

## **Electronic Medical Records and Continuity of Care Records – The Utility Theory**

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**Abstract:** Continuity of Care Records (CCR) is becoming the chosen standard for exchange of patient information for the industry-wide effort to improve the quality of Health Information Transportability (HIT) encompassing the broad range of errors, events and near misses. CCR brings forward the ability of electronic medical records (EMRs) to operate in conjunction with each other embracing communication protocols, hardware, software, application, and data compatibility layers. It is argued that with better guiding policies and current technology, the continuity of care will facilitate a smooth transition of patient information across multiple practices with different EMRs. The author identifies the utility theory playing an important role in the establishment of CCR as a standard applicable to the growing healthcare industry.

**Keywords:** Continuity of Care Records, CCR, Electronic Medical Records, EMR, Utility Theory, Healthcare, Health Information Transportability, HIT.

### **About the Author:**

Nainil, 23, holds honorary Masters Degree in Management in Information Systems (MIS) from Temple University, Philadelphia PA. Nainil also holds a Bachelors degrees in Commerce from Narsee Monjee College of Commerce and Economics along with a Masters of Commerce (1) (specialization in Management) degree from University of Mumbai, India. Nainil works as a developer and knowledge research specialist in eClinicalWorks. For many years, Nainil has served as a consultant and advisor on search engine optimization, website development for many reputed organizations. Nainil has research interest in the Governing Dynamics of the Internet, Marginal utility theory in Economics and the Giffens paradox.

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### **About eClinicalWorks:**

eClinicalWorks is the leading provider of clinical information systems. Our award-winning eClinicalWorks EMR (Electronic Medical Record) and integrated PM (Practice Management) solutions are ideal for multi-specialty and multi-location practice networks.

## PURPOSE

One purpose of EMRs is to increase the accessibility and sharing of health records among authorized individuals<sup>1</sup>. CCR provides an additional utility to the EMR by serving as a medium for information transportability. In economics marginal utility is the additional utility (satisfaction or benefit) that a consumer derives from an additional unit of a commodity or service. “The CCR is being developed and enhanced in response to the need to organize and make transportable a set of basic patient information consisting of the most relevant and timely facts about a patient’s condition”<sup>2</sup>. According to utilitarians, society should aim to maximize the total utility of individuals, aiming for 'the greatest happiness for the greatest number'. Thus CCR serves as an additional unit of service for the EMRs aiming to maximize the total utility of the healthcare industry.

## NEED

In recent years the need for transportability of patient information has been a topic of discussion in almost every sector of healthcare. Various factors play a role in the decision to introduce the CCR transportability standard. First, there is a need for transportability that will enable the next provider easy access to the latest patient records. Second, there is a need for personal health record (PHR) which contains the patient-entered information. Third, there is a need for containment of cost by developing a more systematic approach to healthcare information transportability whereby all disciplines work together towards a documented, integral approach to the individual patient. “It is envisioned that electronic health record (EHR) systems, both inpatient and outpatient, will both import and export all relevant data to and from the CCR document and enable automated transmission with minimal workflow disruption for individual caregivers”<sup>3</sup>.



Figure 1: Need for CCR implementation

<sup>1</sup> Barrows R.: Privacy, Confidentiality, and Electronic Medical Records. JAMIA 1996;139.

<sup>2</sup> Continuity of Care Record (CCR), The concept paper of the CCR. Ver. 2.1b. Page 1.

<sup>3</sup> Continuity of Care Record (CCR), The concept paper of the CCR. Ver. 2.1b. Page 3.

