

4. Keeping up: continuing education or lifelong learning?

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Biomedical knowledge doubles every 20 years¹ and clinical skills must constantly be updated. Yet, unless we are careful, our practice tends to fossilize after completion of formal professional training. How can this be avoided? There is no shortage of techniques to help trained doctors improve their knowledge and skills right up to retirement²—face-to-face courses, specialty conferences, mailed educational materials, multimedia software, grand rounds, journal clubs, Internet sites, pharmaceutical company presentations. Complex schemes are run by colleges and deans to encourage participation (or, at least, attendance). The trouble is that, while traditional continuing education methods may increase our knowledge, they are less good at helping us apply this knowledge to clinical decisions or practice³. For example, Evans⁴ conducted a randomized study to assess the impact on clinical practice of a carefully designed information pack, known to improve knowledge about current management of hypertension, sent in fourteen weekly instalments to Canadian doctors. The intervention made no difference to the treatments that were used; in fact, the best predictor of doctors' decisions about antihypertensive treatment was their year of qualification, not whether they had been randomized to receive the information pack.

IMPROVING CLINICAL DECISIONS AND PRACTICE AS WELL AS KNOWLEDGE

The assumption underlying traditional education is that the way knowledge enters the memory does not influence the ease with which it is later recalled and applied to decisions. This is incorrect: we now know that the problem-based approach is superior not only in improving memorization but also in aiding recall and application^{2,5}. The problem-based learning (PBL) method entails waiting until the learner faces a decision or question, then providing access to the knowledge required for a response. The benefits of such active learning apply even if the clinical question or problem to be solved is simulated, as long as the learner becomes engaged in the dilemma. The efficacy of this approach is enhanced if learning takes place in the physical environment where the knowledge will be used. This is because our memory retrieves knowledge learned in the

same context (e.g. the clinic) much more easily than facts learned in different contexts (the library or seminar room)⁶.

The empirical psychological evidence about PBL makes sense: we learn lessons fastest and recall them most reliably when they originate from everyday experience. There is also good evidence that the method works in medicine. For example, 5–15 years after emerging from McMaster medical school (a pioneer in PBL), doctors showed greater understanding of current medical practice than did graduates from Toronto University (traditional)⁷. A systematic review indicated that, when rated by the supervising consultants, junior doctors trained by PBL methods scored more highly on clinical skills than did those with conventional training—though, interestingly, nurses rated the PBL graduates slightly lower⁸.

So, for continuing medical education (CME), should we shift from conventional methods to PBL? What are the implications of such a move? The problem-based approach means finding solutions to clinical problems at the time they arise or soon after, with minimum effort. It means looking up the answer whenever we are unsure about what has happened or what to do. It means transforming CME from an intensive 2 hours a week (or a few days a year) to 1 minute here, 3 minutes there, prompted by the clinical problems and learning opportunities scattered through every working day. It emphasizes problem-solving and learning skills, such as how to find relevant answers fast—not the learning of facts. PBL is what we promise to do when we leave medical school but seldom achieve.

DIFFICULTIES WITH PROBLEM-BASED LEARNING—AND POSSIBLE SOLUTIONS

To achieve a shift towards PBL, the first thing is to recognize that we cannot get answers to every clinical problem or information need—especially since there are about two information needs for every three clinical encounters⁹. Many clinical information needs simply have no satisfactory answer, and some of the rest are better characterized as 'interesting questions' (see paper 1). Also, various practical difficulties arise when we try to pursue the PBL approach.

Too many questions, not enough time

What is the least time we should devote to keeping up to date, in an era when the human and economic impacts of clinical decisions, risk management and quality

improvement are receiving ever closer attention? In my opinion, a reasonable investment would be 5–10% of our working life—i.e. 3–5 hours a week for the average doctor. However, UK Royal Colleges require only some 50 hours of formal CME *per year*—1 hour a week. This leaves a gap of 2–4 hours a week or 25–50 minutes a day between what will become mandatory and what seems reasonable.

