State of the Computer-based Patient Record

Save to myBoK

by Margret Amatayakul, MBA, RRA

Value, experiments, promises, disappointments, hype, compromises, and change all characterize the status of the computer-based patient record (CPR). An industry expert offers some perspective on where the CPR has been and where it's going.

In 1873, Florence Nightingale lamented her inability to obtain value from paper medical records.[1] In the late 1960s and early 1970s, CPR experiments such as TMR, COSTAR, and others from Duke, Harvard, and other universities showed great promise in access to data, legibility, and aggregation of data for statistical analysis.[2] Early approaches also tended to apply industrial engineering concepts to understanding and automating the flow of healthcare. Technicon, the Regenstrief Institute, and others had success in reducing medication error rates and repeat lab tests.[3]

By the mid-1980s, the Institute of Medicine (IOM) staff was frustrated by inability to obtain healthcare data. The IOM proposed a study on how new technology could improve patient records. AHIMA contributed one third of the funding to this landmark work, which became one of the Institute's top-selling reports. It defined a comprehensive vision of the CPR, recommended the formation of the Computer-based Patient Record Institute (CPRI), and resulted in vendors scrambling to produce CPR products.[4]

When the IOM report was released in 1991, it envisioned that the "future patient record will be a computer-based, multimedia record capable of including free text, high-resolution images, sound (e.g., auscultations), full-motion video, and elaborate coding schemes." CPR systems were expected to offer "access (availability, convenience, speed, reliability, and ease of use), quality, security, flexibility, connectivity, and efficiency." In addition, these future patient records were expected to "provide new functions through links to other databases and decision support tools." The IOM report further noted that "no contemporary clinical information systems are sufficiently comprehensive to be considered full CPR systems."[5] A revised edition of the report, released in 1997, confirmed the requirements and findings.[6]

As vendors approached the marketplace to address the IOM challenge, considerable hype was associated with the vision of the CPR. Many compromises were made in getting products to market quickly. While these CPR products provide improved access to health data, most are not truly integrated with source systems, few provide robust decision support, and most are still not used as an integral part of providing care. Today's CPR is not significantly influencing the practice of healthcare and generally not achieving the level of impact expected of the investment.

Current Status

Describing the current level of CPR penetration throughout the healthcare delivery system is difficult. There is no standard name nor agreement on definition for a CPR.

CPRI threshold criteria for a CPR system

1. The CPR system must acquire, store, transmit, and retrieve data, information, and knowledge from multiple sources.

CPRI uses the term "computer-based patient record" and believes it reflects the full scope of the vision as outlined in the IOM study. It defines the CPR as "electronically maintained information about an individual's lifetime health status and healthcare."[7] It establishes three threshold criteria for determining whether a system is a CPR as envisioned by the IOM (see above). CPRI has been tracking 225 projects for more than four years; only nine have successfully demonstrated that they collect data from multiple sources across the continuum of care, supply comprehensive decision support that yields direct and measurable clinical impact, and are directly used by caregivers in their practice.

2. The CPR system must possess information processing tools that provide added value in supporting decisions about patient management.
3. Caregivers must consult the CPR system as their primary source of information for patient care.

The Medical Records Institute (MRI) attempts to define a continuum of progress toward the ultimate vision for managing clinical information by identifying and defining a set of terms (see page 36).[8] C. Peter Waegemann, executive director of MRI, terms the ultimate vision the "electronic health record" (EHR). While recognizing a migration path toward achieving the CPR is useful and realistic, there is no consensus on either the path or the terms associated with it. The term "electronic health record" is also popular in Europe, although not necessarily reflective of the end result of a continuum.

While there is no standard name nor definition, there is alignment within the industry on the vision of the CPR.[9] There is need for information systems to support all episodes of care wherever they take place, to provide immediate access at any place to all patient data for all episodes of care, and to process and provide data in a variety of ways to support better clinical and business decisions. Furthermore, there is clearly a continuum of progress toward accomplishing something as complex and comprehensive as the vision will require.

Current CPR products are far from the "essential technology for healthcare" envisioned by the IOM. Most healthcare organizations still maintain paper records and provide automated data in error-prone, redundant ways. For example, while document imaging is an effective way to automate health information that currently exists in paper form, using document imaging for contributing new information to CPR systems is a redundant process. Data documented on paper must be scanned and checked for accuracy, resulting in a time delay in having access to the data. Document image systems are not integrated with decision support in a real-time manner. Standard alerts and reminders, such as allergies or needs for immunizations, can be printed on a document image encounter form. Any information which may be generated in response to direct input, however, cannot be provided in such a manner. For example, the benefits of matching a drug ordered against a managed care formulary cannot be achieved in such a system. Document imaging systems have significantly improved with sophisticated indexing systems to provide direct access to imaged documents or even portions of imaged documents, but data cannot be processed at the element level.

