Innovations in Continuing Education

Continuing Medical Education: The Paradigm Is Changing

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Abstract

With the realization that lifelong learning is more than attending conferences, the potential for greatly expanding effective continuing medical education (CME) has never been more encouraging. Databases from groups and individual managed care practices and advances in information technology are providing major opportunities toward this goal by identifying specific information deficits and promoting practice-linked education. The National Committee for Quality Assurance (NCQA) standards, requiring audited Health Plan Employer Data and Information Set (HEDIS) reports, are a step forward in the development of CME linked closely to practice. The optimal educational use of practice data to improve clinical outcomes will require research to determine the best methods. HEDIS standards will probably continue to deal with common problems of omission rather than with those caused by physicians' lack of knowledge, which will require other approaches. Development of these methods will provide rich opportunities for demonstration studies. The spectacular advances in information technology, especially the almost limitless capabilities of the Internet and electronic mail, offer boundless possibilities of information sources and enhanced communication among physicians about puzzling patients. The further implementation of the electronic medical record with computerized reminders and other clinical information delivered at the point of need will trigger major advances. An appealing user-friendly, practice-linked, and self-directed CME is on the horizon, promising to help the practicing physician optimize patient care.

Now more critical than ever, the education of physicians after formal schooling is changing notably. Traditionally, lectures, journal and textbook reading, and informal discussions with colleagues have helped physicians keep abreast of the state of the art. As essential as they may be, they are not enough; the physician must also address individual problems in practice, currently best accomplished by the analysis of personal clinical data, targeted reading of evidence-based information, and focused discussions with collegial experts. Changes are evolving as education becomes more closely linked to practice and as electronic technology records the physician's clinical data, delivers specific information more efficiently, and provides pertinent reminders during patient visits.[1]

Continuing medical education (CME) is so closely identified with the formal lecture hall that efforts to accommodate other learning techniques have often gone unheeded. It is generally becoming realized, however, that CME is not just attendance at courses but also includes methods that are linked to practice. A statement developed by the Council of Academic Societies Administrative Board and approved by the Association of American Medical Colleges (AAMC) clearly points in this direction: "[T]he AAMC believes that changes are needed in CME, which will result in the development of CME activities that will be effective in improving physicians' practice behaviors."[2] Achievement of this goal

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requires a new vision for CME, based on the types of educational activities that are most likely to enhance the physicians' efforts to maintain clinical competence. Recent evidence suggests that, to be effective, CME should be highly self-directed, with content, learning methods, and learning resources selected specifically to maintain or improve the knowledge, skills, and attitudes needed daily in clinical practice. "Individual CME activities should incorporate interactive learning formats and include practice-enabling and -reinforcing strategies. To the degree possible, the learning experiences should be accessible within physicians' practice or work settings. . ."[2] The studies conducted by David Davis and associates describe the limitations and achievements for traditional continuing medical education.[3,4] What current activities will alter CME? Of the multiple forces affecting the discipline, two main driving forces are (1) the methods of delivery of health care, now dominated by managed care, and (2) information technology.

Managed Care

Databases of Group and Individual Practices

A goal of continuing education has long been to create education focused on identified deficits of individual physicians. A major strength of managed care organizations is in the databases that record the health care physicians render, largely through claims data. Analysis of the databases can foster more reliable clinical habits, which also support utilization and quality improvement. As databases of individual physicians become more sophisticated, they can lead to educational remedies tailored to specific identified deficits. For example, if a physician is prescribing antiquated or inadequate treatment for congestive heart failure, a definitive educational approach would be in order. The data on individual practices may

ultimately be managed care's major contribution to medical practice.

Managed Care Mechanisms Applicable to Education

Several mechanisms implemented for other purposes in managed care, such as referral management, case management, utilization analysis, and quality improvement, have potential for education. Many managed care organizations require the primary care physician to obtain authorization from a referral manager for specialty consultation or costly studies. Referral management can be used to teach the indications for referral and sophisticated studies. Case managers often monitor the medical records of patients with major chronic disorders requiring special resources and can target education for physicians serving patients with complicated problems. Utilization management and analysis can also help the physician improve care and reduce costs. If, for example, a patient with bronchial asthma requires frequent visits to an emergency room or hospitalization, an expensive utilization issue, the patient may not be receiving the full benefits of modern treatment, and the physician may therefore need focused instruction. Optimal use of the mechanisms of managed care for education will require more participation by expert physicians to determine needs and formulate responses. The effectiveness of these mechanisms must, of course, be examined.

