BRIEF COMMUNICATIONS

Evidence-based medicine training for residents and students at a teaching hospital: the library's role in turning evidence into action*

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INTRODUCTION

Evidence-based medicine (EBM) continues to be a topic of debate. Some individuals question whether good science makes good medicine [1]. Medical educators want to know if EBM techniques will make a difference in clinical practice and continuing education. In Rochester, Bordley and associates have concluded that EBM techniques provided a powerful tool for clerkship education [2]. Discussion continues as to whether medical undergraduates have the experience to apply information gleaned from EBM techniques [3]. However, educators at McMaster have disputed the success of teaching critical appraisal skills to residents, finding more success with undergraduates [4]. Duration and consistency improve success. Sackett has encouraged educators to move past the why to the how of instilling EBM skills [5].

Among those teaching resident physicians, instruction in the use of EBM methods is gaining in popularity and proven effectiveness. At Cook County Hospital, evidence-based curricula and self-directed, learner-centered educational methods are being used in the context of morning report for internal medicine residents [6]. At the University of Washington, family practice residents search for evidence-based answers on morning rounds [7]. They are also examining the usefulness of clinical practice guidelines [8].

Physicians realize that bridging the gap between research and practice will involve continuing medical education [9, 10]. Librarians, who have been providing support for learner-centered curricular and residency training for years [11–13], are concerned about the role of the library. However, an investigation of EBM how-to guides available from the Centre for Evidence-Based Medicine Web site [14], the Cochrane Library, and the EBM working group articles in *JAMA* [15–17], reveal little about the role of the librarian.

To address some of these issues at a local level, an EBM learning experience for residents in obstetrics and gynecology at the University of Tennessee Medical Center was initiated. A librarian and professor team was interested in whether EBM techniques could make a difference in improving patient care, serve as a continuing education venue, and provide a basis on which to evaluate the librarian's role in instruction. Specific objectives included: teaching residents to refine a problem into a searchable clinical question, to use the literature to find valid articles, and to apply the validity of a study to patient care.

METHODOLOGY

A team approach was used to present an EBM learning experience to a group of seven residents in obstetrics and gynecology. The EBM learning experience consisted of the sequence of activities in Table 1. The librarian was involved in all aspects of the learning sequence, but had singular responsibility for a ninety-minute tutorial on EBM resources. Standard resources used for the tutorial included the Cochrane Database of Systematic Reviews, MEDLINE, EBM Web sites such as the Bandolier evidence-based health care Web site [18], and the EBM working group articles published in *JAMA*.

The Centre for Evidence-Based Medicine training package for sample case development was particularly useful in the case-based EBM exercise segment of the study [19]. Two case-based exercises were developed that presented clinical situations and outlined the steps required to address the issues from an EBM perspective (Appendix A). The residents were divided into two groups and were given two weeks to consult a variety of resources before presenting the cases in the required format before both groups. The professor and librarian jointly facilitated the case presentation sessions in which each resident was asked which treatment regimen he or she would advise based on the EBM exercise. The librarian had researched both cases in advance of the case presentations.

RESULTS AND DISCUSSION

Article critique exercise

All residents successfully evaluated an assigned clinical treatment article according to EBM working group methods and expressed to the instructors that they found this exercise valuable in understanding the process of using the literature as evidence to determine scientifically valid treatment.

* Based on a presentation at the Ninety-eighth Annual Meeting of the Medical Library Association, Philadelphia, Pennsylvania, May 22–27, 1998.

Table 1
EBM learning experience sequence of activities

Activity sequence	Responsibility
• Overview of EBM (lecture)	Professor
• Tutorial on EBM resources	Librarian
• Article critique exercise	Professor
• Case-base EBM exercises	Professor; Librarian
• Case presentations	Professor

Case presentations

The case presentations by the residents revealed that they had used a variety of information-seeking strategies and exhibited a wide variety of information-seeking skills. In their quest for clinically valid answers, their information strategies included: seeking information from other residents (2), seeking information from attending physicians (3), seeking information from physician specialists (1), consulting medical textbooks (5), and searching MEDLINE (5). In one case, all agreed on the treatment, although only two residents used EBM techniques. It was evident from the prior research done by the librarian that most of the residents did not locate the most important articles in their literature searches and at least one resident gave up trying to find relevant articles in MEDLINE and consulted with hospital colleagues.

When asked if learning to use EBM techniques was worth their time, all study participants replied positively and requested more cases to improve their skills. One-on-one MEDLINE instruction was also viewed positively, but the students also realized that they had to learn to search MEDLINE appropriately on their own and that practice was essential. When asked how EBM techniques could be worked into clinical rounds, residents replied that they could assign students to use EBM cases with library research required. They saw the librarian's role as an expert MEDLINE instructor and helpful in locating materials and providing information consultation. Despite the librarian's involvement in the EBM exercise, the residents' search results and methodologies did not reflect a high degree of sophistication or attention to the techniques outlined in the EBM tutorial. Skill levels might have increased, but no pretest and posttest were done to confirm this perception.

