How to Develop, Implement and Evaluate a Longitudinal, Evidence-based Medicine Curriculum for Pharmacy Students

Connie Kraus, PharmD, BCPS
Denise Walbrandt Pigarelli, PharmD, BD-ADM
Gerri Wanserski, MA, MLS
University of Wisconsin-Madison

Why Should We Teach our Students to use an Evidence-based Approach in Answering Clinical Questions?

• Phenomenal, steadily increasing amount of information
• Increasing demands on pharmacist time leaves minimal time for searching
• Learning traditional evidence-based medicine and information mastery approaches to literature searching improves the likelihood of finding best quality literature and saves time
• Framework for life-long learning

Should We Focus on Teaching a Course or Teaching a Skill?

• Commitment to teaching a skill across the curriculum rather than a one-time course
• Frequent use of skill supplemented with “just-in-time” teaching
• Collaboration across faculty, clinical instructors (preceptors) and librarians is a key feature
Our Evidence-based Medicine Curriculum Map

DPH-1
- Hands-on introduction to core health databases from librarian with course writing assignment requiring peer-reviewed literature on a public health topic

DPH-2
- Two lectures in EBM
- 1.5 hour case-based, librarian-facilitated hands-on lab with writing assignment
- Semester course on drug literature review
- 1.5 hour instructor/librarian facilitated lab reviewing clinical query writing assignment

Our Evidence-based Medicine Curriculum Map

DPH-3
- Librarian-facilitated colloquium reviewing EBM principles, resources, and search strategies
- Two written clinical inquiry assignments generated from introductory pharmacy practice experience
- 1.5 hour librarian/instructor facilitated lab with group clinical inquiry on an infectious disease scenario

DPH-4
- Advanced pharmacy practice experiences with 7-8 evaluated and scored clinical inquiries

What is Evidence-based Medicine? And...What are the Key Concepts in Teaching Pharmacy Students?

“The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients.” David Sackett 1997
Key Concept: Approaches to Answering a Clinical Question


Key Concept: Relevance—Are the Outcomes Important to our Patients?

- Patient-Oriented Evidence that Matters (POEMS)
  - Mortality
  - Morbidity
  - Quality of Life
  - Cost


Key Concept: Information Varies in Quality, Currency, and Level of Evidence -- Important to Know the Best Sources

- Colleagues
- Pharmaceutical representatives
- General review articles
- Authoritative Textbooks
- Authoritative Internet Sources
- Clinical Trials
- Randomized, controlled clinical trials
- Systematic reviews and meta-analyses

[http://www.poems.msu.edu/infomastery]
Key Concept: Information Pyramid

- Systematic Reviews and Meta-analyses
- Controlled Double Blind Studies
- Cohort Studies
- Case Control Studies
- Case Series
- Case Reports
- Ideas, Editorials, Opinions
- Animal research
- In vitro (test tube) research

Key Concept: Reviews, Reviews and Reviews

Key Concept: How is a Systematic Review Different from a Review Article?

- Classic review article is an overview (disease state and treatment options)
- Review articles are often unsystematic because the author does not look at all of the evidence and doesn’t assess validity of study
- Systematic review has a formal approach to collection, evaluation and presentation of evidence
- A meta-analysis is a systematic review that uses statistical methods to calculate a summary result
Key Concept: How Can You Tell if a Systematic Review is Good/Valid?

- Did the authors ask a focused clinical question?
- Were the criteria used to select articles for inclusion appropriate?
- Is it unlikely that important, relevant studies were missed?
- Was the validity of the included studies appraised (study quality)?
- Were assessments of studies reproducible (data abstraction)?
- Were results similar from study to study (homogeneity)?

(http://www.poems.msu.edu/informastery)

Key Concept: How Useful is the Information?

Usefulness of Information is equal to:

Relevance \times \text{Validity} \times \text{Work}

(http://www.poems.msu.edu/informastery)

Key Concept: Usefulness of Information Sources

1. Clinical Evidence, Clinical Inquiries
2. Specialty-Specific POEMS (BMJ, Journal of Family Practice, American Family Physician)
3. Best Evidence
4. Textbooks, Up-To-Date, 5 Minute Clinical Consults
5. Journals, Medline
6. World Wide Web (Google)

(http://www.poems.msu.edu/informastery)
Toolkit for Teaching our Students to Search

- Instructors, librarians and residents
- Online EBM resources, tools, tutorials
- Skill-based instruction
- Case-based examples and assignments
- Point-of-need help

Ebling Library: Online EBM Resources, Tools and Tutorials

Duke University and University of North Carolina EBM Tutorial
Five Steps of Answering a Clinical Question Using an Evidence-based Approach

1. Framing the question
2. Finding the best evidence
3. Analyzing the evidence
4. Applying the information to patient care

Framing the Question

- The P.I.C.O. model for clinical questions
  - Patient, Population, or Problem
  - Intervention, Prognostic Factor, or Exposure
  - Comparison of Intervention
  - Outcome to Measure or Achieve

Clinical Question

In patients with neuropathic pain, how does gabapentin (Neurontin) compare with pregabalin (Lyrica) to quickly and effectively relieve/decrease pain?
PICO

P: patients with neuropathic pain
I: gabapentin (Neurontin)
C: pregabalin (Lyrica)
O: quick and effective decrease in pain

Finding the Best Evidence

In following Information Mastery logic:
- if you are unfamiliar with the disease state or the drugs, start by using background resources: (review article, book chapter, disease-oriented database such as Up-To-Date)
- look first for high quality secondary sources (Cochrane systematic reviews, meta-analyses, other systematic reviews, etc.)
- look for newer RCTs than captured by secondary sources, if they exist

Teaching our Students to Search—The Role of Background Resources

- Most of us (including our students) are not experts and may need to find background information on a subject before starting an evidence-based search
- May also be used to identify terminology for searching: terms for disease; drugs used to treat
- Good sources for background information:
  - Up-To-Date, MICROMEDEX
  - Contemporary review article
  - Authoritative textbooks
Secondary Resources

- PubMed Clinical Queries Section
  - Systematic Reviews, including Cochrane Database of Systematic Reviews

- Cochrane Library: Cochrane Database of Systematic Reviews
  - Sometimes has more recent reviews than PubMed
### Search PubMed Clinical Queries

Clinical Study Category for Primary Sources of Evidence

Use the same search terms from the secondary literature source to run a search in "Search by Clinical Study Category". Look for newer research that might influence your thinking on the secondary literature you have collected.

