

Does Continuing Medical Education Improve the Quality of Medical Care? A Look at the Evidence

Alfred O. Berg, MD
Seattle, Washington

Although continuing education has a long tradition within the medical profession, mandated continuing medical education is of very recent origin. The conceptual framework used to justify continuing medical education is that it exposes physicians to new knowledge, changes physician behavior, and favorably alters patient outcomes. Considerable evidence exists that physician knowledge can be increased, and that behavior can be changed, but there is very little to show an effect on patient outcomes. The effectiveness of continuing medical education is further clouded by such issues as consumerism, licensure politics, and professional standards review organization legislation. Family physicians should have a role in determining the outcome of the continuing medical education debate, as participants, as policy-setters, and as informed critics.

The education of physicians has long been acknowledged to be a lifetime process. Observe:

John Shaw Billings: The education of the doctor which goes on after he has his degree is, after all, the most important part of his education.¹ (1894)

Sir William Osler: Post graduation study has always been a characteristic feature of our profession.² (1900)

Karl Marx: The education of most people ends upon graduation; that of the physician means a lifetime of incessant study.³ (1865)

The advent of mandatory continuing medical education (CME) in the last decades, however, has been dramatically abrupt: 35 states have legislated required continuing medical education as a prerequisite to relicensure, and at least 22 medical

specialty boards are moving toward recertification procedures, all with CME requirements. The impact of required continuing medical education has been substantial if measured in terms of dollars and time spent by physicians in CME activities (to say nothing of dollars accruing to CME-sponsoring institutions).^{4,5} The impact of continuing medical education on the quality of medical care in the United States is, however, substantially unknown.

The traditional conceptual framework justifying continuing medical education is that it exposes physicians to new medical information, increases physician knowledge, changes physician behavior, and favorably alters patient outcomes.⁶ It has further been assumed that completion of the first step guarantees the last three.

This paper will briefly review the effects of continuing medical education on physician knowledge, on change in physician behavior, and on

From the Robert Wood Johnson Clinical Scholars Program, University of Washington, Seattle, Washington. Requests for reprints should be addressed to Dr. Alfred O. Berg, Robert Wood Johnson Clinical Scholars Program, University of Washington HQ-18, Seattle, WA 98105.

patient outcome, listed, unfortunately, in descending order of the quality of information available. In the end, the data will allow very limited conclusions regarding the efficacy of continuing medical education, but will permit a broader discussion regarding the relationship of CME to other quality assessment and assurance mechanisms.

Continuing Medical Education and Physician Knowledge

The idea that systematic exposure of physicians to new medical information will lead to increased physician knowledge does not require a very large leap of faith. Yet this first, basic step of documenting increased knowledge must be taken in order to allow interpretation of studies focusing exclusively on later results. Failure to demonstrate increases in knowledge would allow suspicion of results showing large changes in subsequent behavior or patient outcome, or may partially explain results showing no changes at all in behavior and outcome.

On the face of it, the demonstration of increased knowledge following continuing medical education should be a straightforward affair: do a pretest and post-test and measure any significant difference between the two. A much more rigorous approach, however, is necessary if generalization to other programs and situations is desired.

Typical of studies demonstrating increased knowledge is that of Neu and Howrey, who showed significant increases in post-test scores in a large sample of physicians exposed to a nationally distributed televised program dealing with antibiotic use. Since the post-test was part of the presentation, however, the retention of the knowledge gained is open to question.⁷ A more indirect approach to demonstrating the efficacy of continuing medical education in increasing physician knowledge is that by Chang's group, which showed in a community survey that those who scored higher on a test dealing with child abuse and neglect were likely to have reported continuing medical education as their source of information on the subject.⁸ A similar study by Hunter and Portis showed that those physicians scoring higher on a mailed survey dealing with placebos, heart

disease, and new drugs were likely to have viewed televised CME programs on those subjects three to six months earlier.⁹ Both of these studies indicated that CME knowledge is retained beyond the few days or weeks immediately following the presentation.