An evaluation form related to the case presentation exercise (Appendix B) indicated that the exercise was well received. In the study participants' views learning had taken place, EBM techniques were perceived to improve patient care, and the exercise had provided a useful forum for continuing education.

CONCLUSION

While generalized conclusions cannot be drawn from this small study, the exercise clearly has had a positive effect on study participants and confirmed a useful role for a librarian team member in the EBM training process. Some studies, such as the studies by Casey [20] and Dorsch [21], mention the role of the library and librarian in teaching EBM skills, but more studies are needed on the role of the librarian in EBM programs. Formal evaluation of EBM techniques used in clinical situations may ultimately demonstrate a measurable impact on health care outcomes or other clinical measures and further demonstrate the librarian's role in turning evidence into action.

REFERENCES

1. KENNY NP. Does good science make good medicine? incorporating evidence into practice is complicated by the fact that clinical practice is as much art as science. CMAJ 1997 Jul 1;157(1):33–6.
2. BORDLEY DR, FAGAN M, THEIGE D. Evidence-based medicine: a powerful educational tool for clerkship education. Am J Med 1997 May;102(5):427–32.
3. HARRINGTON JT. Primary things first. Acad Med 1997 Nov;72(11):938–9.
4. NORMAN GR, SHANNON SI. Effectiveness of instruction in critical appraisal (evidence-based medicine) skills: a critical appraisal. CMAJ 1998 Jan 27;158(2):177–81.
5. SACKETT DL, PARKES J. Teaching critical appraisal: no quick fixes. CMAJ 1998 Jan 27;158(2):203–4.
6. REILLY B, LEMON M. Evidence-based morning report: a popular new format in a large teaching hospital. Am J Med 1997 Nov;103(5):419–26.
7. SCHNEEWEISS R. Morning rounds and the search for evidence-based answers to clinical questions. J Am Board Fam Pract 1997 Jul–Aug;10(4):298–300.
8. BERG AO, ATKINS D, TIERNEY W. Clinical practice guidelines in practice and education. J Gen Intern Med 1997 Apr;12 Suppl 2:S25–33.
9. FELCH WC. Bridging the gap between research and practice. the role of continuing medical education. JAMA 1997 Jan 8;277(2):155–6.
10. LARSON EB. How can clinicians incorporate research advances into practice? J Gen Intern Med 1997 Apr;12 Suppl 2: S20–4.
11. RANKIN JA. Problem-based medical education: effect on library use. Bull Med Libr Assoc 1992 Jan;80(1):36–43.
12. WATKINS MC. Characteristics of services and educational programs in libraries serving problem-based curricula: a group self-study. Bull Med Libr Assoc 1993 Jul;81(3):306–9.
13. MARSHALL JG, FITZGERALD D, BUSBY L, HEATON G. A study of library use in problem-based and traditional medical curricula. Bull Med Libr Assoc 1993 Jul;81(3):299–305.
14. KURKUL DL. Evidence-based medicine 101: let the Net be your teacher. Medicine on the Net 1998 Apr;4(4):18–20.
15. THE EVIDENCE-BASED MEDICINE WORKING GROUP. Evidence-based medicine. a new approach to teaching the practice of medicine. JAMA 1992 Nov 4;268(17):2420–5.
16. OXMAN AD, SACKETT DL, GUYATT GH. Users' guides to the medical literature. I. how to get started. The Evidence-Based Working Group. JAMA 1993 Nov 3;270(17):2093–5.
17. GUYATT GH, SACKETT DL, COOK DJ. Users' guides to the medical literature. II. how to use an article about therapy or

prevention. A. are the results of the study valid? The Evidence-Based Working Group. JAMA 1993 Dec 1;270(21): 2598–2601.
18. Bandolier: evidence-based health care. [Web journal] Oxford, U.K.: National Health Service R & D Directorate. [cited 10 Dec 1998]. Available from Internet: <http: www.jr2.ox.ac.uk/Bandolier>.
19. The Centre for Evidence-Based Medicine. [Web document]. Oxford, U.K.: University of Oxford, Clinical School Information Management Services Unit, 1998. [rev. 28 Jan 1998; cited 22 Dec 1998]. Available from Internet: <http: cebm.jr2.ox.ac.uk>.
20. CASEY N. Access to library and information services. Nurs Stand 1997 Oct 29–Nov 4;12(6):1.
21. DORSCH JL, FRASCA MA, WILSON ML, TOMSIC ML. A multidisciplinary approach to information and critical appraisal instruction. Bull Med Libr Assoc 1990 Jan;78(1):38–44.

