learning		Core clerkships			
VIII. Clinical Decision Support Tools								
A. Use a drug interaction program to identify potential adverse drug interactions.								
1. Explain alert levels used by drug interaction software.			Int Case based learning		Core clerkships		Log/portfolio	
2. Demonstrate use of drug interaction checking sofware when ordering or prescribing medication.			Int Case based learning		Core clerkships		Log/portfolio	
B. Use clinical calculators and decision support tools								
1. Demonstrate the proper selection interpretation of a clinical calculator.			Int Case based learning		Core clerkships		Log/portfolio	
2. Demonstrate the proper selection and interpretation of a decision support tool.			Int Case based learning		Core clerkships		Log/portfolio	