

Are we providing doctors with the training and tools for lifelong learning?

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Medical practice is evolving rapidly as new information supplants old. Gone are the days when newly graduated doctors were armed with most of the information they would need for a lifetime of practice. Today's clinicians are required to be lifelong learners so that they continue to adapt to the changing ecology of the medical environment. Are our educational systems preparing doctors for this role?

Summary points

“Lecture and test” teaching methods arm learners with plenty of information but not the skills to update and replace it

Although computers put information at everyone's fingertips, insufficient attention has been paid to how this information is delivered

Traditional evidence based medicine focuses primarily on identifying and validating written information; this is unrealistic and too time consuming for most doctors

Efforts to increase the use of the best available evidence at the point of care must focus on the relevance of the information to patients and clinicians

Doctors need a first alert method—a bulletin board—for relevant new information as it becomes available and a way of retrieving the information about which they have been alerted

Learning to learn

Learning and developing competency in medicine is a little like running a bakery. We begin our medical education by having professors and teachers stock our empty shelves with new “loaves” of information. We, of course, do all the heavy lifting—the actual learning—to get this information onto the shelves, but our teachers are always there to tell us what bread to stock and what to do with it.

People who are good at “stocking their shelves” with information given to them by their teachers make good medical students. They excel in school and perform well on tests. They become expert at storing the right answer on their shelves, ready to pull it down when the question comes up in the examination.

Information overload

Many doctors become frustrated, however, when they find that the skills that allowed them to excel in the classroom, and even as house officers, are of little use in their medical careers. They have learned much, but they have not learned effectively how to learn.^{1,2} The skills that got them through the pedagogical process are of little use when they are faced with a flood of information.³ No one is there to direct them towards the new information they need to learn or how to identify those pieces of their hard earned knowledge that are no longer correct.^{4,5} Unlike in a bakery, their loaves of information are not tagged with expiry dates.

This information overload can also be a handicap, since it sets up prejudices and biases that prevent us from embracing new ideas.⁴ This shutting out of new information causes us to see the world in one, constrained way. When the only tool available is a hammer, everything looks like a nail.

Except for problem based learning,^{6,7} the traditional “lecture and test” method of teaching arms the learners with plenty of information, but does not give them the skills to update and replace this knowledge. One result is the inability of continuing medical education to affect the actions of doctors.⁸ Consequently, we have plenty of smart, learned people with inadequate training in how to continue to learn.

Paradox of adult learners

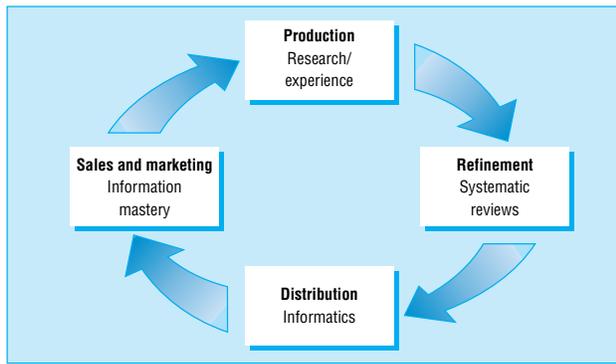
This is a problem. Educators faced with adult learners who are overwhelmed with information yet underskilled in learning are caught in a paradox. On the one hand, adults are self directed and make their own decisions, from what to eat to what to learn. This is the psychological characteristic that differentiates them from children. Yet when these adults are placed in a learning environment, they immediately revert back to the role into which they were conditioned by the pedagogical model—that of passive dependency on the teacher. If the educator treats them as child learners, though, the deeper need to be self directed reasserts itself, putting the educator in a teaching purgatory.⁹

The inability of the traditional, pedagogical techniques to prepare doctors for lifelong learning has been recognised for some time.¹⁰⁻¹² However, new technologies are now available that, in theory, allow learners to teach themselves. Rapid access via computers and database storehouses puts information at everyone's fingertips. Not enough attention has been paid, however, to the actual delivery process.

Providing the goods

The medical information process is analogous to the production of petrol for consumers (figure). Placing the best information into the hands of the doctor (and the patient) at the point of care demands four distinct components:

- Production—clinical experience and original research produce the crude oil that begins the process
- Refining—this raw material must be refined before it can be used. In the medical information process, refinement occurs



The information process

through systematic reviews and overviews, meta-analyses, decision and cost analyses, and guidelines

- Delivery—the informatics process then brings the refined product to the market, delivering it to doctors with ever increasing efficiency. Too often, however, this informatics process is akin to trying to fill a tea cup with a fire hose
- Sales and marketing—the crucial component of the medical information process is the final step—educating the consumer about the product.

