

Electronic Health Record

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In the past 20 years, information technology has radically changed virtually every aspect of our lives. All types of organizations have experienced that IT - viewed in an all inclusive manner and deployed effectively - can substitute old challenges with new possibilities. However, our healthcare system is one of the slowest growing areas. Paper-based record-keeping systems are contributing to the healthcare expenses. The dependence on paper-based clinical records imparts a tremendous financial burden, with significant costs for record storage and administrative support staff.

Electronic Health Records (EHRs) seem to provide a logical solution to the problem. They provide easy approach to patient information, enhance decision support and reference data, decrease the chances of errors, and improve patient-provider communications. They can be a major tool in dealing with the quality of care and cost/time issues in medical practice.

White Paper Overview

Abstract

This white paper talks about the problems being faced by the US Health care industry, Electronic Health Records, and their benefits

Business Situation

Define EHRs, Explain how they can help address some of the challenges in the health care industry, provide an approach as to how to implement solutions for implementing EHRs

Benefits

1. Improve the quality of care
 - a. More informed and improved clinical decisions through better patient information availability
 - b. Reduced clinical care variance
 - c. Reduction in clinical care errors
 - d. Enhanced Data Quality
 - e. Evidence based medicine
2. Increase the productivity of providers - by providing all relevant health records in a timely manner.
3. Enhance the continuum of care
4. Reduce costs
 - a. Improvement in billing
 - b. Reduction in clinical care errors lowers follow-up costs
 - c. 24*7*365 information availability leads to better staff satisfaction
 - d. Saves paper and storage space

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Introduction

The Vision: The Canadian Advisory Committee on Health Infostructure defines the vision of an Electronic Health Record as:

“...a longitudinal collection of personal health information of a single individual, entered or accepted by healthcare providers, and stored electronically. The record may be made available at any time to providers, who have been authorized by the individual, as a tool in the provision of healthcare services. The individual has access to the record and can request changes to its content. The transmission and storage of the record is under strict security.”

EHR - General Overview & Definitions

The Electronic Health Record (EHR) is a longitudinal electronic record of patient’s past, present or future health information derived from a number of sources. It includes information like patient demographics, problems, medication history, vital signs, immunizations, laboratory test and radiology reports.

EHR vs EMR

Many in the healthcare industry use the terms electronic medical record (EMR) and electronic health record (EHR) interchangeably. However, these terms depict entirely different concepts, both of which are critical to improve patient safety, improve the quality and efficiency of patient care, and reduce healthcare delivery costs.

The EMR is the legal record which originates from hospitals and ambulatory visits that is the source of data for the EHR. The EHR constitutes of the ability to easily share medical information among those involved and to have a patient’s information follow him or her through the various modes of care employed by that individual. Stakeholders consist of patients/consumers, healthcare providers, employers, and/or payers/insurers, which also includes the government.

EMR: A legal record of all patient encounter within a CDO. Composed of the CDR, enhanced CDSS, order entry/ CPOE, CMV, pharmacy, clinical documentation applications etc. *Does not comprise data exchange with external CDOs or stakeholders.* A CDO in this context will mean one organization, possibly having multiple care centers.

EHR: An aggregation of a subset of EMR information derived from various CDOs (patient owned record). This provides for enhanced patient access to view/ append details. This sort of information sharing would require implementation of Consent Management Applications for regulatory compliance. Other close match to this concept is HL7’s CRS (Care Record Summary) and ASTM’s CCR (Continuity of Care Record).

Healthcare challenges

Healthcare organizations of all sizes face many of the same demands and challenges when making the transition to electronic health records. To realize the long-term and widespread benefits in this transition requires network connections. The true value comes through networked access through a range of devices across the continuum of care.