In 1993, the National Committee for Quality Assurance (NCQA) launched the Health Plan Employer Data and Information Set (HEDIS) to compile practice data from questionnaires and encounter data and chart reviews to evaluate the quality of health care. Initial quality markers (standards) emphasized preventive measures, including help for smokers to quit, beta-blocker treatment after a heart attack, flu immunizations for the elderly, breast cancer screening, childhood and adolescent immunizations, and gynecologic check-ups after delivery. Markers continue to expand, now including aspirin after a heart attack,

control of hypertension, follow-up after an abnormal Pap smear, and prevention of stroke in patients with atrial fibrillation. The HEDIS 3.0 includes 75 such markers, with an additional 30 markers being tested.

Many managed care groups use computer systems that define the profile of physicians' practices in terms of diagnosis and procedures and compare the profile to "appropriate" practices. In addition to detecting "outliers" who may need education and guidance, some systems screen data to identify physicians who do not meet HEDIS requirements, such as for immunizations, mammography, and Pap smears. These will be missed, however, if studies and immunizations done elsewhere have not been recorded in encounter data sets or in the patient's chart. Requiring compliance with HEDIS standards for NCQA accreditation will be a strong stimulus for practice-linked CME and will improve evaluation of physician performance. HEDIS standards will probably continue to deal with common problems of omission rather than identifying physicians' lack of knowledge, which will require other approaches.

Educational Use of Practice Data

Further demonstration studies in individual settings are needed to discover the most effective use of practice data to identify knowledge deficits and, even more important, to enhance physician performance. Performance feedback may modify practice behavior[5] by allowing a comparison of individual physician performance with that of peer groups.

Local Study Groups

Observational studies indicate that interaction with a peer group actuates learning.[6] Studies on group learning with Bale's Categories of Interactive Behavior show that negative emotional behavior is rare in physician study groups and that physicians show more interest in concrete information than in opinion and theory.[7] In

Premi's Practice Based Small Group Learning Program,[8] groups of Canadian physicians meet for 1½ hours twice monthly to discuss previously studied instructive modules in primary care. Each module comprises an introduction, case studies demonstrating key features, and integration of key published articles. Denmark has a similar program.[9]

We encourage local study groups to address knowledge deficits by discussing not only prepared material but members' individual practice data, which may be sensitive. We agree with Eisenberg that everyone makes errors at some time and that "name, blame, and shame" is not a solution, but, rather, that the opportunity to discuss, reflect on, and correct errors and problems in a nonpunitive atmosphere leads to learning and improved care.[10]

Technology

Technology That Replicates Traditional Educational Methods

Despite major fanfare over the past several decades, information technology, with some exceptions, has not yet depreciated or replaced personal conferences, journals, and textbooks. But changes are occurring. The current databases provided by the National Library of Medicine (NLM) on the Internet without charge are a major contribution to CME. A number of commercial companies have designed search engines to access MEDLINE and other scientific databases by subscription, but other services, supported by industry, are free. The services vary greatly, attempting to meet the needs of researchers, practitioners, students, teachers, and others; their value is determined by their currency, accuracy, and easy accessibility. Access is usually through the World Wide Web, and although searching the medical databases may not require additional fees, special features, such as accessing full-text journal articles, usually carry charges. An important caveat is that users should examine cautiously the accu-

racy and currency of the information since some information on the Internet may be out of date or of questionable validity. As Candy states, "Physicians must be equipped not only with the ability to locate information but to evaluate its relevance and credibility."[11]

CD-ROMs

CD-ROMs on various aspects of health care are being produced by specialty societies, publishing companies, pharmaceutical firms, and communication companies. Some journals include CD-ROMs with abstracts of medical meetings. The accessibility, interactivity, and graphics on CD-ROMs are usually excellent.

World Wide Web

A significant effort is being mounted to place continuing education courses on the World Wide Web, where many leading journals are now available. Electronic conferences and discussion groups that can be attended by physicians throughout the world are expanding international CME.[12] Many Web programs are turn-page, but the medium lends itself to interactive programs as well. Some coordinate slides with voice. Using the Internet to access video programs is reducing costs and stimulating distance learning.

Information services such as Medscape and WebMD help physicians become aware of recent developments and often provide essays on subjects of clinical importance. Many services exist, and reliable Websites can be found in numerous journals. Patients also have access to a wealth of medical information, both good and poor. Validating the accuracy or completeness of the plethora of information on the Internet, however, is inadequate and requires further refinement. Some medical schools are broadcasting grand rounds by streaming over the Internet. Currently, the main advantages of the computer over printed books and medical journals are the ease of access and the ability to consult many references promptly without

going to the bookshelf or the library. As more is learned about how physicians use the computer to gain knowledge, the information will undoubtedly be organized in a more utilitarian and efficient format.