The first strategy to square this circle is to adjust our threshold for seeking answers. Among relevant factors would be the degree of uncertainty, the likely clinical impact and the ease and speed of finding the answer¹⁰. Thus, the order of priorities for clinical impact would be:

- 1 Answers needed now, to inform a current decision or action
- 2 Answers needed before we next see the patient
- 3 Answers needed to guide the care of later patients or to reorganize clinical practice
- 4 Answers that interest us but have no obvious clinical implications.

When we have time, we can pursue all question categories. When under pressure, we can only pursue category 1 questions. However, if we never pursue other question categories, we will miss many clinical advances. Also, since one of the greatest challenges is to recognize where we lack knowledge, we ought sometimes to pursue questions even when we are only slightly uncertain of the answer.

A second strategy is to spend less time answering each question. This means gaining instant access to comprehensive, easily searched, knowledge resources.

The third strategy is to increase the time available for learning. Individually, we can work for longer hours, reserving time for 'reflective practice'. Sometimes this is easier when a colleague takes on the role of preceptor or mentor, exploiting 'teachable moments'¹¹ and perhaps writing us an educational prescription¹². For the medical profession, however, it means insistence on lifelong self-directed learning throughout every clinical career.

Lack of clear questions

Sometimes, in a moment of uncertainty, we neglect to formalize a question and then allow the matter to lapse. The solution is to encourage immediate identification of clinical questions. This is easy on ward rounds or when teaching students. When working alone some clinicians log their questions in a book and look up or discuss the answer with peers later. Structuring a question by deciding the kind of dilemma, the clinical goal, options being considered and relevant patient data (see article 1) makes a question easier to recall and answer.

Some doctors tend to equate lack of knowledge with errors, believing that both are best forgotten. In a survey of 254 US medical residents questioned anonymously, 90% described making an error with a serious patient outcome. Only a little over half had discussed their mistakes with anyone. Those who had reported and discussed their error made more constructive changes in their clinical practice than those who had attributed the mistake to overwork¹³. If our routine clinical practice does not yield sufficient questions, then clinical audit and anonymous 'near miss' incident reports can provide rich seams to mine.

Lack of relevant, rigorous, usable answers

Questions are more easily asked than answered. What we need is a source of answers that are clinically relevant, scientifically sound and in a form that can influence decisions. Paper 2 discussed how to set up and run a small clinical library, close at hand and organized for rapid access. As much as possible of the material should be evidence-based and filtered for clinical relevance—for example, *Clinical Evidence*¹⁴, the *Best Evidence* CD-ROM or a team library of journal articles (paper 5) focusing on systematic reviews¹¹. In addition a local medical library may be able to help with difficult questions by supplying Medline searches promptly (within 30 minutes) by e-mail or fax.

Telephone help lines have been provided for years by poisons and drug information services, providing instant answers to a restricted range of questions. Some libraries, primary care groups and academic departments are beginning to offer similar services with a broader range of topics, usually calling back or sending a summary or relevant article within 2 hours. Many of these services are underused and underfunded at present.

Parochialism

If the questions that you pursue are confined to your personal practice, you will become parochial; your knowledge and understanding will depend on the local casemix. To avoid this, consider participating in a multidisciplinary clinic or ward round, or network with colleagues via an e-mail discussion group. To widen their outlook, many clinicians read a general medical journal (paper 5) or look up points raised in replies to referrals, inpatient summaries, clinic letters or laboratory reports. And to make themselves ready for those rare serious events that require an instant response, some use high-fidelity patient simulators—for example, for management of cardiopulmonary arrest, anaesthetic accidents or brittle diabetes¹⁵. Commercial pilots can include time spent on simulators toward their mandatory continuing education, but this is not yet true of doctors.

Videoconferencing is another means to enhance in-service learning¹⁶. Telemedicine sessions offer the perfect opportunity for problem-based learning, with reserved time, one-to-one mentoring and a video of the consultation for participants to review later. Telemedicine projects often tail-off in their second or third year; one reason may be that knowledge and skills equilibrate within the group.