Today's CPR systems are generally cumbersome, resulting in the creation of "work-arounds" to manage daily operations. Physician order entry frequently requires several screens. Physicians find this cumbersome, so they write orders on paper for someone else to transcribe into the system. This defeats the purpose of any alert that may be generated through direct entry. Likewise, entering a note is time consuming and frustrating. Physicians rely on context and rich narrative to enhance the meaning of their documentation. Relying on structured data from pull-down menus is more time consuming than intended and much more cryptic. Yet for many who do not type, keyboarding is burdensome. Voice recognition systems are not sufficiently intelligent to handle the breadth of vocabulary desired by most and are still not fully reliable. As a result, most notes are still handwritten or dictated. Some progress is being made in introducing textual templates that include embedded pull-down menus for variable data -- but these are only effective for common situations. Computer workstations are not portable. Even small hand-held devices are heavy and require synchronization with a workstation for full support. Again, the use of the paper intermediary -- which, in many cases, are not on standard forms -- increases the risk of loss or abbreviated annotation.

Many providers are beginning to invest in clinical data repositories. These are effective for collecting data to produce comprehensive reports. They serve as an important component of the CPR. Repositories, however, serve primarily to collect data in one location. They can easily supply data for direct patient care events, but cannot easily be mined to provide aggregate information on demand. Many find it necessary to move key data from a repository to a warehouse to run lengthy reports.

The technology of the Internet has greatly improved data sharing across disparate systems. What is lacking, however, are infrastructure and policies and protections required to support potential data sharing. The US far exceeds any other country in having telephone, electrical, and other basic services for virtually every part of the country. These advancements, however, are working to our disadvantage as we are not more rapidly adopting newer technology to support the exchange of large blocks of data and images. Running T1 lines throughout the country, for example, is a major undertaking and investment. Without adequate technology to support sophisticated encryption techniques or privacy legislation that adequately protects health data, the healthcare industry is necessarily reluctant to extend data sharing beyond local area networks. Internet access and sophisticated browsers have also come to be much more readily available, but tools to synthesize the information obtained from these sources are lacking.

Table --Extent of CPR Implmentation

No plans/No Response	34%
Planning	32%
CPR	25%
CDR	9%

(Based on *The Dorenfest IHDS+Database* market research.)

As a result of the variability of CPR products and their implementation and use, the extent of true adoption is difficult to ascertain. Dorenfest Associates conducts market research on an ongoing basis to understand the market penetration of products and buying plans. THE DORENFEST IHDS+ DATABASE(tm) identifies that fully 25 percent of all integrated healthcare delivery systems (IHDS) have a CPR (see Table). But closer scrutiny reveals that either the CPR is in a very early stage of piloting or implementation, it is a document imaging or dictation-based system, it is actually a clinical data repository, or it exists in one component of the IHDS. It has been found that, in general, the ambulatory environment is significantly further along in adopting CPR systems that incorporate direct use by the caregiver than the acute care area. Hospitals that started developing CPR systems many years ago have made significant progress, but there are far fewer of those than there are ambulatory settings with more recently adopted CPR systems.

Barriers to CPRs

What will it take to achieve the IOM vision for the CPR to be "the standard for medical and all other records related to patient care?"[10] The IOM envisioned a time frame of 10 years, from 1991 to 2001, for CPRs to be well integrated into the healthcare delivery system. But it also recognized significant barriers: informational, organizational, behavioral, and technological. The HIMSS 1998 Leadership Survey identified vocabulary standards as the most important current barrier to full CPR development.[11] Many from other industries question why healthcare is so far behind in adopting technological solutions to its health information needs. Most do not recognize the tremendous textual and contextual nature of the data that healthcare must manipulate. Where there is no misunderstanding concerning numeric data, terms often have a variety of meanings associated with them. Even if a standard vocabulary existed in healthcare which addressed differences in meaning in different contexts, that is still far more complex to automate than numeric data.

Furthermore, while information in healthcare is valued, documented data are not relied upon for delivery of healthcare. Because information is often not available in a healthcare event, caregivers have had to develop a means to rapidly assess and immediately address a healthcare situation.