Sales and marketing

This last process, sales and marketing, has largely been ignored. The consumers of medical research are left to stumble on new information, essentially on their own. In the business world, manufacturers first make sure their new products are tailored to the needs of potential customers and then provide them with education on the benefits and use. However, most new research findings in medicine are rarely marketed to the consumers who need them the most (except for those that benefit the pharmaceutical industry).

Evidence based medicine

Evidence based medicine has been hailed as the long awaited bridge between practice and research. Simply put, practising evidence based medicine involves trying to use the best evidence currently available when making decisions about the care of individual patients. By defining precisely the clinical question and then searching and critically appraising current information, the doctor will be armed with the best evidence that he or she can then use to make a clinical decision.¹³ Although the techniques of evidence based medicine have greatly enhanced and simplified the evaluation of the validity of clinical research, they are not tailored to the day to day needs of practising clinicians.

Filter needed

The traditional evidence based medicine technique of information management begins by focusing on a specific, patient related question. Though busy doctors are often faced with hunting for answers to practice generated questions, this problem driven mode of information gathering is incomplete. Providing the best information at the point of care also requires an efficient method for foraging through the jungle of medical information to keep up with new findings—it demands a filter to find the relevant stuff.

Getting research into practice

Traditional evidence based medicine has focused primarily on identifying and validating information communicated by the written word, making it unrealistic and too time consuming for most clinicians. This approach of “rigor over relevance” is rooted deep in the foundation of pedagogy.¹⁴ Clinicians, even those who identify themselves as practising evidence based medicine, infrequently use information sources that provide research in its

pure form.¹⁵ As a result, information from research that should change practice often does not achieve this, at least until it gets repackaged in a way that can reach and be understood by doctors. Although doctors report that they often use journals to obtain medical information, observation of information gathering habits has found that other sources, from pharmaceutical representatives to consultants, are more commonly used.¹⁶⁻¹⁸

Keeping abreast of research

Using research reports can be dangerous if they are not reviewed in their entirety. An isolated study, taken out of context, becomes medical “gossip” if doctors are not aware of other conflicting data.¹⁹ Clinicians using the research reports must be kept up to date with the continuing context of the conversation with some sort of bulletin board that provides all of the available, relevant information.

Patient oriented evidence that matters

Marketing efforts aimed at increasing the use of the best available evidence at the point of care must focus first on the relevance of the information to patients and clinicians. Doctors, as adult learners, will seek out new information and retain it only when they have the “need to know.”⁹ The best information for clinicians focuses on well validated evidence that shows a direct benefit to patients. People desire to live lives that are long, functional, pain free, and symptom free, and the most relevant information addresses these goals directly. Two other criteria also are important. The information must relate to a problem that is common to the doctor’s practice. Most important, though, the information must cause the clinician to change his or her clinical behaviour.

We have coined the acronym “POEMs” (patient oriented evidence that matters) to describe information that is of clear relevance to doctors.¹⁹ Limiting our information gathering to a continuing search for POEMs can keep us from getting lost in the information jungle.

Bulletin board

Two specific tools are needed to help doctors identify efficiently information that is highly relevant and valid. Clinicians need a first alert method—a POEM bulletin board—for relevant new information as it becomes available. The myriad newsletters, web based systems, and other current awareness services attempt to fill this need. With few exceptions, they do not filter information based on relevance and validity, and thus may not provide clinically useful information.²⁰⁻²²

Fast and portable retrieval

Clinicians also need a way of retrieving rapidly the information to which they have been alerted, but which has not yet been cemented into their minds.²³ Computer based sources



are available that can provide information in less than 30 seconds.²⁴ Hand held portable computers that can be used at the point of care will probably be even more useful sources.²⁵

Hunter and forager

Medical schools equip future doctors with some of the information they will need to practise effectively. The traditional curriculum does not ensure that they become informed consumers of medical information who are capable of finding, evaluating, and applying new information as it becomes available. To be lifelong learners, doctors have to rely on new methods of learning, while caring directly for patients, by using tools that help them to hunt and forage through the jungle of information.

Competing interests: AFS and DCS receive royalties from the sale of *InfoRetriever* software and the newsletter *Evidence Based Practice: POEMs for Primary Care*.

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