The Evolution of the Electronic Health Record

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Medical records have changed dramatically because of the development of the electronic health record. The federal government has promoted the electronic health record through incentives programs. However, obstacles remain with regard to standardization, interoperability, time-consuming data entry, and security issues.

At a Glance
- The electronic health record (EHR) has undergone transformational change since its introduction and the transition from written medical records.
- Data-sharing challenges across settings still exist, and healthcare providers cite this as an issue.
- A need exists to increase standardization and security of the EHR.

M edical record documentation of patient data has evolved during the past several years. Early patient medical records included brief, written case history reports maintained for teaching purposes. One such document obtained is a text from Egypt of 48 case reports that includes injuries, fractures, wounds, dislocations, and tumors that date back to 1600 BC. This document was written on papyrus text and acquired by Edwin Smith, an Egyptian priest, in 1862 (Atta, 1999; Gillum, 2013). Case reports served as the patient record for many years, used only intermittently by physicians. By the 1880s, concerns regarding medical records as legal documents for insurance and malpractice cases encouraged administrators of hospitals to supervise record content (Gillum, 2013). By 1898, the patient record came to the bedside, moving from retrospective documentation to cases reported in actual time. Medical records resembled more of the present-day record with family history, patient habits, previous illnesses, present illness, physical examination, admission urine, blood analysis, progress notes, discharge diagnosis, and instructions (Gillum, 2013).

Transformation of the Electronic Health Record

Electronic health records (EHRs) were introduced in the 1960s in the United States, with multiple systems developed by different groups during the same time period. In the 1960s, Larry Weed, MD, introduced the Problem-Oriented Medical Record (POMR), which focused on a patient problem list and consisted of history, physical examination, laboratory data, complete problem list, initial plans, daily progress notes, and discharge summary (Gillum, 2013; Siegler, 2010). Weed led an effort to develop an electronic version of the POMR. He stated,

I realized that medicine must transition from an era where knowledge and information processing capacity resides inside a physician’s head, to a new day where information technology would provide knowledge and the processing capacity to apply it to detailed patient data. (Jacobs, 2009, p. 85)

In 1971, Lockheed Corporation created a company that eventually became known as Eclipsys Corporation (now part of Allscripts Healthcare Solutions, Inc.), featuring computerized physician order entry. At the same time, the Veterans Administration became one of the first large healthcare systems to fully implement a computerized patient record system, which was eventually fully integrated as an inpatient and outpatient EHR, allowing for the ordering of medications, procedures, x-rays, patient care nursing orders, special diets, and laboratory tests. This EHR is now known as the Veterans Health Information System and Technology Architecture (U.S. Department of Veterans Affairs, 2014). In 1972, the Regenstrief Institute in Indianapolis, Indiana, had developed the Regenstrief Medical Record System. Although it has not been widely used throughout the United States, it has been implemented in three hospitals at the Indiana University Medical Center campus (Tripathi, 2012). McDonald et al. (1999) described the purpose of the EHR in a quote that is still applicable.

Our goal was to solve three problems: (a) to eliminate the logistical problems of the paper records by making clinical data immediately available to authorized users wherever they are, (b) to reduce the work of clinical book keeping required to manage patients, and (c) to make the informational “gold” in the medical record accessible to clinical, epidemiological, outcomes, and management research. (p. 226)
Barriers to the Electronic Health Record

As these various electronic health records matured, the technologies began to commercialize. There was a growing need for an ambulatory EHR, and vendors took advantage of this opportunity. In 1991, the Institute of Medicine (IOM) recommended that, by the year 2000, every healthcare professional and organization use a computer in their practices to improve patient care. The IOM report included policy recommendations on how to achieve this goal (Wright, Sittig, McGowan, Ash, & Weed, 2014). Interest in the computer-based record has continued to grow steadily since the release of the IOM report, possibly because of the continued technologic advances and an increased use of computers by patients and healthcare professionals. An obstacle that arose with the commercialization of EHRs was the need for customization of the EHR at clinical sites according to individual physician and hospital needs. This led to a lack of standardization in the EHR, which has prevented data sharing across settings, a frequent frustration among healthcare providers. Standardization requires customer demand, but the customers have been reluctant to move toward the EHR because of the lack of standardization, further complicating the issue (Tripathi, 2012).

Recognizing the lack of demand for the EHR, the Centers for Medicare and Medicaid Services has offered to incentivize health professionals’ investment in the system. The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act of 2009, was signed into law on February 17, 2009, to promote the adoption and use of interoperable EHRs and health information exchange, with a goal of improving cost and quality in the healthcare system. The main EHR domains required to fulfill HITECH Act meaningful use requirements are to (a) improve quality, safety, and efficiency; (b) engage patients and families; (c) improve care coordination; (d) improve public and population health; and (e) ensure privacy and security for personal health information (HealthIT.gov, 2013).

Challenges to Using the Electronic Health Record

A survey by the American Medical Association and the RAND Corporation (2013) looked at factors that influenced physician satisfaction and found that physicians have found EHRs to be a source of frustration despite not wanting to return to paper medical records. Physicians approved of the concept of the EHR and appreciated remote access to patient information; however, physicians also noted dissatisfaction with poor usability, time-consuming data entry, interferences with face-to-face patient care, inefficient and less fulfilling work content, inability to exchange health information, and degradation of clinical documentation. At the time of the study, “meaningful use” rules for EHRs was the regulation most commonly singled out by physicians and practice leaders as burdensome (RAND Corporation, 2013).

Another important concern of this technology is that, by allowing for the exchange of health record information among hospitals and providers, this interoperability will make the health records more susceptible to data breaches. EHR hackers have access to personal identification and insurance information, laboratory results, and other private data. According to the security rating firm BitSight Technologies (2014), the healthcare industry is one of the least-prepared industries for a cyber attack. This message was further reinforced in 2014 when the Federal Bureau of Investigation stated that the healthcare industry is not as resilient to cyber intrusions compared to the financial and retail industry; therefore, the possibility of increased cyber intrusions is likely (Finkle, 2014).

Conclusion

Since the passage of the HITECH Act, steady growth has occurred in the usage of EHR systems among healthcare organizations (Furukawa et al., 2014). However, there has been continued reluctance by many healthcare providers to adopt the EHR, and a need exists to increase usability, interoperability, and security. Policies that address the current barriers preventing more widespread EHR use and outcomes research that examines whether these incentives programs translate into better healthcare outcomes must be pursued.

References


Jacobs, L. (2009). Interview with Lawrence Weed, MD—The father of the Problem-Oriented Medical Record looks ahead. Permanente Journal, 13(3), 84–89.


