Effective Clinical Practice

The Computerized Patient Record: Somewhere over the Rainbow?

This issue of *Effective Clinical Practice* reviews the status of computer-based patient records (CPRs). The hype about the CPR has been enormous. The goal of this issue is to determine if, in 1998, the CPR is real, and if not, to evaluate its prospects for success.

From a quality point of view, the case for the CPR is compelling. From *The Wall Street Journal* (1) to *The New England Journal of Medicine* (2), we know that physician compliance with guidelines is woefully inadequate in areas as clear cut as influenza immunization (3), the use of aspirin in coronary artery disease (2), and diabetes care (1). We also know that information about guidelines, presented to physicians at the moment of care, can improve compliance (4). Have any organizations demonstrated the ability to turn these research findings into reality?

In developing this issue of *Effective Clinical Practice*, our goal was to focus on organizations that were not academic training centers. We wanted to assess the status of CPR implementation in mainstream organizations with full-time clinicians delivering care on a daily basis. We are not belittling the work of the academic training centers—indeed, these organizations have determined which deployments of the CPR are effective. However, no one could argue that implementation of an automated medical record system in medical training institutions, by fiat, is different from implementation of such a system for attending physicians, by consensus.

CPR Systems in Practice Settings

This issue features the work of five institutions: two are Kaiser Permanente organizations, one each in Ohio and Oregon; the third is CIGNA Healthcare of Arizona; the fourth is the Maccabi Health Fund in Israel; and the fifth is the Veterans Administration Palo Alto Health Care System. A common thread among these articles is that they come from institutions organized around group or staff models of care. A formal organizational structure seems to be a great help in implementing computer-based systems, as evidenced by the lack of CPR systems in managed care organizations in which clinicians practice in large networks of private offices.

These articles represent substantial effort and lots of practical learning. However, they cannot be viewed as rigorous research efforts. Nonacademic institutions have trouble conducting interventions in ways that would satisfy a rigorous researcher. There are several reasons for this. The first is an ethical issue: If a care delivery organization has an automated medical record system and university training centers have demonstrated that reminders improve immunization rates (e.g., for influenza), is it ethical to divide the organization's member population into those who benefit from a reminder and those who don't?

Second, complex care delivery organizations usually have simultaneous initiatives. For example, in Kaiser Permanente of Ohio, an automated medical record system was programmed to remind internists and cardiologists about the use of angiotensin-converting enzyme inhibitors in patients with congestive heart failure

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while parallel efforts in case management of these patients and deployment of a short-stay unit capable of treating them rapidly in an outpatient setting were being done.

Third, because these are not academic institutions, the emphasis on publication does not exist. Consequently, much good work is identified only by word of mouth or by presentations at professional meetings. Despite this, some organizations manage to publish useful articles. For example, Lovelace Healthcare in Albuquerque, New Mexico, has done groundbreaking work in the improvement of diabetic care, using "old" mainframe technology (5); likewise, Group Health Cooperative of Puget Sound in Seattle, Washington, has improved the care of diabetic patients by using an internally developed "Diabetes Registry"(6).

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Despite these limitations, papers in this issue of *Effective Clinical Practice* demonstrate substantial advances in the application of the CPR to patient care. Patients in the organizations of our contributing authors all benefit from the use of these systems. The articles also provide a glimpse into the real-world issues involved in implementing these systems. One organization in particular, Kaiser Permanente, Northwest Division, in Portland, Oregon, has been forthright in assessing such variables as physician productivity before and after CPR implementation (7).

Barriers to Implementation

Given all of the above, what are the barriers to implementing CPR systems? The first and foremost seems to be ease of use. Some of these systems require a large amount of training, an amount that a physician in private practice probably would not tolerate.

The second issue involves workflow. The apparent chaos in many medical offices often represents workflows that, over the years, have been modified to increase the number of patients seen per day. The CPR drastically alters workflow. Physicians are probably willing to spend a moderate amount of time training and suffer decreased productivity for a brief period, but in the long run, these systems will need to retain productivity while, we hope, improving the quality of care.

A third major issue surrounds existing billing and medical management systems. It is unlikely that physicians would be willing to use separate electronic systems for medical business management and clinical management.

The fourth issue is payment—to be specific, who will pay for the CPR? Will it be practicing physicians, managed care organizations, integrated delivery systems, or self-insured employers? This crucial issue remains unresolved. Related to it, of course, is the cost of these systems. How much is any of these parties willing to pay? The only benchmarks we have are the current charges for medical business management systems ($6000 to $15,000 plus service contracts per physician) and public statements by managed care organizations about their commitment to medical information systems. For instance, Kaiser Permanente has stated that it will invest $1.4 billion for clinical information systems over the next 5 years, which works out to approximately $100,000 per clinician. Given all of this, it is unlikely that the current version of the full computer-based patient record will be in use by a majority—or even a large minority—of physicians, at least in the next few years. However, we should see the development and deployment of hybrid systems that combine medical management and the essential clinical support required to improve quality of care. Added features that improve workflow, such as prescription-generating systems that facilitate formulary compliance of multiple payers, will increase acceptance of these systems.

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Correspondence

Allan T. Khoury, MD, PhD, Kaiser Permanente of Ohio, 5400 Lancaster Drive, Cleveland, OH 44131; e-mail: allan.khoury@kp.org.