

***Interoperability will bind together a wide network of real-time life critical data that not only transform but become healthcare.***

## **Health Information Interoperability Challenges**

Healthcare and healthcare information technology (HIT) continue to be a data integration challenge in terms of requirements for patient identification, document format/sharing, record location, audit trail and authentication, subscription services and persistence in a repository.

Another wider challenge being faced in Healthcare industry is slow and fragmented adoption of Electronic Medical Records. Interoperability is a fundamental requirement for ensuring that widespread electronic medical record (EMR) / electronic health records (EHR) adoption gives the desired social and economic benefits.

Healthcare professionals seeking to acquire or upgrade systems need a convenient, reliable way of specifying a level of compliance to standards sufficient to achieve truly efficient interoperability via Health Information Exchange (HIE) solutions. The purpose of the Integrating the Healthcare Enterprise (IHE) initiative is to meet that need.

### **Goal of IHE**

IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information.

Systems developed in accordance with IHE communicate with one another better, are

easier to implement, and enable effective use of information by providers. IHE is based on the understanding that system interoperability requires global collaboration and implementation.

### **IHE Profiles and Standards**

IHE Profiles provide a common language for purchasers and vendors to discuss the integration needs of healthcare sites and the integration capabilities of healthcare IT products. They offer developers a clear implementation path for communication standards supported by industry partners and carefully documented, reviewed and tested. They give purchasers a tool that reduces the complexity, cost and anxiety of implementing interoperable systems.

### **Nationwide Health Information Network**

The Office of the National Coordinator for Health Information Technology (ONC) has been facilitating development of the Nationwide Health Information Network (NHIN), which will tie together health information exchanges, integrated delivery networks, pharmacies, government, labs, providers, payors and other stakeholders into a "network of networks." The NHIN participants continue to work with IHE technical committees to develop specifications for areas such as Document metadata and Subscription and Notification.

**iPatientCare EHR and iPatientCare HIE**

MCS’s iPatientCare EHR is a full-featured EHR, which serves everybody in the healthcare provider’s office - physicians, physician / medical assistants, nurse professionals / practitioners, front-office, billing staff, and even patients! Designed using Microsoft .net framework, it scales up from solo physicians practices to offices having more than 200 physicians, multiple locations, and serving multiple specialties. iPatientCare EHR integrates seamlessly with third-party practice management systems, lab / test information systems, retail pharmacies, state immunization registries, various medical devices, speech recognition solutions, CMS and PQRI registries for reporting on Meaningful Use measures, DOQ-IT program for pay-for-performance, and many more. It also supports instant patient history created by patients themselves from home using the Web Portal or using kiosks at doctor’s office. The backbone of this seamless integration is MCS’s standards-based Interoperability platform known as iPatientCare Health Information Exchange (HIE).

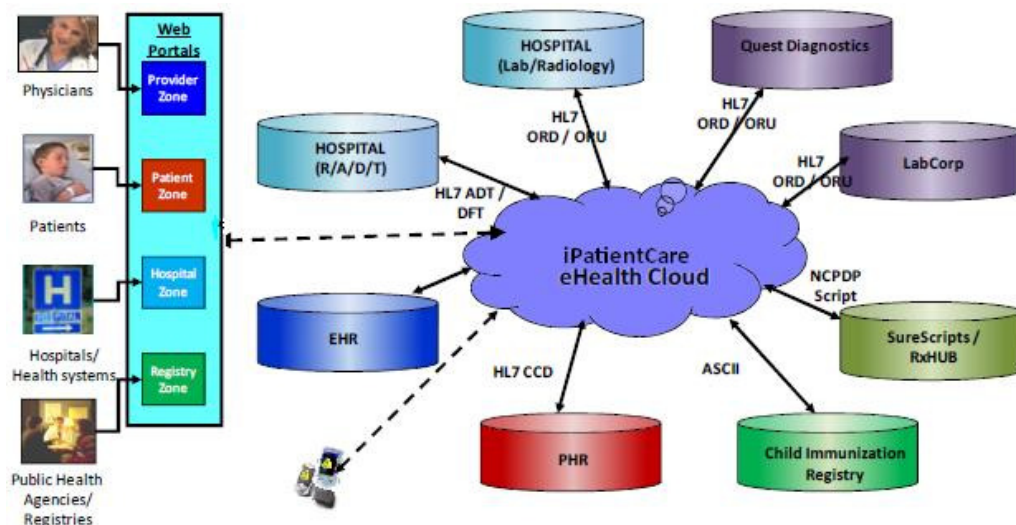
**iPatientCare HIE framework supporting IHE standards and NHIN initiatives**

