

### EHR vs CCR: What is the difference between the electronic health record and the continuity of care record?

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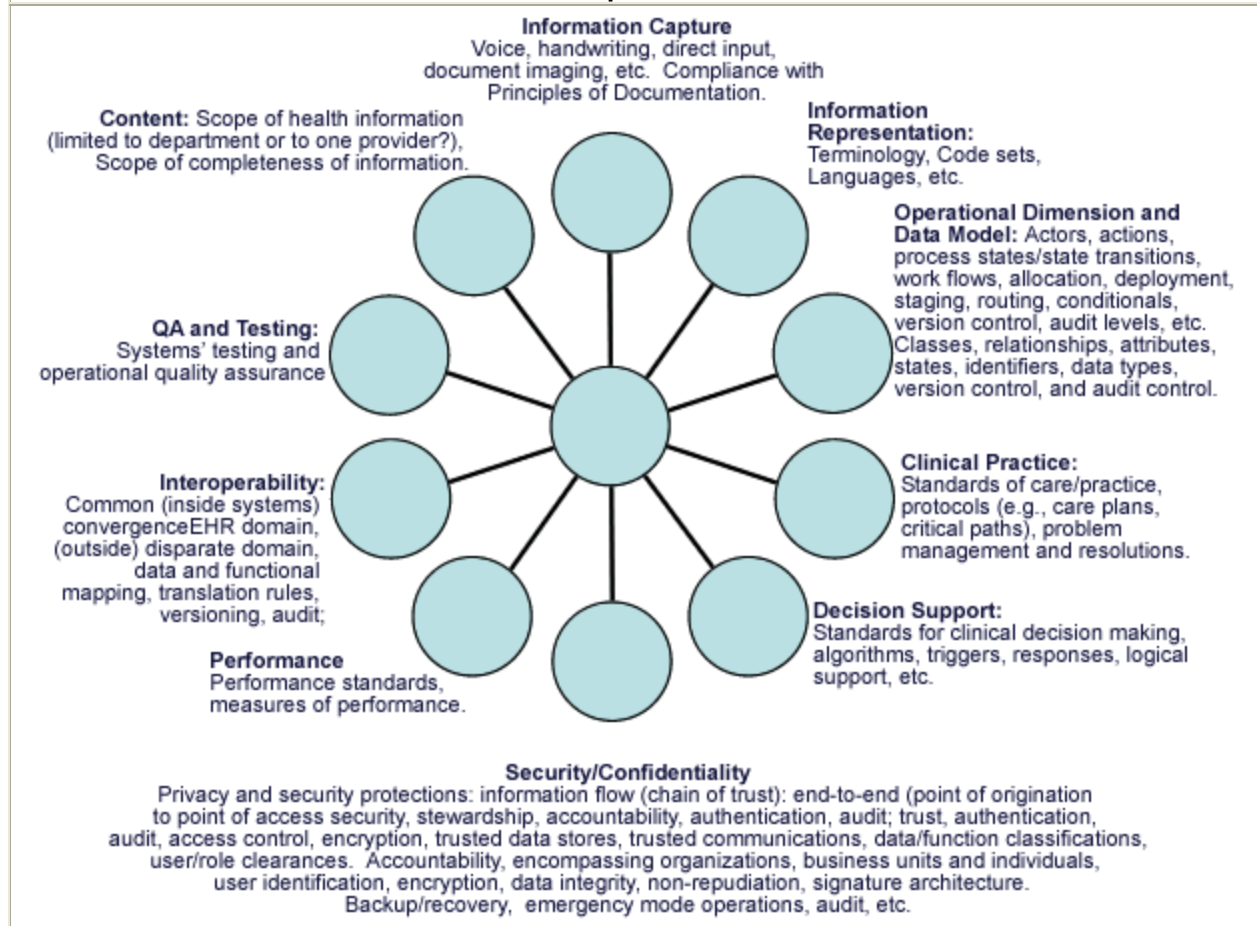
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The idea of the electronic health record was born some 40 years ago. Thirty years later, in 1991, the report by the Institute of Medicine declared the vision of computer-based patient record systems essential to future medicine. This study provided a vision for a much-needed, computer-based, longitudinal, life-long, integrated patient record including entries from all healthcare providers. As a result, there was major interest in computer-based records (CPRs) in the early 1990s. "The electronic health record is a computer-stored collection of health information about one person linked by a person identifier. <sup>1</sup>" This statement encompasses the fundamental vision of the computer-based patient record. The vision for the CPR encompasses a mainly virtual, computer-based medical record that includes all information (clinical and administrative) and covers all practitioners ever involved in a person's health care, including all medical specialties covering a lifetime, even prenatal and postmortem information. The CPR vision also had an important feature as it foresaw the CPR as a basis for and an integral part of decision support. In other words, it distinguished the CPR from the paper-based medical record, which was a passive recording tool.