The enormous volume of health and medical information available to physicians and patients on the Internet is affecting the physician-patient relation as patients often arrive at their doctors' offices with a stack of computer printouts. This evolving trend of patients as partners in health care strongly encourages physician learning. The work of Towle demonstrates, through the standardized patient, that feedback from patients on whether they were well informed about their illness resulted in a change of physician clinical behavior.[13]

Maintenance of Competence Program

An educational program sponsored by The College of Physicians and Surgeons of Canada provides computer software to help physicians define individual learning needs and keeps a "pearls of wisdom" portfolio on major concepts and principles generated from clinical experience, conferences, journal reading, and informative discussions with colleagues. The ability to communicate through the Internet about problem patients may one day prove as effective as informal discussions in the hospital physicians' lounge.

The "Internet Question Library," another feature of the Maintenance of Competence Program (MOCOMP),[14] permits the physician to pose questions on puzzling aspects of medicine, such as "What will the long-term effect of Viagra be on vision?" Electronic conferences among users, as well as easy access to NLM's MEDLINE, are already available. MOCOMP, which allows recording of "pearls" and questions to guide education and validate learning, is a major tool in facilitating self-directed, practice-based education. According to participating physicians, recording items learned helps focus and systematize their education.

Practice-Linked CME

Lawrence Weed's Problem Oriented Medical Information System (PROMIS) gave hope to linking education to practice.[15] Using information learned has usually depended on memory and determination to apply that knowledge. Now, much of this information can be built into an electronic medical record as automatic diagnostic and management reminders, which are then accessible during history taking and physical examination and which therefore bypass the memory.

Clement McDonald of the Regenstrief Clinic is a pioneer in developing computer systems that supply reminders to physicians while patient data are being entered into an electronic medical record.[16] For example, when a physician prescribes digitalis, a prompt may suggest that potassium and digitalis levels be ordered. The day is near when patients will have access to computer reminder systems as they now have to other medical databases, and physicians will need to remain alert to this information so that they can advise patients which reminders or other computer information is relevant for a particular patient and which is not.[17,18]

Some questions arising during a patient visit may go unresolved because consulting traditional references is time consuming and inconvenient.[19] If brief answers to specific questions were a mouse click away, however, physicians could immediately apply that information to the patient's care. Dr. Robert Greenes considers the essential challenge facing physicians while seeing a patient with specific problems to be the ability to "navigate through a rising sea of information, receiving intelligent yet unobtrusive guidance, and readily obtaining the relevant resources." He equates this with the global positioning systems now available in automobiles that help the driver navigate to a destination, giving advice on the way regarding the location of service stations and restaurants.[20] Such at-the-point-of-need answers and guidance are becoming available electronically. Several systems are already approaching this goal.[21–23]

Machines that respond to the human voice will significantly expand the use of all information technology. In the future, a physician might use a microphone at his computer to ask "Should a 70-year-old, nondiabetic man with blood pressure of 159/90 mm Hg be treated for hypertension?" The voice response, using evidence-based information, might be "According to The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure,[24] the treatment goal in elderly patients should be the same as in younger patients (< 140/90 mm Hg, if at all possible). Elderly patients often respond to modest salt reduction and weight loss. If they need medication, diuretics are preferred as first-line therapy."

Evaluating CME in the Future

The test for CME lies in its success in improving physician performance and thus health care outcomes. Measuring changes in physician performance after an educational intervention, although still in the developmental phase, is an achievable goal. The direct consequence of the physician's performance on patient health, however, is more difficult to quantify since many other factors, such as patient compliance and lifestyle, are operating. More research is needed to perfect practice evaluation techniques.

Necessary Research

Research in CME has often lagged in quality because of such variables as busy physicians dropping out of a study, difficulties in defining outcome measures, and the inability to control extraneous factors that may have influenced physician learning. Most studies that have tested physicians before and after an educational experience indicate that physicians do learn from traditional CME. More difficult to determine is whether they apply that knowledge to practice and how it affects patient care. The complexities of health care are well demonstrated by the classic study of Starfield and

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Scheff,[25] who showed that in a relatively simple condition like iron deficiency anemia, even without a physician knowledge deficit, many pitfalls prevent the patient from receiving iron: lost laboratory slips, physicians ignoring laboratory data, patients failing to fill a prescription, or patients simply failing to take the prescribed iron. Related to, but separate from, CME is the need for continual study of clinical processes in the office and hospital to eliminate barriers to optimal health care.