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APPENDIX A

Evidence-based medicine: case presentations

Patient problem 1: Mrs. Bond

Mrs. Bond is a thirty-two-year-old music teacher who got married last year and intends to start a family shortly. Her routine cervical smear is reported as "severe dysplasia; urgent colposcopy advised." A cone biopsy is performed, for which the pathologist's report states: "The specimen is a well preserved sample of cervical tissue showing micro-invasive squamous cell carcinoma with maximum depth of invasion 12.9 mm with lymph vascular space involvement; all margins are well clear of tumor tissue." You explain the following treatment choices: no further treatment (cone biopsy alone), hysterectomy, hysterectomy with pelvic lymph-adenectomy, radical hysterectomy, radiotherapy, or combination of surgery and radiotherapy. Mrs. Bond feels that preservation of fertility is crucial, but asks your advice on which option she should take. Her husband states that his wish is for "anything to be done to completely abolish the risk of cancer spreading. If necessary, we can adopt kids." What is the best treatment option? What would you advise?

Patient problem 2: Mrs. Smith

Mrs. Smith, a science instructor at the community college, is visiting you in your office at the end of her second trimester. You delivered her first child about three years ago and everything went fine. As usual, you find her to be very cordial and willing to learn. However, unlike her first pregnancy, she tells you that she is worried about having an epidural this time. She says it worked like a charm for her son, but since then she has been told that "there is extra risk of having a Cesarean if she has an epidural." She asks for your opinion and wonders what "the data" show on this issue. How would you advise her?
Learner: You
Task: To go through the steps outlined below for evidence-based medicine as applies to the patients.

Step 1: Define important, searchable question(s)

Well-built clinical questions are the basis for evidence-based medicine. You may have more than one, and, if so, which are you going to address first?

Step 2: Select the most likely resource for evidence

Decide where to search. May want to get help on this one.

Step 3: Design a search strategy

Depending upon your question(s), this step could be as simple as consulting a text to doing PubMed, MEDLINE, Cochrane CD-ROM, Web, NIH searches, etc. Always remember, you want the "best" evidence for your patient.

Step 4: Summarize the evidence yield

This step varies according the amount and nature of evidence uncovered. Generally speaking, levels of evidence are:
I Controlled, randomized
II—1 Controlled, but no randomization
II—2 Cohort or case control
II—3 Multiple time series
III Expert opinion or case study
Be able to rate your evidence. If you have a poor yield, go to subsequent resources (step 2) again.

Step 5: Apply the evidence

Apply the evidence to your patient.
Presentations will cover:
i. How you found what you found
ii. What you found
iii. The validity and applicability of what you found
iv. How what you found will alter your management of the patient
v. How well you think you did in filling this ___
vi. Time required

APPENDIX B

EBM case exercise evaluation form

1. Did you learn to refine a problem into a searchable clinical question?
   Yes—6 No—1
2. Did you learn to use the medical literature to find more valid articles? Yes—4
   If yes, please circle the sources you used:
   MEDLINE on Ovid—1 MEDLINE on PubMed—5
   MEDLINE other—2 Cochrane CD-ROM
   PubMed's Clinical Applications
   CEBM Web page Reference lists from articles or texts—2
3. Did you learn to apply the validity of an article to patient care? Yes—6 No—1
4. Was instructor modeling effective in learning EBM techniques? Yes—6 No—1
5. Do you plan to continue to use EBM techniques in clinical practice? Yes—7 No

6. Would you be willing to train medical students or other physicians? Yes—6 No—1
7. In what way was the librarian's assistance useful:
   a. instruction in use of sources—3
   b. finding materials—3
   c. assistance in developing search strategies—1
   d. librarian not useful—2
   d. other
8. How would you describe the time limits imposed by the instructor:
   a. insufficient b. too much c. just right—5
   Estimated time spent on the project: Mean = 1 hour
9. Did you find the structuring of the project (circle all that apply):
   a. too rigid b. too flexible c. just right—4
   d. helpful—2
10. Did you find EBM techniques (circle all that apply):
    a. improved patient care—4
    b. useful continuing education—7
    c. improved my confidence in practicing medicine—2
    d. not useful
    e. confusing—1
    f. time consuming—2
    g. time saving—1
11. How would you rate the exercise overall:
    a. Excellent—1 b. Good—6 c. Fair d. Poor

The SEND (SouthEastern Network on DOCLINE) Project: a reciprocal document delivery network*

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The SouthEastern Network on DOCLINE (SEND) is a group of eighty-seven primary access libraries from the Southern Chapter of the Medical Library Association. SEND is a reciprocal interlibrary loan (ILL) network based on two fundamental ideas: (1) that basic health sciences collections can assume more of the ILL burden among themselves, and (2) that DOCLINE tables can be manipulated to ensure balanced ILL traffic [1]. Using these assumptions, the SEND group has produced significant cost savings in document delivery and has become an unusual multistate network of libraries based on reciprocal interlibrary loan.

LITERATURE REVIEW

Standard ILL consortia are common in many areas, but cooperative networks of primary access libraries serving multistate areas are not common. One network was found in the literature review, the Basic Health Sciences Network (BHSL) [2].

The BHSL is a long-standing large multistate network with 460 members in 1994 based in region 1 of

* Based on a presentation at the 1996 Southern Chapter of the Medical Library Association conference on October 13, 1996.

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