# CORE ELEMENTS

At present the CCR consists of six mandatory core elements. The sections are:

- Header, or Document Identifying Information
- Patient Identifying Information
- Patient’s Insurance and Financial Information
- Health Status of the Patient
- Care Documentation
- Care Plan Recommendation

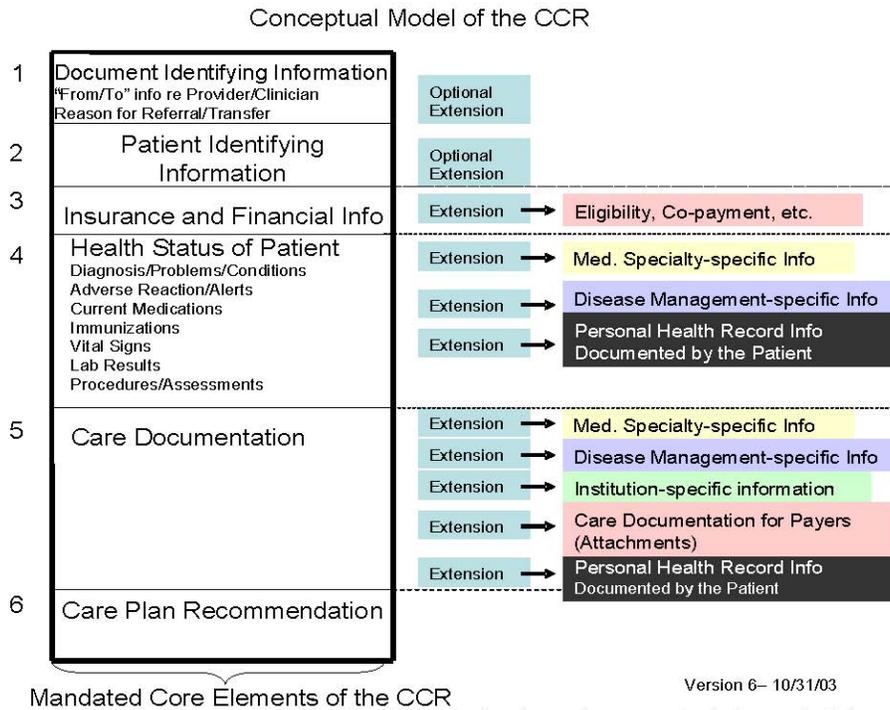


Figure 2: The Conceptual Model of the CCR. Mandated core elements are in the box on the left.  
Source: Continuity of Care Record (CCR), The concept paper of the CCR. Ver. 2.1b. Page 7.

## AVAILABILITY

The state of the availability of CCR functionality for the EMR systems can broadly be divided into four categories. The first approach is to integrate all relevant core elements available into one conceptual model. The second approach is extending of the core elements into sub-divisions for preserving the integrity of the elements. The third approach is found in the exportation and storage of all relevant medical data into a combined Continuity of Care Record (CCR). The difference between a CCR and an EMR is that CCR is not a sublimed version of EMR. It does not need events to be in chronological order as expected in EMR. The CCR involves fewer narratives, free texts and is much more concise. The fourth approach of CCR is designed to actively support the interoperability and import functionality of the CCR from other EMRs.