Challenges being faced by the Healthcare industry

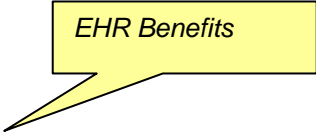
S.No.	Healthcare Challenges
1	Enhance quality of care: Healthcare providers are striving to reduce dependency on manual records and enforce enhanced systems to efficiently capture patient encounters, automate notifications & communications, track operations and prescriptions, and provide medical best practices based on knowledge base systems.
2	Improved productivity and efficient organizational workflow: Healthcare organizations' success depend on the productivity of providers and the efficiency of the care staff. Very frequently, skilled providers spend a huge time finishing paperwork instead of treating patients. Maintaining paper-based records is a big challenge, as the medical staff must deal with lost charts, records duplicates, and unavailable records during transcriptions.
3	Dependable information and bettered communications at provider centers: Many-a-times, patient records, lab test results, and other crucial data are unavailable when required, are often misplaced, and in some cases, are completely lost.
4	Reduce costs: Healthcare costs are shooting high due to non-productive paper-based, manual processes such as transcription expenses; pulling, filing, and maintaining charts; and upkeep of record storage.
5	Protect privacy of medical records: Ordinances for patient record privacy calls for rigorous checks on healthcare providers to secure patient information while implementing electronic methods for sharing with other providers and patients.

Why Need EHRs – Its Advantages

Electronic Health Records play a vital role in maintaining an efficient delivery of health services, especially in the situation of intensifying costs and constraining budgets. The primary benefits of EHR coupled with the derived benefits of EMR include:

1. **Improvement in the quality of care** - by giving caregivers precise and comprehensive information about their patients at the point of care, including access to medical practice guidelines and care plans.
 - a. More informed and improved clinical decisions through better patient information accessibility
 - b. Decreased clinical care deviations and variance

- c. Decrease in clinical care errors
 - d. Improved Data Quality
 - e. Evidence based medicine
2. **Increase in the productivity of providers** - by providing all relevant health records in a timely manner.
3. **Enhancement to the continuum of care** - by providing unified clinical, administrative and decision support data to all caregivers at the point of care, on a need-to-know basis.
4. **Reduction in overall costs** - by sharing information in a more effective electronic manner, rather than by unreliable modes of communications like telephone, photocopies, etc, as well as nullifying potential duplication of tests.
- a. Improvement of billing accuracy may lead to possible increase in collections and reduced litigation costs
 - b. Reduction in clinical care errors lowers follow-up costs
 - c. Round the clock information availability leads to better staff satisfaction
 - d. Saves paper and storage space
5. **Empowering patients** - providing access to their own health information will enable patients to more responsibility for managing their own health and healthcare.



Key Capabilities of an EHR System

Core EHR functionalities have been described for four situations - hospital, nursing home, ambulatory care, and the personal health record. Additional settings need to be dealt with in the time to come, such as home health agencies, pharmacies, and dental care. While contemplating the key functionalities of EHR systems, it is critical to acknowledge their many potential uses.

Primary and Secondary Uses of an Electronic Health Record System	
Primary Uses	Secondary Uses
Patient Care Delivery	Education
Patient Care Management	Regulation
Patient Care Support Processes	Research
Financial and Other Administrative Processes	Public Health and Homeland Security
Patient Self-Management	Policy Support

To guide the process of identifying core EHR system functionalities, following five criteria can be used. Although each functionality considered alone may not meet all five criteria, but together as part of an EHR system, the key functionalities should address all criteria.

1. **Improve patient safety.** Safety is the prevention of harm to patients.
2. **Support the delivery of effective patient care.** Effectiveness is providing services based on scientific knowledge to those who could benefit and at the same time refraining from providing services to those not likely to benefit.
3. **Facilitate management of chronic conditions.** Chronic conditions are now the leading cause of illness, disability, and death in the United States.
4. **Improve efficiency.** Efficiency is the avoidance of waste, in particular, waste of equipment, supplies, ideas, and energy.
5. **Feasibility of implementation.** Whether software is currently available or under development; the time period necessary for vendors to develop, produce, and market new software to achieve certain functionalities; and the willingness of users to purchase and implement such systems.

