

EHR of the Future

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History of Electronic Health Record (EHR)

is it EMR or EHR?

We use terms “electronic medical record” and “electronic health record” (or “EMR” and “EHR”) interchangeably.

“**health**” relates to “The condition of being sound in body, mind, or spirit; especially...freedom from physical disease or pain...the general condition of the body.” The word “health” covers a lot more territory than the word “**medical**.” And EHRs go a lot further than EMRs ¹

However, in reality they are synonyms

1. ¹ "EMR vs. EHR—What is the Difference?," Peter Garrett and Joshua Seidman, PhD, HealthIT Buzz, January 4, 2011 <http://www.healthit.gov/buzz-blog/electronic-health-and-medical-records/emr-vs-ehr-difference/>

What is EMR?

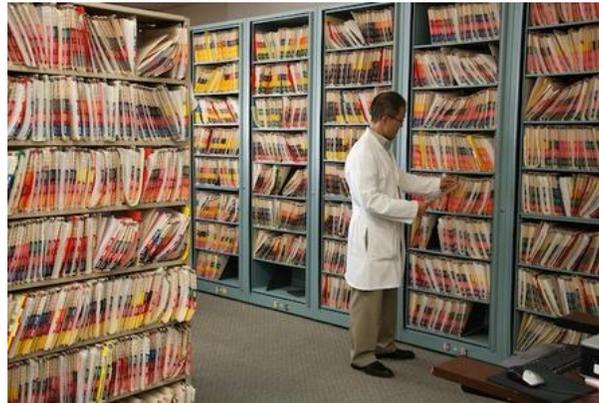
An electronic medical record (EMR) is a digital version of a paper chart that contains all of a patient's medical history from one practice. An EMR is mostly used by providers for diagnosis and treatment ¹

Longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting ²

1. <https://www.healthit.gov> Office of the National Coordinator for Health Information Technology
2. <http://www.himss.org/library/ehr> Healthcare Information and Management Systems Society

The History of EMR's

Prior to 1960 all medical records were kept on paper and in manual filing systems ¹



1. Amatayakul M. Electronic Health Records: A Practical Guide for Professionals and Organizations. 3rd ed. Chicago: American Health Information Management Association; 2007.
2. Image from <https://sfpublicpress.org>

The History of EMR's

- The first EHR systems were known as “clinical information systems”¹
- 1960 Lockheed developed the first one



1. Amatayakul M. Electronic Health Records: A Practical Guide for Professionals and Organizations. 3rd ed. Chicago: American Health Information Management Association; 2007.

The History of EMR's

- 1960 University of Utah and 3M developed Health Evaluation through Logical Processing (HELP)
- It was the first clinical decision support system (CDSS)

1. Amatayakul M. Electronic Health Records: A Practical Guide for Professionals and Organizations. 3rd ed. Chicago: American Health Information Management Association; 2007.

The History of EMR's

- 1968 Massachusetts General Hospital and Harvard developed the Computer Stored Ambulatory Record (COSTAR)
- COSTAR included new EMR features at that time (flexible vocabulary and modular design)

The History of EMR's

- 1970 Department of Veteran Affairs start using “VistA”
- VA was the first federal agency to use EMR
- 1980 Huge efforts by Institute of medicine (IOM) to promote the use of EMR, undertook analysis of paper health records
- Published results in 1991 and with revisions in 1997, IMO argue the case for using EMR
- In 2000 “To Err is Human” report by IMO stated that we will be safer if we use “CPOE”
- IOM has also collaborated on the development of an electronic standards organization, HL7 in 1987

1. Amatayakul M. Electronic Health Records: A Practical Guide for Professionals and Organizations. 3rd ed. Chicago: American Health Information Management Association; 2007.

Politicians and EMR

“By computerizing health records, we can avoid dangerous medical mistakes, reduce costs, and improve care.”¹

President George W. Bush
2004

أن الصحة الإلكترونية أحد مقومات نجاح الرعاية الصحية الحديثة.²

وزير الصحة السابق د. عبدالله الربيعية
2010

1. M. Allen, “Bush Touts Plan for Electronic Medicine,” *Washington Post*, 28 May 2004
2. <http://www.al-madina.com/node/245039>

Politicians and EMR

2009 President Obama incorporated EMR in stimulus package “Recovery Act”

Health Information Technology for Economic and Clinical Health Act (HITECH) will provide higher payments to health care providers that meet “meaningful use” criteria, which involve using EMR. ¹

The main goal was “incentives to accelerate EMR uptake”

1. Centers for Medicare and Medicaid Services. Meaningful use.
http://www.cms.gov/EHRIncentivePrograms/30_Meaningful_Use.asp#TopOfPage. Accessed February 15, 2011

Future of EMR

- Documentation
- Patient engagement
- Blockchain
- Virtual services/telehealth
- Wearable technology, smart scales, and remote monitoring
- New players in healthcare industries like Amazon, IBM, Apple, Google

Documentation

“A clinician will make roughly 4,000 keyboard clicks during a busy 10-hour emergency-room shift,” Abraham Verghese, Professor for the Theory and Practice of Medicine at Stanford Medicine, in the New York Times Magazine

And this due to User interfaces and onerous billing requirements, have become a burden to doctors and nurses, contributing to burnout and information overload among physicians, and degrading patient care.

Computers are getting between doctors and patients, providers are forced to spend more time clicking and typing than talking to patients

Artificial intelligence (AI) can help in this by pulling relevant information from the EMR and allow for easier documentation and coordination

Virtual services/telehealth

- Clinicians set availability, view virtual waiting room and receive alerts when individuals present
- Clinicians will access and launch the telehealth session from within the EMR (all information and images are available)
- Patients attend their session live on mobile phone or thru web
- Clinicians will assess and discuss treatment plan
- Patients can receive Pharmacy, Lab, Imaging from nearby service location

Wearable technology, smart scales, remote monitoring

- FitBit, AppleWatch, Samsung Gear
measuring heart rate, monitoring calories burned, counting the number of steps and detect abnormalities in sleep patterns
- Bluetooth (BT) pulse oximeters, BT blood pressure cuffs, BT Scales, BT Glucometer
Measuring vitals and patient glucose level.

Mobile App can aggregate these information and send it to the patient EMR.

Patient Engagement

EHRs will enhance patient engagement as they become integral to the patient experience

Patient will ask questions and get answers before attending the appointment

Patient will be able to evaluate the services he received during his journey and able to write reviews.

Blockchain

Very similar to the way a blockchain Bitcoin wallet works, but instead of keeping track of coins, it is used to track and store data such as the patient's Medication history, Images, lab results, medical reports, etc.

Benefits:

Reliability: The use of decentralized, cloud-based storage ensures maximum reliability and prevents data loss through regular automated backups of all data.

Security: All sensitive patient data storage exceeds HIPAA and PIPEDA requirements; Since only the hash value of sensitive data is stored on the blockchain, data can only be decrypted with the private key of that account.

Transparency: The use of a distributed ledger ensures data is tamper-proof, preventing cyber-attacks on the system itself since previous transaction data cannot be changed or overwritten.