This was and still is a great vision. However, it must be admitted that this vision failed. First, the CPR was based on the idea that various provider records are linked together by a patient identifier. In the United States, it is likely that a national patient identifier system will not be politically acceptable in the foreseeable future. Second, a life-long patient record meets much resistance from privacy advocates who consider the storage and management of health information that is, say 40 or 50 years old, in most cases irrelevant to the care process and a violation of a patient's privacy. "My health history dating 40 or 50 years back should be of no concern to my current caregiver," stated a patient recently. "I am healthy and it is not my doctor's business what sensitive issues I faced during my teenage years." Third, and most importantly, after promoting longitudinal interoperability, it is time to acknowledge the reality, namely, that full interoperability is very complex and is not likely to be achieved in health care in the near future. We can assume, for instance, that a clinic New York is not likely to connect with full interoperability to a hospital in Alabama and would be even less likely to interoperate with a hospital in Italy.

If one accepts that the CPR is a vision that will not be implemented in decades to come, then the question arises why there has been so much support for this vision? Indeed, several new visions have begun to enter the health informatics field (see Appendix 1). The term electronic health record (EHR) stands for a new vision that has emerged during the last 8 years. This vision avoids some of the controversial aspects of the CPR, assumes a more realistic approach as far as the scope goes but is still promoting full interoperability among specialties and provider domains. Ten areas need to be harmonized and standardized in order to achieve interoperability. Each of these functional requirements is quite complex. While many standards organizations are working on bits of pieces of these functional requirements, it will take some time to create and implement standards that will enable full interoperability.

## 10 Functional Requirements of the EHR



These ten functional requirements apply to enterprise-wide interoperability, which is the EMR concept. Some of these functional requirements can currently only be implemented within an enterprise. In other words, an organization can implement the appropriate policies and select the systems which lead to interoperability within the enterprise.

For multi-enterprise interoperability, as required by the CPR, EHR, EPR versions, functional requirements must be met through minimum standards. It will take many years until we can achieve this. In addition, when multi-provider and multi-specialty interoperability is involved then the requirement of (national or international) patient identifiers is added.

### Why Are Definition, Functionality, and Standards For An EHR So Complex?

Definitions need to take into account (1) different visions and applications, (2) different functionality, and (3) specific requirements of medical specialties. First, at least 11 concepts depict very different EHRs. Appendix 1 shows eleven different visions of EHRs. Second, these concepts have been further complicated by regional or country-specific functionalities. Third, for example, a medical record in a community behavioral health clinic and a medical record in an ICU of a teaching hospital are very different in content, structure, security requirements, functionality, and system integration. In other words, it is questionable whether it is a good exercise to create one model for an EHR and try to fit all versions into it.

The most important consideration, however, is that the EHR is the outcome of processes. These processes of care have not been standardized. In order to standardize the EHR, we need to standardize healthcare processes of which the EHR documentation is the outcome. It will take a long time to standardize care processes as this involves caregivers' behavioral changes as well as wide-ranging consensus of process changes. One example is the early attempts to standardize order entry into a process that applies to all provider types (inpatient and outpatient), is based on decision support, and integrates relevant information from the patient information system.

## Why EHRs?

It has been widely accepted that the creation of a global EHR system may save more lives and have greater benefit to patients and our society at large than a cure to cancer. Four major reasons drive providers toward implementing an electronic health record system.

The first and most valuable is shareability. In real terms, this is a level of interoperability within an enterprise. The concept of sharing patient information among authorized professionals within an enterprise fits the vision of the electronic medical record (EMR). The benefits are for the provider organization. The provider organization has it in its power to select and implement systems that allow shareability or some lower level of interoperability.

The second reason is in regard to necessary accuracy and documentation in health care. The most prevalent information capture method is handwriting, which can lead to medical errors due to illegibility, non-standardized abbreviations, or other handwriting-caused misinformation. Therefore, electronic documentation brings the benefit of better accuracy.

The third benefit of electronic health records is in the field of workflow. The EHR is an important tool to achieve a more efficient way of delivering healthcare.

The fourth benefit is that the EHR is the necessary infrastructure for many of the necessary changes. For example, a good electronic order entry system is dependent on the patient information stored in the EHR. Similarly, many decision support systems depend on information stored in electronic format.

The [Survey EHR Trends and Usage](#) conducted by the Medical Records Institute clearly shows that these are the driving forces for the implementation of systems that fit the EHR Vision.