Many aspects of CME need to be studied. The big challenge for research is not to determine which methods teach best but which will help the physician incorporate the best diagnostic and therapeutic methods into practice. As databases of individual practice become more sophisticated, educational deficits will be better defined, and studies of changes in practice after educational intervention will be more productive.

Further research on clinical practices and factors that change professional behavior is crucial.[26,27] Research is needed not only to develop skills to create and analyze physician databases but also to find how best to motivate physicians to correct identified deficits. Fox pointed out that academic research in CME has not led to widespread changes in the field. He recommended that future CME research should emphasize practical educational approaches that will truly facilitate physician learning and performance and will teach educators how best to provide education to physicians.[28]

It is encouraging that more studies are being conducted to determine methods of changing practice habits and the effect of interventions on physician performance, often by interpretation of data collected in individual practice settings. Gatekeepers may not always have the intended effect of reducing specialty care.[29] A physician's stated intent to change after educational intervention is often fulfilled.[30] Peer influences and pressures,[31] as well as academic detailing,[32] are powerful means of changing behavior. Constructing order forms as teaching vehicles may effect significant improvements.[33] Feedback on performance is, of course, generally beneficial.[34]

Medical School Curriculum

Medical schools have an obligation to instill in students the concept of lifelong education and of preserving the passion for medical practice.[35] Commencement is a particularly apt term after 4 years of medical school for it signals the beginning of the continual expansion of knowledge and skills in a discipline marked by constant flux. If medical education is truly a continuum, undergraduate medical students should learn the techniques of self-directed, practice-linked continuing education. Specifically, medical students should be taught to create, analyze, and interpret practice databases to correct educational deficiencies, and they should learn how to develop a personal information system, using the computer to record lessons they have learned. Many medical schools are emphasizing evidence-based medical information as these sources continue to expand.[36–38] Students are taught to create answerable questions that address their information needs and then to obtain the best evidence from sources critically appraised for validity, currency, and utility. The application of the evidence-based information and self-evaluation of performance rounds out the experience.

There appears to be a trend in undergraduate education to encourage learning in groups. This will establish habits to join study groups with colleagues in practice and avoid isolation when formal training is complete. In addition, students should be encouraged to explore, assess, and select the most appropriate of the ever-increasing teaching programs and medical information sources on the World Wide Web.

Medical students who may have been overloaded with lectures during medical school should not avoid all lecture programs after graduation. In the current computer frenzy, lectures are being prematurely relegated to the dustbin as antiquated and irrelevant. Interactive pedagogy, Kenneth Stunkel believes, reduces the professor from a "sage on the stage" to "a guide on the side."[39] We have all endured poor, even worthless lectures, but those

that excel are memorable. A good lecturer is an authority on a subject who organizes vast information cogently, explains and critically interprets fundamental concepts, recommends applications, and stimulates questions and discussion by the students. The skilled lecturer's objective, in fact, is to guide students to a stage of self-directed inquiry, from which they can continue to advance in knowledge, skills, and, optimally, wisdom. So, physicians in practice will still find lectures informative and an efficient way to learn, but real learning requires sustained individual concentration, effort, and contemplation, sometimes best mastered alone.

Conclusions

Now, more than ever, physicians must be perpetual students. But today they have more choices on how to learn, and education will become increasingly integrated into practice. The social attraction of colleagues and the desire to interact personally with medical experts will ensure the survival of live conferences. Teleconferencing will become more practical as costs decline through the use of the Internet. Medical journals, print or electronic, will remain the dominant source of new research and clinical information.

Even if the current managed care approach is abandoned, data collection on individual physicians and groups will likely continue. Medical education after formal schooling will be driven by data collected from individual practices and used to assess and correct deficits. Such data should be used positively, not to produce harsh, punitive measures that will drive problems underground and prevent remedies. The success of postresidency education will be judged by behavioral changes that improve patient outcomes. More research is needed on the methods of inducing and measuring such changes. Computerized interactive teaching programs may encourage individual education.

Small groups of physicians discussing formal programs and reviewing their practice data will also stimulate learning. Interdisciplinary problem-solving meetings of coworkers in hospitals and in-office practices will help overcome obstacles to accomplishing routine procedures. At-the-point-of-need answers to specific questions arising during patient visits will become available, probably through the Internet. The state of the art must be developed so that the computer systems provide answers more readily than printed publications, and the information must be valid and evidence based. The computerized medical record will make a significant contribution when it is universally connected to decision support and reminders. All information technology will be greatly advanced when machines respond to the human voice.

Change is difficult and often slow. Implementation of practice data and information technology will come in stages, user acceptance being the most significant hurdle to overcome. The seeds for new, exciting, and user-friendly CME have been planted and, if carefully nourished, will yield a rich harvest.

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