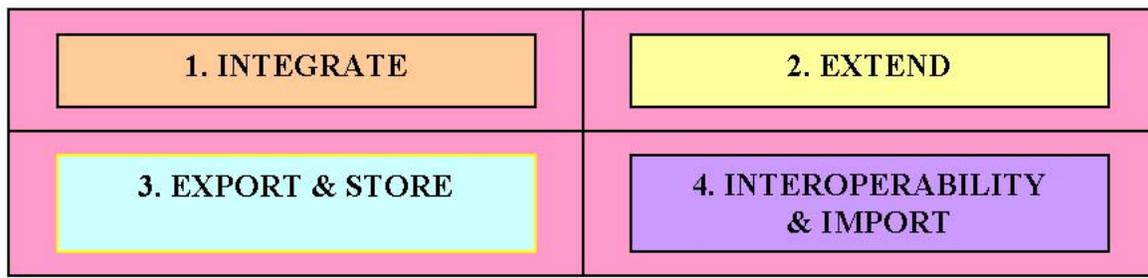
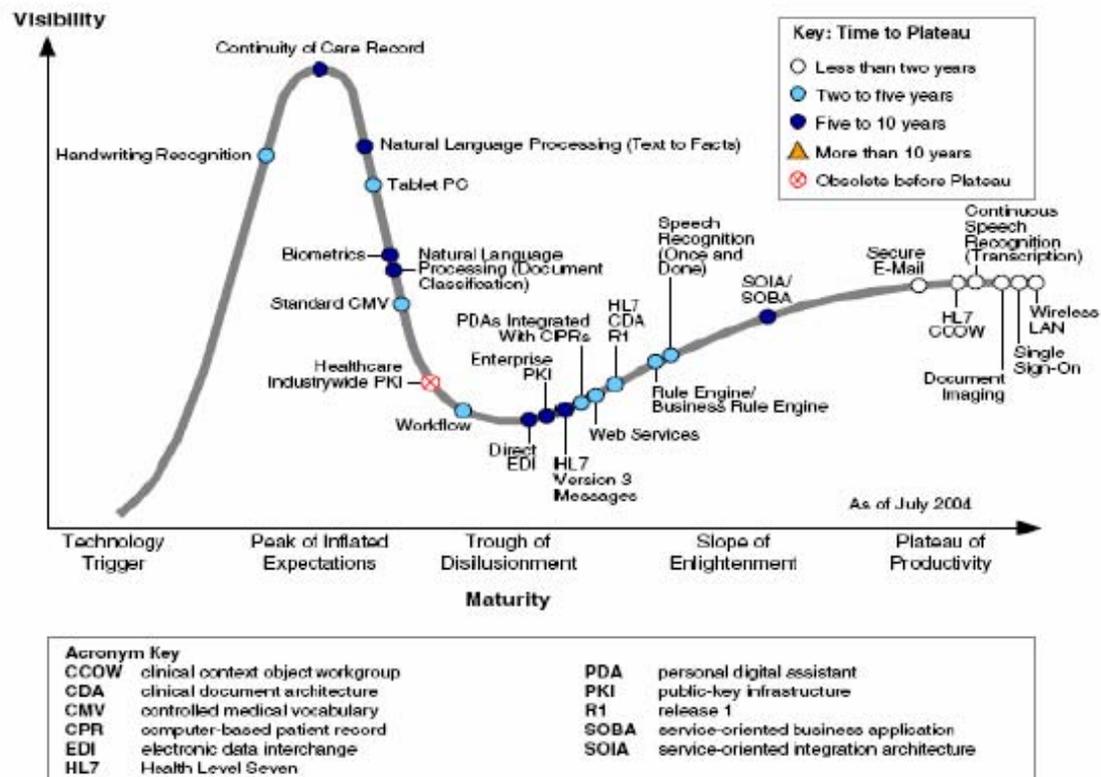


Figure 3: Structured Approach towards CCR implementation

# HYPE CYCLE FOR HEALTHCARE PROVIDER TECHNOLOGIES

According to Gartner Research, continuity of care records (CCR) is defined as “a subset of patients’ medical record that can be exchanged between two medical entities as a standard set of clinical information”. CCR is shown on the peak of the hype cycle. It states that the business areas impacted by CCR would be exchange summary data, planned extension for chronic disease management etc.

## 1.0 Hype Cycle for Healthcare Provider Technologies, 2004



Source: Gartner Research (July 2004)

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Image Source: <http://videocast.nih.gov/pdf/TNIC111604b.pdf> Gartner also states that web services which include “Extensible markup language (XML) - based technology for deploying service-oriented architecture across the internet” have a high benefit rate. The maturity level of web services has reached the adolescent stage. CCR is an XML based standard document which will be both human as well as machine readable.

## UTILITY CALCULATION

The utility of implementing CCR can be calculated by taking the following factors<sup>5</sup> into consideration:

1. Accurate patient information for the next healthcare provider
2. Up-to-date availability of patient assessment & recommendation records
3. Optimum utilization of technological resources
4. Make the health information transportability process redundant of repeated data.
5. Easy establishment of the patients' insurance and demographic information.
6. Reduction in cost and time associated with repeated tests through transportability.
7. Minimizes the effort to continuously update the patients' record.
8. Use of XML as a technology for easy transportability of patients' information.