Several investigators have gone further by comparing different methods of continuing medical education on increasing physician knowledge given similar subject material. Hogben demonstrated similar increases in knowledge following two CME courses in cardiology, differing only in length. The study is subject to criticism because of poor documentation of comparability between groups, and the lack of adequate controls.¹⁰ Donnelly's study of weekend seminars for physicians learning about new drugs addresses issues regarding methods, but his findings were inconclusive.¹¹

Other examples are available, of varying methodological quality. Research in the area has been less than enthusiastic, presumably because few have seriously questioned that continuing medical education increases physician knowledge; nearly all studies published have shown increases in knowledge, independent of methodological rigor. The notion has some face validity, and is indirectly supported by a large volume of research in educational psychology and teaching methods. Knowledge assessment has, for better or worse, become entrenched as the only necessary and sufficient evaluation technique in many CME programs.¹²

Continuing Medical Education and Behavior Change

Evaluation of CME's impact on the behavior of physicians presents obvious methodological difficulties. In the arena of perhaps the greatest interest, that of the practicing physician's private office, the literature is practically silent. A single study, by Mock's group, failed to demonstrate an impact of a medical television network on physician behavior, largely because medical records reviewed were inadequate for the analysis.¹³ Caplan showed high physician compliance 6 to 12 months after a CME course on tonometry, but the numbers were very small, and not all those taking the course were evaluated.¹⁴

The issue is less difficult and the endpoints

easier to measure in hospital based studies of physician behavior. Setting aside the (literally) hundreds of testimonial reports from hospitals to the effect that an audit/continuing education program has "changed behavior," there are a few studies which have attempted to look at the question in more depth. Reed has shown that audit generated continuing medical education was effective in changing a variety of physician behaviors in the coronary care unit setting, although the definition of continuing medical education (eg, suspension of hospital privileges) and the small numbers of physicians involved, limit generalizability.¹⁵ Dramatic changes in behavior were documented by Rubenstein following continuing medical education directed at the use of blood products and the work-up of pulmonary embolism in a large hospital setting.¹⁶ A similar study was reported recently showing reduction in blood products ordered for elective surgery.¹⁷

Within the framework of a large well-designed study on the quality of care in Hawaii, Payne and co-workers demonstrated significant improvements in appropriateness of hospitalization, length of stay, and staff assessment of quality of care following seminars dealing with identified problems in six hospitals. The study was hampered by a follow-up of only five months and by inadequate measurement of some relevant outcomes, but offers convincing evidence of changes in physician behavior in defined areas.¹⁸

What is certainly clear from these and other studies is that physician behavior can be changed. However, the active agent is not always clear. Few studies have randomized physicians to exposed and nonexposed groups in experimental fashion, nor have selective, historical, situational, and maturational effects generally been taken into account. Further, the intervention itself has frequently been a confusing mixture of continuing education coupled with administrative fiat (as in reducing availability of certain tests or drugs).

Given the enormous number of testimonial reports and anecdotal comments from hospitals and practitioners that behavior does change in response to continuing education, the complacency of the medical profession in not demanding more rigorous "proof" is not difficult to understand. There is certainly even less evidence that continuing medical education *negatively* affects behavior. Perhaps that is proof enough.

Continuing Medical Education and Patient Outcome

The fog of imperfect evidence that surrounds the effect of continuing medical education on physician knowledge and behavior becomes no less dense when considering patient outcome. Good outcome measures are difficult to come by in any event, and attempting to causally relate them to antecedent CME appears virtually impossible.

Lewis and Hassanin attempted to relate short courses in obstetrics and pediatrics to measurable outcomes, such as perinatal mortality and maternal complications, without showing a positive effect. The report has been widely criticized, however, because the endpoints chosen were sensitive to many other uncontrolled factors.¹⁹ Improved patient knowledge and compliance, and better control of blood pressure were demonstrated among patients in a general medical clinic cared for by resident physicians receiving a single teaching session on hypertension. The study included a comparison group of physicians not exposed to the teaching session, but ability to generalize is weakened by follow-up of less than one year.²⁰

Unfortunately, the most valid evidence for the most part ends here. The few other reports of the effect of continuing medical education on patient outcome are very small anecdotal studies with negligible external validity. Not surprisingly, all such studies have shown dramatic effects of continuing medical education on measured outcomes. Perhaps the consistency of the findings is in itself useful.

Discussion and Conclusions

The evaluation, at any level, of continuing medical education has been meager. Of the nearly 200 listings on CME in the 1977 *Index Medicus*, over three quarters are editorial comments, and nearly all the rest are reports of "how we do it at our place"—documentation of a given CME program. Only a handful, fewer than ten, are attempts at evaluation, and few of those are worth examining beyond the abstract.

The evidence that continuing medical education assures quality care is weak, but the association between continuing medical education and quality assessment is certainly stronger. Suggestions that

continuing education be linked to perceived deficiencies in physician knowledge (examination or self-assessment), physician behavior (process measures, medical audits), or patient outcome (audits of outcome) have been exhaustively pursued in the literature, mostly in editorial comment.²¹ Particularly popular has been the notion that data collected as part of mandated peer review (through the professional standards review organizations—PSRO) be integrally linked to the design of continuing education programs.²²⁻²⁴ This conceptual framework certainly has intuitive appeal, and neatly fits the current input-output-feedback mentality. In this respect, there is little doubt that deficiencies in medical care identified by process or outcome evaluations can be corrected in many cases, but the precise role of CME in the process remains to be defined.