MRI steps to achieving the CPR

- Automated medical record: paper and electronic medical records existing in parallel
- Computerized medical record: scanned documents, eliminating medical record management
- Electronic medical record: medical record information in electronic form at a single provider setting
- Electronic patient record: medical record information in electronic form at multiple provider locations; a virtual record
- Electronic health record: move health information from the medical community to the individual; incorporates wellness

The IOM identified several other barriers to CPR development, which still exist. These include lack of consensus on content, CPR diffusion adversely affected by the disaggregated healthcare environment, the complex characteristics of CPR technology, unpredictable user behavior, the high costs of acquiring CPR systems, a lack of adequate networks for transmitting data, a lack of leadership for resolving CPR issues, a lack of training for CPR developers and users, and a variety of legal and social issues. Although no new technological breakthroughs were seen to be needed by the IOM, emerging technologies were believed crucial.[12]

Planning Activities

There is no single compelling event driving the development and adoption of CPR systems, yet there is a steady increase in need. Pressures from industry consolidations, legislation, managed care initiatives, and renewed emphasis on quality are all reasons for implementing CPR systems. Some activities under way show considerable promise for advancing CPR implementation. These may be considered at the macro level across the industry and at the micro or local level.

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) called for administrative simplification in the area of electronic transactions. Specific standards were required for certain transactions-and the healthcare delivery system responded with greater interest in and more rapid approval of standards in those areas identified directly in HIPAA. It was also recognized that the legislation laid the ground work for further standards to support electronic management of clinical

information throughout the country. While HIPAA continues to hold great promise, delays and public reaction have somewhat stilled the realization of significant change in our ability and willingness to adopt standards.[13]

Another promising event is the G-CPR project in which government agencies have committed to developing a CPR for government use (Department of Defense, Veterans Affairs, and Indian Health Services, and Louisiana State University) from commercial off-the-shelf products.[14] The project is expected to establish the standard for the industry. While it remains to be seen to what extent a government project can be adopted in the private sector, such work will surely have some impact on the vendor community as it rises to meet requirements for the project.

Revision of Medicare Conditions of Participation,[15] the Joint Commission's ORYX requirements, NCQA's HEDIS requirements, and other such increased demands for data will also put pressure on improved systems to meet data needs.

Finally, pressure to contain costs will continue. But cost savings from the administrative side of healthcare have been squeezed nearly dry. New cost savings must come from the clinical side of healthcare. Clinical guidelines, protocols, and pathways will be required to assist in altering practice. Instead of reducing lab tests and holding back on treatments, however, these guidelines will direct caregivers to both preferred treatments and preventive care. Cost savings will be realized through improved quality and keeping people well, rather than minimally treating illness that can result in further, costly complications. Such tools will require CPR systems not only to supply data but to provide robust rules engines that can process guidelines and display them in a manner that is most efficacious.

At the micro level, each institution will need to establish its own vision of the CPR, prepare a migration path toward that end, and invest in the infrastructure necessary to support the CPR. The culture of the organization must value information as an integral part of "doing business." There must be commitment from the top-to the value of information as well as to the financial, time, and change a CPR will require.

Roles for HIM Professionals

New roles for HIM professionals and others will result from CPR systems. In the interim, we are seeing several new functions.

As healthcare providers develop clinical data repositories, HIM professionals are helping identify, define, and monitor the integrity of data elements. HIM professionals are particularly suited to this function as our professional membership organization has long supported work in this area and our members are specifically trained in health record content. AHIMA has published a glossary of healthcare terms for many years. The Association has supported the ASTM E31 Healthcare Informatics standards work on the content and structure of the CPR[16] which has both contributed data structures to HL7 and to the community at large.

HIM professionals are also assuming key roles in security management. Demonstrating knowledge of confidentiality and security and serving as patient advocates in this area have been primary functions in the profession since its inception. Again, AHIMA has supported ASTM standards work in this area, contributed to the NRC work on privacy[17], and performed numerous other activities at the national level.

Interim CPR technologies, such as document imaging and transcription, also are developing new functions. While transcription has long been an important function, it can be expected that this field will continue to grow and potentially expand. Despite the need for using CPRs at the point of care, it is likely that caregivers will not only continue to dictate traditional reports but increase dictation of notes and other items for inclusion in the CPR. Transcribed reports and notes can also serve as models for creating standard templates for CPR systems. Transcriptionists will be called upon to develop such templates and lists of variables for pull-down menus. Document imaging systems are creating completely new functions. For documents to be scanned on a timely basis, their integrity ensured, and their retrieval made possible, document managers are needed to manage the flow of documents, check scanned documents against electronic form, and index documents or segments thereof.