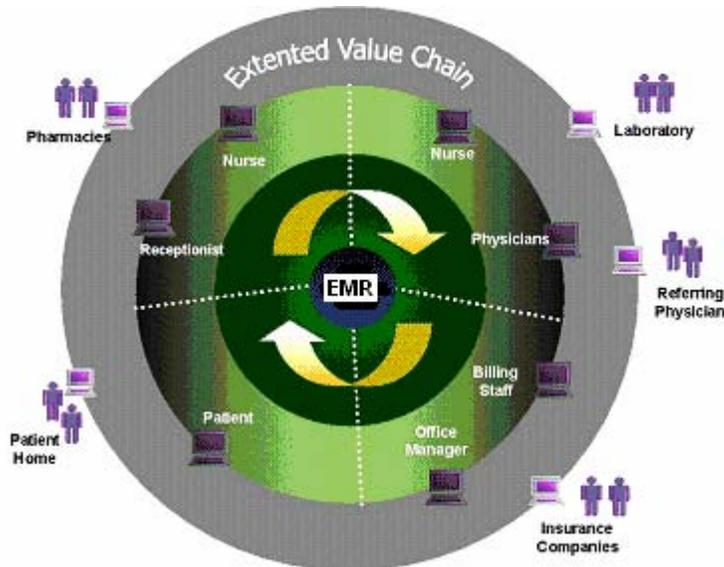
Total utility means the total satisfaction derived by the consumer from all the units of a commodity consumed together, i.e. the sum total of utilities experienced by the consumer from all the units of a commodity. The total utility of the healthcare industry would thus include the satisfaction derived by the usefulness of CCR. The actors involved in the process of deriving utility to the healthcare industry include:

1. Patient
2. Receptionist
3. Nurse
4. Physician
5. Billing Staff
6. Office Manager
7. Pharmacy
8. Laboratory
9. Referring Physician
10. Insurance Company
11. Hospitals

Each actor has an individual role which effectively contributes towards the complete health care system. According to Jeannie L Haggerty, "Continuity of care is achieved by bridging discrete elements in the care pathway—whether different episodes, interventions by different providers, or changes in illness status—as well as by supporting aspects that endure intrinsically over time, such as patients' values, sustained relationships, and care plans"<sup>6</sup>.

<sup>4</sup> Gartner Research: <http://videocast.nih.gov/pdf/TNIC111604b.pdf> ; v2004.

<sup>5</sup> Continuity of Care Record (CCR), The concept paper of the CCR. Ver. 2.1b. Page 9.



Source: eClinicalWorks LLC.

All these actors together contribute to the total utility for the healthcare industry.

## CONSEQUENCES

The choices to be made with regard to the CCR implementation process are often complex and require proper understanding of the standard and the core elements data structure. The implementation must be kept in line with organizational developments, especially in areas where work processes need to be restructured or redesigned in connection with the introduction of the CCR. It is necessary to approach the CCR project as a grand scheme from its early inception. An effective phasing of the project will offer sufficient scope for developments, while ensuring that these can be adequately integrated in the EMR system as a whole.

## CONCLUSION

Although CCR is a developing standard, a major challenge will be that of enticing EMR vendors to incorporate the CCR standard. Substantial advantages of the electronic medical records implementation to the CCR standard exist, and it seems prudent to move ahead in implementations of CCR standards by all the EMR vendors. The importance of an effective CCR implementation is universal acknowledgement. Thus, confidence in effectiveness of the healthcare industry may increase by following through the XML based CCR standard. The utility theory proves that more the need for health information transportability more would be the acceptance rate of CCR the standard.

<sup>6</sup> Haggerty, J. Continuity of care: a multidisciplinary review. *BMJ* 2003;327:1219-1221 (22 November). <http://bmj.bmjournals.com/cgi/content/full/327/7425/1219>

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