Criteria to identify the EHR system functionalities

❖ Core EHR Functionalities

The EHR core functionalities can be divided into eight categories:

- **Health Information and Data** - Care providers require certain information to make informed decisions. EHR systems with a defined dataset that includes such items as, medical and nursing diagnoses, a medication list, allergies, statistics, medical narratives, and lab test results, can ensure enhanced access to at least some types of information needed by caregivers when they need it. The health information and data captured by an EHR system must also evolve over time, as new knowledge becomes available.
- **Results Management** - Managing all types of results (e.g., lab test results, radiology results reports) electronically has several distinct advantages over paper-based reporting in terms of improved quality of care. They can be accessed more easily by the caregiver at the time and place they are needed; the reduced lag time improves both efficiency and patient EHR Functional Model. Moreover, the display of previous test results reduces redundant and additional testing, thus improving efficiency of treatment as well as costs reduction.
- **Order Entry/Order Management** - Even in the absence of decision support capabilities, such systems can improve workflow processes by getting rid of lost orders and ambiguities caused by illegible handwriting, generating related orders automatically, monitoring for duplicate orders, and reducing the time to fill orders. The use of computerized order entry, along with an EHR, is demonstrating a positive effect on caregiver productivity.

8 Core Functions of an EHR

- **Decision Support** – CDSS have demonstrated their strength in improving clinical performance for many facets of health care, including prevention, drugs prescription, diagnosis and management, detection of harmful events and disease outbreaks. Decision support systems can improve practitioner compliance with established evidence-based guidelines and protocols.
- **Electronic Communication and Connectivity** – Efficient communication - among health care stakeholders and other care partners (e.g., laboratory, radiology, and pharmacy) - is crucial to the provision of quality health care. Electronic connectivity is indispensable in creating and populating EHR systems, especially for those patients with chronic conditions, who characteristically have multiple caregivers in multiple situations that must align care plans.
- **Patient Support** - Patient education has demonstrated significant effectiveness in improving control of chronic illnesses. Computerized patient education in particular seems successful in primary care.
- **Administrative Processes** - Electronic scheduling systems for hospital admissions, inpatient and outpatient procedures, and visits not only increase the effectiveness of health care organizations, but also provide better, more timely service to patients. Use of communication and content standards is equally important in the billing and claims management area - close coupling of authorization and prior approvals can, in some cases, eliminate delays and confusion. Additionally, immediate validation of insurance eligibility should add value for both providers and patients through improved access to services, more timely payments and less paperwork.
- **Reporting and Population Health Management** – Organizations presently have multiple public and private sector reporting requirements at the national, state, and local levels for patient safety and quality, as well as for public health. In addition, the internal quality improvement efforts of many health care organizations include routine reporting of key quality indicators (sometimes referred to as clinical dashboards) to providers. Most of the data for these reports must be abstracted from claims data, paper records, and surveys, a process that is manual and time-consuming, and usually occurs retrospectively. Medical data represented with a standardized terminology and in a machine-readable format would reduce the significant data collection burden at the provider level, as well as the related costs, and would probably improve the accuracy of the data reported.

❖ **How will the system be used - A practical scenario**

The Electronic Health Record will also be available to those health care professionals who treat patients in an accident or emergency. This may include out of hours staff, ambulance service staff or staff in the Accident and Emergency and minor injuries departments.

Example – Jon goes out with his old friends to celebrate the New Year party. This is a special occasion that he’s been looking forward to. But during the party, he feels like choking and starts getting breathless. The feeling gets worse with time. The ambulance is called and he is rushed to the nearby hospital. By this time, Jon has fallen unconscious and so is unable to tell about his illness. The doctor is

*EHR System
usage – A
practical example*

smart; he identifies Jon, searches for his EHR and checks out his medical history. He discovers that Jon has a history of asthmatic attacks and is being treated by a doctor Phil. The EHR also shows the medication that Jon has received till date. Now the emergency doctor can treat Jon accordingly and can prescribe appropriate medicines which won't have any clash with the existing medication and with minimal side effects.

Calance capabilities

❖ General Overview

- **Life Sciences and Healthcare Industry Practice.** Calance has constituted a dedicated team of professionals which is focused towards providing innovative solutions for the global healthcare and lifesciences industry. It aims to provide solutions that not only beneficial are but also increase efficiency in the healthcare systems.



Why Calance?

Besides our technology based services, Calance offers HTAP (Healthcare Technological Architecture Planning) service to its clients. The HTAP engagement encapsulates a workshop for market research and business strategy to align the business imperatives of the clients with their technological environment.