iPatientCare HIE solution a.k.a. eHealthCloud (eHC) provides a framework for disparate clinical systems to interact with one another and build a community-wide network; that can eventually tap into NHIN. It provides a portal that facilitates a holistic view of a patient’s record captured at various care settings and typically serves the following customers:

- Physicians within a community network, e.g. members of IPAs and PHOs
- Consumers to view and control access to their health record
- Hospitals and Health Systems to connect with their affiliated physicians
- Public Health Agencies and Registries to view the summary of patient population

eHealthCloud framework of the iPatientCare HIE platform encompasses following IHE and/or HHS-ONC recognized standards and is already well placed to participate in NHIN initiatives:

**CDA | HITSP | HL7 | ASTM | W3C**



## iPatientCare HIE supported IHE Integration Profiles:

The IHE Profiles implemented by iPatientCare HIE platform are summarized below, categorized by their IHE domains and followed by a brief description. Underlying HITSP Standards based transaction capabilities for these domains have been successfully demonstrated at IHE Connectathon 2011. These profiles enable interoperability among care settings such as PCP's office, hospital outpatient clinic, patient's home, quality and research initiatives etc. They also play a key role in enhancing interoperability capabilities towards Meaningful Use.

### Patient Care Coordination (PCC)

- XDS-MS – Cross Enterprise Document Sharing of Medical Summaries
- XPHR – Exchange of Personal Health Record

### Quality, Research & Public Health (QRPH)

- CRD – Clinical Research Document

PCC domain IHE capabilities for iPatientCare HIE involve Cross-Enterprise Document Sharing platform for structured (**XDS-MS**, **XPHR**) and non-structured (**XDS-SD**) medical records; incl. at discrete content level.

Such information transfer via iPatientCare HIE platform takes place over Secure Communication infrastructure (**XDS.b**) among Document Repositories and Registries or over portable media (**XDM**). iPatientCare also acts as a Secure Node (**ATNA**) ensuring authentication of systems involved in such information transfer and capturing end-to-end audit-trail records pertaining to PHI access, while remaining synchronized with a Time Server (**CT**). The HIE can also query (**MPQ**) Public Health Registries based on certain population health criteria.

### IT Infrastructure (ITI)

- XDS-SD - Cross Enterprise Sharing of Scanned Documents
- XDS.b - Cross-Enterprise Document Sharing
- XDM – Cross-Enterprise Document Media Interchange
- ATNA – Audit Trail & Node Authentication
- CT – Consistent Time
- MPQ – Multi-Patient Queries
- RFD – Retrieve Form for Data Capture

In QRPH domain, iPatientCare HIE platform supports capability to electronically pre-populate patient and medical record information enabling participation in clinical research trial (**CRD**).

iPatientCare HIE platform also supports data capture (**RFD**) at the point of care towards clinical and administrative data collation and archiving via structured online Forms involving partnering systems that render and receive such Forms; ranging from simple Demographics data capture to details of Labor and Delivery. This mechanism also supports efficient capture of context-sensitive information such as medication Adverse Event Reporting to FDA aimed at improving population health.

Further explanation of above profiles in the context of their IHE definitions is given below:

**XDS-MS:** XDS-MS defines a sharing process between care providers of Medical Summaries that are created and consumed at points in time of transfers of care such as referrals or discharge.

**XPHR:** XPHR provides a mechanism for patients to supply the information most often requested by their healthcare providers, and to allow those same providers to assist patients in keeping their personal health record up to date, via PHR systems.