Many CPR systems are being designed to incorporate automated coding or proposing code recommendations for caregivers to select. HIM coders may assume new roles in monitoring the accuracy of such coding, ensuring the existence of documentation that substantiates the coding, and keeping the code masters up to date. They will be arbitrators of coding discrepancies and internal auditors.

HIM professionals are also serving as liaisons to information service departments, serving on help desks, providing CPR training, and managing the transition from paper to electronic records.

Finally, HIM professionals are championing CPR systems in many settings. Uncertain about the direction CPR system selection and implementation should take, providers are turning to HIM professionals for guidance. HIM professionals have the opportunity to see the entire range of health information within the healthcare delivery system. They may be the first to break down barriers and negotiate turf battles over control of information. They recognize the importance of data accuracy, completeness, and integrity and can promote single-source data collection to avoid redundancy. HIM professionals are trained in work flow analysis and process improvements-which are critical to making CPR systems work in the healthcare environment. And HIM professionals are taking leadership roles in provider areas as well as in vendor and consulting roles.

Conclusion

Achieving the vision of the CPR may be elusive, but the vision is gaining momentum. In the absence of a single, compelling event, HIM professionals must be ruthless in their quest for improving the health record in light of new technologies.

Notes

1. *Notes on a Hospital*, 1873.
2. Abdelhak, Mervat, ed. *Health Information: Management of a Strategic Resource.* Philadelphia: W. B. Saunders Company, 1996, pp. 587-589.
3. Teich, Jonathan M. *Third Annual Nicholas E. Davies CPR Recognition Symposium Proceedings.* Schaumburg, IL: Computer-based Patient Record Institute, 1997, pp. 73-121.
4. Dick, Richard S., and Elaine B. Steen. *The Computer-based Patient Record: An Essential Technology for Healthcare.* Washington, DC: National Academy Press, 1991, p. ix.
5. Dick, Richard S., and Elaine B. Steen. *The Computer-based Patient Record: An Essential Technology for Healthcare.* Washington, DC: National Academy Press, 1991, pp. 135-136.
6. Detmer, Donald, Richard Dick, and Elaine B. Steen. *The Computer-based Patient Record: An Essential Technology for Healthcare.* Revised Edition. Washington, DC: National Academy Press, 1997, p. vi.
7. CPRI. *Description of the Computer-based Patient Record and Computer-based Patient Record System.* Schaumburg, IL: Computer-based Patient Record Institute, 1995.
8. Marchese, Beth-Ann. "C. Peter Waegemann, Fighting for Better Health Through Computers." *Healthcare Technology Management* 9, no. 7 (1998): 34-36.
9. Dorenfest, Sheldon I. "Focusing on Improving Clinical Process and Realizing the Benefits of IT Investments." Presentation at the Annual HIMSS Conference, Orlando, FL, Feb. 26, 1998.
10. Detmer, Donald, Richard Dick, and Elaine B. Steen. T*he Computer-based Patient Record: An Essential Technology for Healthcare.* Revised Edition. Washington, DC: National Academy Press, 1997, p. 180.
11. "The Ninth Annual HIMSS Leadership Survey." *Healthcare Informatics* 15, no. 4 (1998): 55-74.
12. Detmer, Donald, Richard Dick, and Elaine B. Steen. *The Computer-based Patient Record: An Essential Technology for Healthcare.* Revised Edition. Washington, DC: National Academy Press, 1997, p. 179.
13. Health Insurance Portability and Accountability Act of 1996, P.L. 104-191.
14. Defense Supply Service. "Government-Computer Based Patient Record." *Commerce Business Daily* (January 20, 1998).
15. U.S. Department of Health and Human Services. "Medicare Conditions of Participation Proposed Rules." *Federal Register* 62, no. 244 (December 19, 1997).
16. ASTM. "E1384: Content and Structure of the Computer-based Patient Record." West Conshohocken, PA: ASTM, 1996.
17. National Research Council. *For the Record: Protecting Electronic Health Information.* Washington, DC: National Academy Press, 1997.

Margret Amatayakul *is vice president of Sheldon I. Dorenfest & Associates, Ltd., in Chicago.*

Article citation:
Amatayakul, Margret. "The State of the Computer-based Patient Record." *Journal of AHIMA* 69, no.9 (1998): 34-40.