In addition, Calance has a dedicated and highly accomplished group, which is focused completely on PROGRAM MANAGEMENT for large corporate initiatives. The guiding principle on which this group works on is "Focus on achieving business results". The group has developed large number of field tested Program Management tools which ensure the business behind IT is kept paramount and project activities yield measurable results.

- **Rational Unified Process (RUP).** Calance after pioneering RUP approach to software development in various technologies like J2EE, .NET, has come up with a proprietary application development process especially to manage healthcare projects. The framework has specially been designed to provide fast turn-around in healthcare projects using .NET as the front end and middle layer with Oracle 10G/SQL Server 2000 as the back end.

❖ Our Value Proposition

EHR systems are undoubtedly complex and difficult to implement. However, Calance is uniquely experienced to help you succeed from the initial planning stage through to final implementation of your Electronic Health Record initiative.

In a short span of work in the health sector, we've built a powerful team of experts whose goal is to enhance your business position with "best of breed" IT-based solutions that integrate seamlessly with your business practices.

In addition, we are continuously making investments in strategic partnerships which can enhance the value of our deliverables to the healthcare industry. Our work with various



healthcare product & services organizations and our partnership with Kinapse (<http://www.kinapse.com>) are a case in point.

Whether you want to reduce operating costs, expand your healthcare services, or introduce new medical procedures, we will strive hard until you have come through.

❖ **Why choose Calance**

Calance has a short but rich experience in healthcare. In that time we have built a strong team of program management, technology and domain professionals to help bring in your Electronic Health Record project on time, on budget and hassle-free. The team comprises of people from strong educational and renowned professional backgrounds and is ideally suited to implement complex solutions for domains like healthcare.

Calance has undertaken a US health care project whose success completely depends on flawless implementation of the Virtual Health Record and the response in the market has till date been very positive.

Calance Approach to EHR

We help realize the EHR vision through:

Program Management. Calance can support your EHR initiatives by establishing a Program Management office which will work with you throughout the EHR project, right from the ideation stage to need assessment, planning, technology evaluation, implementation and final transition from existing environment to the new one.

Solution Development. Additionally, Calance can leverage its extensive development expertise on varied platforms coupled with its Global Optimal Delivery Model to help, whole or in part, in developing your EHR solution. Such an engagement would typically go through the following phases and leverage our Program Management and transition management experience:

1. *Planning and Evaluation.* We can assist you to plan a new EHR deployment or to evaluate an existing implementation.
2. *Development.* We can provide custom development services for an Electronic Health Record solution for your organization - in whole or in part. Or, we can partner with leading packaged solution vendors to implement their solutions.
3. *Integrating Systems.* Our team can integrate the new EHR solutions into your existing health information systems environment, using industry standard messaging and interfaces.



Contact Info

Email to bizdev@calance.com or call +1 917 779 9920 for further enquiries.

Glossary

- CCR – Continuity of Care Record
- CDO – Care Delivery Organization
- CDSS - Computerized decision support systems
- CPR – Computer-based Patient Record
- EHR – Electronic Health Record
- EMR – Electronic Medical Record
- HTAP - Healthcare Technological Architecture Planning
- NHIN – National Health Information Network
- RHIO – Regional Health Information Organization
- RUP - Rational Unified Process

About the author (s)

Ajay Deewan is currently working as an Architect in Calance's Advanced Technology Group for Microsoft Technologies. He has wide-ranging experience in enterprise solutions. He has worked in the areas of software project development and solution implementations esp. on Distributed Technologies, Healthcare and e-Commerce. He has rich experience on some of the best products available in the market viz. Forte, Vignette Development Center, Informatica, MicroStrategy, Rational Rose, etc. He has worked extensively in some of the big corporations like Cognizant and Sapient, and has written success stories on more than 20 projects in a short span of last 6 years.

Manish Garg is currently working as a Business Analyst with Calance. He experience ranges across various verticals such as Healthcare (both payor and provider end), Retail, Manufacturing, Aviation, Cement, Steel, Oil, Electrical and Electronics. He has worked with leading consulting and manufacturing organizations to provide advanced techno-commercial solutions in various industries. His key value to the clients is his skill in understanding the business drivers of the client's business and discovering the core capabilities that would support those drivers. He is a B.E. and an MBA with over 8 years of experience.

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