**XDS-SD:** XDS-SD enables associating structured healthcare metadata with non-healthcare specific document format to maintain the integrity of the patient health record as managed by the source system.

**XDS.b:** This profile facilitates the registration, distribution and access of patient electronic health records across health enterprises belonging to an XDS Affinity Domain (e.g., a community of care). Federated document repositories and a document registry create a longitudinal record of information about a patient within a given XDS Affinity Domain.

**XDM:** XDM provides document interchange using a common file and directory structure over several standard media, incl. email that patient can use to carry medical documents.

**ATNA:** ATNA defines basic auditing and security requirements for a Secure Node (user identification, authentication, authorization, access control, etc.) and enforces secure communication via Transport Layer Security (TLS) etc.

**CT:** Various infrastructure, security, and acquisition profiles require use of a consistent time base on multiple computers. The Consistent Time Profile provides median synchronization error of less than 1 second.

**MPQ:** MPQ facilitates querying of stored patient records in a Document Registry to enable clinical research, quality accreditation institutions and public health organizations to make sound decisions in their field of activity. The data to be aggregated, queried, and retrieved pertain to XDS Affinity Domains.

**RFD:** RFD provides a method for retrieval of forms from a form source, display and completion of a form, and return of form instance data from the display application to the source application.

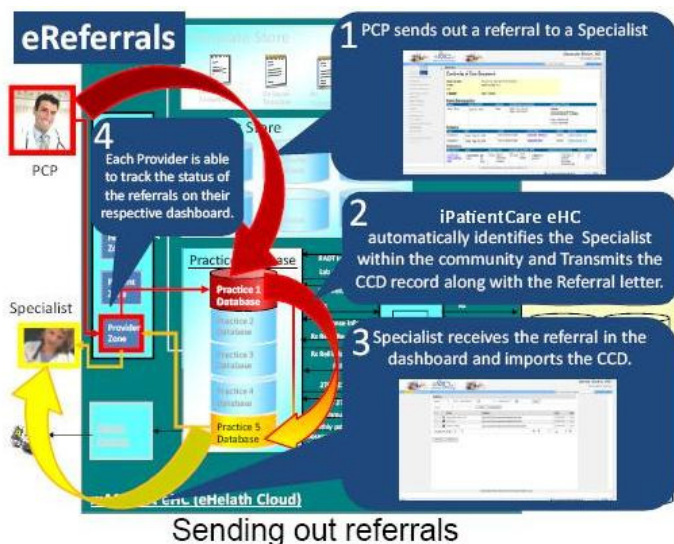
**CRD:** CRD Profile describes a standard set of pre-population and workflow data which the RFD Form Filler provides for use in Clinical Research; and optionally archives it too.

**iPatientCare HIE deployment enabling integration benefits across care settings:**

MCS’s eHealthCloud solution encompasses following components (zones) and features. All put together, it allows health care providers, consumers and others involved in healthcare process greater access and more control in overall healthcare process.

**Provider Zone | Patient Zone | Hospital Zone | Registry Zone**

**eHealthCloud Features:**



**eReferrals**

Electronic referrals can be made directly with iPatientCare EHR. This eliminates the paper work and other overheads. The referrals can be tracked and reminders can be sent electronically for pending consult reports.

**Physician-to-Physician Communication**

Facilitates sharing of records between physicians involved in patient care with the consent of patient. This ensures greater accuracy and completeness of patient information; brings in efficiency and reduces errors and costs.



Referral Tracking

**Hospital Interfaces**

iPatientCare eHC interfaces with most major hospital networks including Cerner, IDX, Siemens, Epic and Meditech. This allows the patient information sharing between in-patient and out-patient settings.

**Continuity of Care Document (CCD)**

iPatientCare eHC provides options to use HL7 Continuity of Care Document (CCD) or ASTM Continuity of Care Record (CCR).