### Search Cochrane Library Central Register of Controlled Trials (Clinical Trials) for Primary Sources of Evidence

### Trouble Shooting: What if I Can Not Find Secondary Sources?

- Re-evaluate the search terms by looking at the PICO again
- Use Medical Subject Headings as well as keyword terms
- There may not be secondary sources for all well-asked questions
Trouble Shooting: What if I Can Not Find Primary Sources?

- Are the search terms appropriate?
- In addition to PubMed, use Cochrane Registry of Controlled Trials for additional European studies
- Have trials been conducted comparing the items you want to look at or do you need to look at trials of agents compared with placebo (or other agents) to make inferences?

Trouble Shooting: What if I Can Not Find Secondary or Primary Literature Sources to Answer my Question?

- Is there a way to broaden your search strategy?
  - Use generic names, check spelling, etc.
  - Use additional synonyms or MeSH terms
  - Did you AND together too many concepts? If you entered terms for outcome, redo your search leaving those terms off.
  - Go back to the Information Pyramid and identify other types of evidence to search for: cohort studies, case series, etc.

3rd Year Skill Based Lab

- Librarian/Instructor facilitated
- Students assigned a clinical question related to infectious disease
- Students work in groups, find information, and write an answer to their question
- Requires clinical guidelines, background resources to answer
  - Some 80% of questions will be answered using background resources only
Clinical Inquiry Evaluation Training

- School of Pharmacy Clinical Instructors
  - For those who take DPH-4 rotation students
  - Annually in Milwaukee clerkship region
  - Other regions as requested
  - Includes basics of EBM (see agenda)

Pharmacist EBM Trainings

Not limited to clinical instructors-
- Pharmacy Society of Wisconsin spring meeting spring 2007
- 2008 Fall Distance Learning Experience

Clinical instructors-
- Town Halls
- Annual Meetings
EBM/Clinical Inquiry Training Agenda

• Session One (90 min)
  - EBM definition
  - EBM resources
  - 5 steps
  - Framing the question (PICO) + activity
  - Approaches to finding information, information pyramid
  - Assignment goals
  - Answering the question
  - How to evaluate written response

• Session Two (~100 min)
  - Assignment policies
  - Evaluation criteria
  - Evaluation practice + group discussion

Evaluating the Written Response

• Paper should be referenced, using superscripts, & the references cited should match up with the reference list
• Ideas that come from literature should be referenced
• Ideas should be presented in a logical, well-flowing manner

Evaluating the Written Response

• Grammar and punctuation should be checked
• References should be in the AMA format
  - Each journal has own format style (future)
Systematic Evaluation of the Clinical Inquiry

• Step 1: Read the question & PICO

• Step 2: Look at the references & see where the information used to answer the inquiry came from (article titles, sources)

Systematic Evaluation of the Clinical Inquiry

• Step 3: Read & re-read the paper
  – Was the question actually answered?
  – How well was the information analyzed? Is the response believable? Was the clinical significance summarized in the Evidence-Based Answer?
  – Was the information accurate and complete in the Evidence Summary?
  – Does the response meet all the criteria in the clinical inquiry evaluation tool?

FPIN: Family Physicians Inquiries Network
**FPIN: Non Profit Consortium**

- Promotes scholarship and evidence-based teaching and learning
- Academic family physicians, family medicine residents, medical librarians, and others
- Pairs librarian with physician or resident as co-authors to answer a clinical question
- Librarian develops search strategy for a clinical query, perform searches in multiple evidence-based resources, and filter results for physician
- Answers published in the Journal of Family Practice and the American Family Physician

**Value of FPIN**

- Provides evidence-based answers to common clinical questions from family physicians
- Faculty physicians and residents get an opportunity to evaluate literature, write and publish
- Provides a structured research project that encourages writing and publishing
- Promotes scholarship which helps in teaching
- Builds skill in locating and evaluating evidence-based literature

**FPIN CIs Indexed in PubMed**
Resources Searched for an FPIN Clinical Inquiry include:

- Cochrane Library
- Clinical Evidence
- AHRQ Evidence Reports
- National Guideline Clearinghouse, any relevant societies/association web sites
- PubMed or MEDLINE searched for: (if Therapy)
  - Systematic Reviews; Meta Analysis
  - RCTs and other clinical trials
  - Guidelines
  - Review articles

FPIN HelpDesk Answers (HDA)

Sample: http://resources.fpin.org/EBP/EBP-Jan06%20(2).pdf

- Answers published in Evidence-Based Practice (EBP) peer-reviewed journal
- Structured responses to the clinical questions of practicing family physicians
- Students work with faculty clinician to answer queries and are co-author
- Improves clinical research and writing skills

Our students contribute to FPIN HelpDesk Answers - structured responses to clinical questions from practicing family physicians. Student/faculty co-authors search for and assess best evidence on a clinical question, including:

- systematic reviews
- a meta-analysis
- evidence-based guidelines
- original research studies, or, if none of these is available, authoritative guidelines