TRENDS				
	2002	2001	2000	1999
Improve the ability to share patient record information among healthcare practitioners and professionals within the enterprise	90.00%	83.00%	85.00%	73.00%
Improve quality of care	85.30%	83.00%	80.00%	72.00%
Improve clinical processes or workflow efficiency	83.60%	83.00%	81.00%	67.00%
Improve clinical data capture	82.40%	78.00%	68.00%	61.00%
Reduce medical errors (improve patient safety)	81.70%	n/a	n/a	n/a
Provide access to patient records at remote locations	70.70%	73.00%	71.00%	59.00%
Facilitate clinical decision support	70.00%	69.00%	66.00%	58.00%
Improve employee/physician satisfaction	63.00%	n/a	n/a	n/a
Improve patient satisfaction	60.40%	59.00%	54.00%	40.00%
Improve efficiency via pre-visit health assessments and post-visit patient education	40.20%	38.00%	36.00%	n/a
Support and integrate patient healthcare information from Web-based personal health records	30.40%	28.00%	29.00%	n/a
Retain health plan membership	9.30%	9.00%	7.00%	n/a
OTHER	0.30%	4.00%	1.00%	3.00%
Responses to this Questions	729	293	296	358

Shareability is the number one reason to install EHRs. This means sharing patient information among authorized healthcare professionals within an organization as achieved in the Electronic Medical Record

(EMR). However, most people think the EHR concept depicts a patient-centric database of health information that combines all health information concerning a person independent of provider type or specialty. It is time to recognize that a national patient identifier is politically not acceptable and that therefore, this vision of a longitudinal electronic health record cannot be implemented in the foreseeable future.

### Continuity of Care

The core element of EHRs has been to provide continuity of care by ensuring that a provider has relevant information of a patient’s history in order to base decisions on such information as allergies, medications, previous diagnoses, etc. As it becomes clear that inter-provider interoperability cannot be achieved in the foreseeable future, one must look for alternatives to achieve interoperability. The goal is simple. Whenever a patient leaves a hospital, or is referred by the primary physician to any specialist, or is transferred from one provider to another, the relevant information should be sent to authorized professionals through a Continuity of Care Record (CCR).

The standard of the CCR is technology neutral. This means that the CCR can be printed out and transported by a patient or other authorized person, sent as a standard HL7 message, or sent as an XML message to be integrated into the patient information system.

This is done in the following ways:

	To be sent via
Discharge/Transfer from hospital to another provider institution	<ul style="list-style-type: none"> <li>o XML message</li> <li>o HL7 message</li> <li>o Secure email</li> <li>o Fax or</li> <li>o Other method:</li> <li>o Pulled from last provider’s system</li> <li>o Provided by the Healthplan or Payer</li> </ul>
Referral from Primary Caregiver to Hospital, Specialist, or other Provider	<ul style="list-style-type: none"> <li>o XML message</li> <li>o HL7 message</li> <li>o Secure email</li> <li>o Sealed or unsealed envelop carried by patient</li> <li>o Fax or</li> <li>o Other method</li> <li>o Pulled from last provider’s system</li> <li>o Provided by the Healthplan or Payer</li> </ul>
Upon discharge without referral	<ul style="list-style-type: none"> <li>o Given to the patient/authorized representative</li> </ul>
Upon Discharge from an Urgent Care Center, Emergency Department or similar provider	<ul style="list-style-type: none"> <li>o Given to the patient/authorized representative</li> </ul>

This Continuity of Care Record is a minimum dataset of the most relevant information a healthcare provider needs to make informed decisions. It consists of

- Identification of the Provider and last services
- Identification of the patient within the last provider organization
- Details of the admitting/receiving clerk
- Patient Demographics
- Insurance/healthplan information
- Relevant appointments

- Diagnoses
- Allergies
- Medication list
- Physician Orders
- Anticipated goals (care plan) incl. rehabilitation plans
- Home health/hospice information
- Follow-up
- Nurse detail
- Self-care status
- Disabilities and impairments
- Equipment requirements
- Nutrition details
- Therapist details
- Social service detail

In short, the CCR includes all information that enables a caregiver to learn all relevant facts about a patient.

As the CCR will be refined to include input from medical specialties, it should become a major contribution to better health care. The benefits are obvious:

1. A healthcare provider will not have to guess about a patient's allergies, medications, or former diagnoses.
2. The healthcare provider will be informed about healthcare services performed in the past.
3. The healthcare provider will be informed about recommendations of the caregiver who treated the patient last.
4. As patient demographics will be provided, time and effort will be saved by not having to ask a patient for demographic information in detail. Rather, it can be verified, which takes less time.
5. A patient's insurance status is more easily established. This can be expanded within the system.

### **Next Steps**

A draft of the standard exists within ASTM E 31 ([www.astm.org](http://www.astm.org)) and may be obtained by emailing [dsmith@astm.org](mailto:dsmith@astm.org). Individuals and organizations may provide input at a series of meetings and/or direct to the standards committee ASTM E31. This is best done by becoming a member of ASTM E31 (annual membership is \$75) at their website, which will also give you the right to vote when the standard is balloted later this year.

A series of meetings will be held to which medical specialties and other healthcare organizations will be invited. The first will be on August 5, 2003 at the Massachusetts Medical Society in Boston, MA. A further meeting will be held in September 2003.

The main standards meeting for ASTM E31 members will be held on November 17, 2003, in Tampa, Florida. It is anticipated that this will be the last opportunity for input into the standard before it goes to ballot.

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1. Concept Model Group of the Computer-based Patient Record Institute, chaired by C. Peter Waegemann, 1993-1995.