If a new evaluation were to be initiated, demonstration of efficacy and effectiveness of continuing medical education with respect to patient care and physician knowledge, behavior, and satisfaction should be the first steps. These may yet be examined, more rigorously than has been done, but the examination is increasingly difficult with the overlay of other issues, such as licensure, certification, politics, CME as big business, professional standards review organizations, and the consumer movement. On the other hand, surely the high costs implied by these other issues argue even more urgently for thoughtful analyses of benefits and overall effectiveness.

The precise role of family physicians in this controversial area is not clear. Certainly as "consumers" of continuing medical education, the profession has a great deal at stake in arguing for high quality programs of demonstrated effectiveness. Further, as the first specialty to require both CME and an examination for recertification, family practice is in a unique position to evaluate the effects of CME over time. Many family physicians are in positions of leadership in local, state, and national medical organizations where issues related to CME requirements frequently surface. Overall, I would argue for a more critical approach, with emphasis placed upon problem-directed continuing medical education meeting known needs of the participants, followed by rigorous evaluations of effectiveness. A healthy skepticism should remain: continuing medical education will not in itself solve all the problems of

assuring quality medical care. The problem is far too complex for that.

References

1. Billings JS: Educating the physician. *Boston Med Surg J* 131:140, 1894
2. Osler Sir W: The importance of post-graduate study. *Lancet* 2:73, 1900
3. Marx K, quoted by Garrison FH: The evil spoken of physicians. *Bull NY Acad Med* 5:145, 1929
4. Continuing medical education. In *Medical Education in the United States, 1970-1971*. *JAMA* 218:1258, 1971
5. Storey PB: Mandatory continuing medical education: One step forward—two steps back. *N Engl J Med* 298:1416, 1978
6. Scott AJ: Continuing education: More or better? *N Engl J Med* 295:444, 1976
7. Neu HC, Howrey SP: Testing the physician's knowledge of antibiotic use. *N Engl J Med* 293:1291, 1975
8. Chang A, Oglesby AC, Wallace HM, et al: Child abuse and neglect: Physician knowledge, attitudes, and experience. *Am J Public Health* 66:1199, 1976
9. Hunter AT, Portis B: Medical education television survey. *J Med Educ* 47:57, 1972
10. Hogben MD, Schorow M, Caine T: Shorter training in cardiology for practicing physicians. *J Med Educ* 47:806, 1972
11. Donnelly FA, Ware JE, Wolkon GH, et al: Evaluation of weekend seminars for physicians. *J Med Educ* 47:184, 1972
12. Turiel SM, Kummer TG (eds): *Goals and Techniques in Continuing Education*. Arlington, Association of Hospital Medical Education, 1970
13. Mock RL, McLoard BF, Prestwood R: Northern California postgraduate medical television: An evaluation. *J Med Educ* 45:40, 1970
14. Caplan RM: Measuring the effectiveness of continuing medical education. *J Med Educ* 48:1150, 1973
15. Reed DE, Lapenas C, Rogers KD: Continuing education based on records audits in a community hospital. *J Med Educ* 48:1152, 1973
16. Rubenstein E: Continuing medical education at Stanford. *J Med Educ* 48:911, 1973
17. Mintz PD, Lanenstein K, Hume J, et al: Expected hemotherapy in elective surgery. *JAMA* 239:623, 1978
18. Payne BC, Lyons TF, Dwarchius L, et al: The quality of medical care: Evaluation and improvement. Chicago, Hospital Research and Educational Trust, 1976
19. Lewis C, Hassanin R: Continuing medical education: An epidemiologic evaluation. *N Engl J Med* 287:254, 1970
20. Inui TS, Youtree EC, Williamson JM: Improved outcomes in hypertension following physician tutorials. *Ann Intern Med* 84:646, 1976
21. Hutchison D: The process of planning continuing education programming; AND Fleisher D: Priorities and data bases: Their relationship to continuing education. In *Health Resources Administration, Bureau of Health Resource Development (Rockville, Md): Fostering the Growing Need to Learn*. DHEW publication No. (HRA) 74-3112. Government Printing Office, 1973
22. Nelson AR: Orphan data and the unclosed loop: A dilemma in PSRO and the medical audit. *N Engl J Med* 295:617, 1976
23. Inui TS: Continuing medical education and the professional standards review organizations. *Johns Hopkins Med J* 139:37, 1976
24. Geyman JP: Toward performance-based continuing medical education. *J Fam Pract* 5:333, 1977