Web-Based Evidence-Based Medicine Library Consult Service

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EBM Process Refresher

- Formulate a foreground question
- Search for evidence
- Appraise evidence to identify valid evidence
- Interpret valid evidence to answer question
- Evaluate applicability of answer to local setting
- Apply applicable answers to practice
- Follow outcomes

Obstacles to EBM

- Physician limits:
  - Curricular time
  - Clinical time
  - Search skills
  - Appraisal skills
  - Individual nature of most work
- In rural settings:
  - Search technology

Vision

- Physicians who need appraised evidence for specific questions should be able to get it in a timely fashion
- A group of EBM experts could provide these services on a consultation basis

Surmounting obstacles

- Optimize question-asking
  - online form
- Optimize search by turning it over to search experts – librarians
- Improve ability to follow up by tracking questions – database
- Enhance someone's appraisal/interpretation skills – but whose?

Physician-Librarian-Technology partnerships

- Physicians bring:
  - Patients (questions)
  - Medical knowledge
  - Application skills
- Librarians bring:
  - Search expertise
  - Greater time availability
  - Technology savvy
- Technology brings:
  - Question standardization
  - Follow-up, QA
- Still missing: appraisal and interpretation skills

Physician-Librarian-Technology partnerships

- Formulate a well-structured foreground question
- Search for evidence
- Appraise evidence to identify valid evidence
- Interpret valid evidence to answer question
- Evaluate applicability of answer to local setting
- Apply applicable answers to practice
- Follow outcomes

Project objectives

1. Fully develop an EBM web-based consult service application
2. Train health science librarians to staff the service, and produce a training manual
3. Train physicians to use the service, and produce online training materials and context-sensitive help

Project objectives

4. Evaluate the service's
   - Feasibility
   - Usefulness
   - Educational and attitudinal impact on staff and users
5. Implement and evaluate a second independent service targeted to rural physicians.

Collaborators

- Schwartz, DME
- Hupert, Peds
- Scherrer, LHS
- Connell, FM
- Niederman, Peds
- Dorsch, LHS Peoria
- Hruska, DME

Preliminary work: paper-based prototype

- Eight weeks (4/2000 - 5/2000) Pediatrics residents were told they could write a clinical question in the standard EBM PICO format on one of two consult boards (in UIH or OCC). A librarian collected the forms each day and, after completing a search, posted an article to address each question, together with the search strategy used by 4pm next day.

Preliminary work: paper-based prototype

- Thirty-nine questions:
  - 16 (41%) therapy questions
  - 9 (23%) diagnosis questions
  - 7 (18%) each prognosis and etiology questions
- Library staff were consistently able to respond to questions with articles within 24 hours, but indicated a need for greater training in critical appraisal of research methodology. Copying expense and hand delivery were deemed unscalable.

Preliminary work: Web-based prototype

- Additional librarian training in research design and appraisal.
- Three months (10/2000 – 1/2001) Pediatricians submitted questions online using the PICO format. System automatically sent physician an e-mail acknowledgment of receipt. A librarian retrieved the question, performed a search and selected the most methodologically sound clinical study (or studies). Article(s) and an on-line link were sent by e-mail to the physician within 24 hours.
- Database of answered questions was maintained to provide immediate answers to frequently asked clinical questions.
- Of 88 prospective users (76 residents, 2 fellows, 8 attendings), 38 submitted 71 questions.