Lack of incentives

For some problem-based learners, the continuous expansion of personal knowledge will be sufficient exhilaration to sustain the effort; for rather more, the resolve to look up answers will wane as time goes by. One way to maintain momentum is to keep a running logbook of questions and answers; another is to conduct routine audits of clinical practice, comparing current results with those 6 to 12 months ago. Reducing the obstacles will help: it is much easier to look up a drug point in a 2-year-old *British National Formulary* in your desk drawer than to consult the current version in the practice library next door, let alone the postgraduate library 3 miles away with no car park. Electronic libraries and the Internet can bring the world's published work to your desktop but, as Ely found¹⁰, they are at present slower than paper sources and yield fewer answers to clinical questions. This will soon change (articles 7-9).

A major incentive to learning is the opportunity to share insights. A short presentation often prompts enlightening discussion at weekly meetings, especially if it clearly defines the clinical dilemma and specifies the immediate sources searched, the answers found and the action taken. This activity can be formalized and shared as a 1-page 'critically appraised topic' (CAT)¹², and published on paper or a local intranet (see article 7).

Lack of recognition from professional organizations

The PBL approach, with its emphasis on individual, unsupervised and often undocumented learning, does not fit easily within the CME/postgraduate education allowance points system. Some colleges are moving towards recognizing self-directed learning. For example, since 1996 the Royal College of Physicians has included specially commissioned continuing-education material in every issue of its journal, and gives CME credits to those who return the associated self test. However, only 90 of the current circulation of 13 400 physicians currently return the self tests, of whom 65 get the necessary 80% to be awarded 3 CME points. The College also awards CME points to individuals who publish journal articles on relevant topics, but these must again be a small minority. The College is placing the CME articles and, perhaps more importantly,

Table 1 Changes associated with problem-based lifelong learning

Old think	New think
Passively listening to lectures	Actively participating in learning sessions
Educator decides the topic	You decide the topic
You attend the CME courses and sessions you know most about	You actively seek out areas of ignorance and answers to your clinical dilemmas
Focus is on research results, pathophysiology, mechanisms	Focus is on what works in practice, what to do, problem solving
Reading a journal or textbook	Problem solving on real or simulated cases, answering a quiz
Education to learn facts, pass exams	Learning to solve clinical problems, improve teamwork, clinical and information-seeking skills
Formal, timed courses	Informal, self-directed, on-the-job learning
Getting CME points for turning up	Getting points for participating, returning an MCQ, using learning materials, improving standards
Case presentation, journal club	Educational prescription, critically appraised topic, work on clinical simulator
Competition: keeping your knowledge to yourself	Sharing: open learning, exchange of knowledge and understanding to benefit patients and the health system
Knowledge belongs to the individual, so CME points accumulate to the individual	Communities of practice: learning is an attribute of the team and organization, and part of its quality and risk management strategies
Recertify the individual	Accredit the organization
Patients as passive recipients of care	Patients as sources of stimuli and as learning collaborators
Accept the learning curve: read about a new technique, practise it on patients	Reject the learning curve: work with an expert, perfect the technique on high fidelity models or simulators
Errors should be forgotten, hidden, denied	Errors are a learning experience, to be discussed and understood
Errors happen only to 'bad apples'	Errors happen to everyone

CME=Continuing medical education; MCQ=multi-choice questionnaire

the self tests, on its website, setting a welcome precedent for recognizing reflective use of the Internet. However, it will be some time before the majority of clinicians use such a mechanism, and how can the scheme be extended to monitor and reward the learning that results from seeking

answers to questions arising during individual clinical practice?

CONCLUSIONS

Taken as a whole, the shift away from continuing education implies a modest culture change (Table 1). Some of it has already taken place in undergraduate medical education and primary care, while clinical governance, risk management and the Information for Health strategy will further promote it.

Use of clinical questions to guide learning will always rely heavily on the motivation of individuals, teams and organizations, and goes hand in hand with a new open attitude to clinical errors and near misses. Motivation is especially necessary when it comes to funding the means to gain instant answers in clinical practice. Fortunately, electronic media will provide a simpler, cheaper and more up-to-date method for PBL than paper libraries, though more librarians will be needed to support them. Later articles will discuss how to commission and use these media.

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