**Personal Health Record (PHR)/Patient Portal**

Using iPatientCare Patient Portal - patients can update their demographic information, request refills, view lab results, view patient education material and securely communicate with providers. They can also perform virtual visit where they can provide their complete history through a series of customized questions. The virtual visit is done prior to the real visit to the office and it saves a great amount of time in the physician’s office. iPatientCare Patient Portal empowers patients to have a more active role in their care process via above features and also reduces number of phone calls to doctor’s office while enhancing overall healthcare experience.

**Public Health Depts./Registry Reporting**

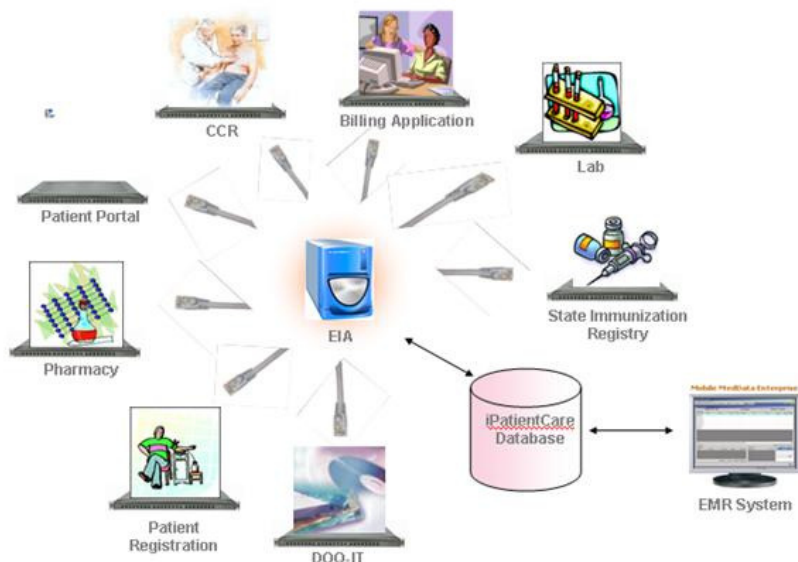
iPatientCare eHC facilitates authorized agencies to search their patient population from the most basic to highly detailed and complex queries using multiple and hierarchical filters to narrow down the results. The searches can be saved as templates, which can be reused in future. The searches can be done based on patient demographics, medical history, vitals, labs, diagnosis, procedures, medications, visits and immunizations. It also facilitates setting up disease surveillance related automated alerts based on the information captured within community.

**iPatientCare Enterprise Integration Adapters (EIA):**

MCS partners with application vendors and medical device vendors to provide end-to-end personal and electronic health solution. Such integration and communication among EHR, eHealthCloud entities and partnered Healthcare IT systems is achieved using iPatientCare EIA engine.

**Enterprise Integration Adapters (EIA)**

Provides Interface with external entities like Patient Portal, Lab, Pharmacy, Billing agency etc.



**MCS at Interoperability Events in 2011:**

MCS test-proved iPatientCare’s IHE Standards based interoperability capabilities at IHE North American Connectathon 2011. Connectathon is an annual weeklong interoperability-testing event organized by IHE and is HIT industry's largest interoperability testing event.

At the HIMSS Interoperability Showcase 2011, MCS is showcasing the implementation of these capabilities within Communities of Care setup. Communities of Care relate a set of healthcare systems implementing specific IHE capabilities for specific actors (a role that a given system performs) and integration profiles (the integration function) across different Care Settings; while the information flow among them simulates real-world clinical scenarios a.k.a. Use Cases.

iPatientCare EHR and HIE platform are involved in demonstrations of IHE capabilities within a couple of such Use Cases relating to Communities of Care for Patient Care Coordination and Adverse Event Reporting. The first Use Case involves demonstrating ability to share patient information across multiple care provider systems and then provide the information from the care event to the patient’s PHR. The second scenario revolves around improving the flow of medication adverse event reports to the regulating agency as part of drug safety surveillance. These scenarios are also closely related to Meaningful Use goals of “Patient Engagement” and “Improving population and public health” respectively.



**IHE North American Connectathon**



**HIMSS Interoperability Showcase**



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