Development Plans

- Database backend
  - Reimplement using a standard SQL relational database as the backend
- Librarian interface
  - Make it easier for librarians to identify which questions they are responsible for and to claim questions or assign them to other librarians as the need warrants
  - Allow questions to be triaged in cases of heavy query load, with associated notification to physicians when their responses will be delayed.
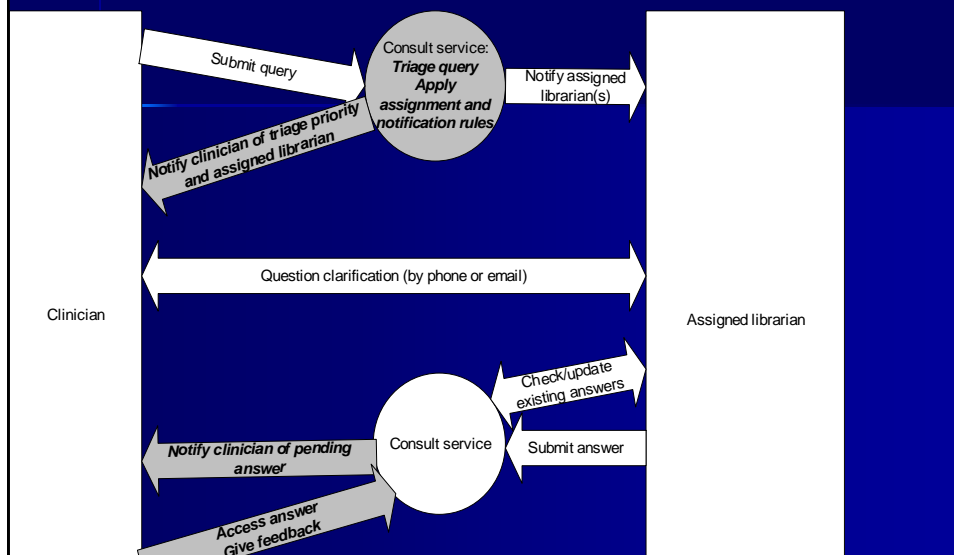
Development Plans

- Physician user interface
  - Provide context-sensitive help
  - Develop a "My Questions and Answers" page dynamically generated for each physician
  - Improve review of others' questions by organizing topically or chronologically and omitting name of questioner.
- User feedback
  - Introduce a "closed feedback loop" by providing answers on a web page that asks for evaluation of quality of answer

Development Plans

- Notification
  - Text-message paging of librarians (when a question is submitted)
  - Text-message paging of physicians (when a question is answered).
  - Provide physicians with query load at time of submission to enable them to self-prioritize questions and anticipate response time.
- Authentication
  - Integrate with UI Bluestem authentication

Procedural design

Clinician — Submit query — Consult service: *Triage query Apply assignment and notification rules* — Notify assigned librarian(s) — Assigned librarian

Notify clinician of triage priority and assigned librarian

Question clarification (by phone or email)

Check/update existing answers

Notify clinician of pending answer — Consult service — Submit answer

Access answer Give feedback

Evaluation: Feasibility

- Documentation
  - Development
  - Training
  - Implementation
  - Evaluation
- Log of activities and resources
- Comparison of librarian appraisals to EBM-experienced physician appraisals

Evaluation: Usefulness

- Metrics
  - Frequency of use
  - Average daily query load per librarian
  - Average hours from question to response
  - Question types
  - Sources of evidences used
  - Characteristics of querents
  - Others?

Evaluation: Usefulness

- Feedback from users on each answer received
  - Relevance of evidence
  - Quality of interpretation
  - Likelihood of impact on focal patient's care
  - Likelihood of impact on future patient care
  - Open-ended comments
- Random subsample of users will be asked to perform searches in response to questions (submitted by other users) to evaluate
  - Search time
  - Citations returned (compared to those returned earlier by

Evaluation: Education & Attitudes

- ACQ skills
  - Developing a question
  - Recognizing best question (MCQ)
- Critical appraisal skills
  - Using method developed by Schwartz & Hupert in past NBME-funded studies
  - With additional checklist ratings of features relevant/irrelevant/absent in evidence

Evaluation: Education & Attitudes

- 44-item attitude survey
- Two subscales
  - Attitudes about EBM in general
  - Attitudes about the consult service
- Assessments every six months, with analysis based on within-subject (individual growth) modeling approaches.

Questions to address

- Handling insufficiency in literature
- Appropriate physician:librarian ratio

- And what else?