HL7 Basic Overview

HIMSS 15
April 14, 2015

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and Past Chair, HL7 Board of Directors &
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Topics

- Need for Electronic Healthcare Information Exchange
- Healthcare Trends, Challenges, which argue for Standards and their Benefits
- The HL7 Organization
- High-Level Review of Core Standards
- New HL7 Initiatives
Need For Integrated Systems

Doctors need to be connected with each other – especially during transfer of care
Global Healthcare Trends

- Rising cost of healthcare
  - Insufficient reimbursement
  - Aging population
  - High cost of chronic care
  - System and organizational inefficiencies
  - Demand on public health hospitals

- Paper to Electronic Records
  - Better clinical outcomes
  - Shared data between healthcare providers
  - Meaningful Use program in the United States
  - Enables automated evaluation of clinical pathways and risk assessment

- Consumer Empowered
  - Patients and providers seeking greater access and control over information
  - Personal Health Records empower a consumer to manage their own health
Many Types of Healthcare Information Need to be Exchanged

- Government Agencies, Public Health, Research
- Doctors Orders and Clinicians Notes
- Pharmacy Medication Lists
- Lab Test Results
- Hospitalization Summaries
- Medical Imaging Results
- Home Health Monitoring Devices
- Payers / Financial Systems
- Patient
Healthcare IT Stakeholders

- Patients
- Consumers
- General Practitioners
- Specialists
- Outpatient Healthcare Providers
- Residential Care Providers
- Hospitals
- Healthcare Administration
- Laboratories
- Research
- Pharmaceutical
- Payers, Insurance
- Employers
- Medical Equipment
- Review Boards
- Practice Guidelines
- Government Agencies
- Standards Enforcement Agencies
HL7 Standards support a variety of healthcare activities

- Patient Administration and Demographics
- Orders and Results for Clinical Lab/Pathology, Imaging (radiology, ultrasound, etc.)
- Signs and Symptoms, Diagnosis and Treatments
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- Clinical Research (e.g. Genomics) and Public Health/Disease Surveillance
- Pharmacy prescriptions, dispensing and administration
- Scheduling and managing healthcare resources
- Claims and Reimbursements
- Patient Care messages, Clinical Documents (referrals, H&P, Summary record, etc.)

Sharing and re-use of information from many healthcare domains
The HL7 Organization

- Founded in 1987, Health Level Seven International (HL7), with members in over 55 countries, is a not-for-profit, ANSI-accredited standards developing organization, with affiliate HL7 standards organizations in over 30 countries.

- HL7 is dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and management, delivery and evaluation of health services.

- HL7's 2,300+ members include approximately 500 corporate members who represent more than 90% of the information systems vendors serving healthcare.

- Over 45 healthcare standards from anatomic pathology to vocabulary.

Take a Flash tour at
http://www.hl7.org/documentcenter/public/training/IntroToHL7/player.html
HL7 Mission - Business Value

■ HL7's mission is to provide standards for interoperability that:
  ➢ improve care delivery
  ➢ optimize workflow
  ➢ reduce ambiguity
  ➢ enhance knowledge transfer

■ Wide range of healthcare standards: clinical, administrative, clinical research, electronic claims, public health, personal health, clinical genomics, etc
HL7 Interoperability Goals

- Develop coherent, extendible standards that permit structured, coded healthcare information of the type required to support patient care, to be exchanged between computer applications, while preserving the meaning

- Promote the use of HL7 standards worldwide through the creation of HL7 International Affiliate organizations
HL7 Collaboration Goal

- Stimulate, encourage and facilitate domain experts from healthcare industry stakeholder organizations to participate in HL7 to develop healthcare information standards in their area of expertise

- Partner with healthcare information technology users to ensure that HL7 standards meet real-world requirements, and that appropriate standards development efforts are initiated by HL7 to meet emergent requirements
Standards Drive Increased Business for Healthcare IT Vendors and Service Providers

- Speed of development, faster time to market
- Lower development and installation costs over customized interfaces
- Clients prefer the flexibility and scalability of products with standardized interfaces
- Enhanced interoperability of product
- Standards create best practices for the international community
- Bigger market beyond that for proprietary products
Benefits of Standards:

- increase efficiency,
- improve quality,
- lower cost,
- and reduce risk

- Improve quality of care
- Electronic documents provide value to clinicians
- Ensure clinicians have latest knowledge
- Improve patient safety/Minimize preventable errors
- Improve clinical workflow
- Improve public health reporting
- Supports lifetime electronic health record
- Eliminate duplicate medical tests
- Lower cost of healthcare delivery
- Empower patient to manage their own health
- Lower cost of healthcare delivery

Empower patient to manage their own health
Additional HL7 Programs and Activities

- Education Summits
- Product and Services Guides
- Working group meetings with an annual international conference
- Speakers and booth at conferences
- E-learning courses
- Ambassador Program
- Best Practices
- Government Standards Project
- Country Affiliates with workshops, education
- IT professional Certification
- Networking among members
- University Educational Program
- E-Newsletter

All accessible through http://www.hl7.org
Still to Come

- HL7 Family of Standards
  - Version 2 messaging
  - Version 3 messaging
  - The Reference Information Model (RIM)
  - Clinical Document Architecture
  - EHR specifications
  - Clinical Genetics

- Other products, activities, and benefits HL7 has to offer
HL7 Version 2

DESCRIPTION

- HL7’s Version 2.x (V2) messaging standard is the workhorse of electronic data exchange in the clinical domain and arguably the most widely implemented standard for healthcare in the world. This messaging standard allows the exchange of clinical data between systems. It is designed to support a central patient care system as well as a more distributed environment where data resides in departmental systems.

BENEFITS

- Supports the majority of the common interfaces used in the healthcare industry globally
- Provides a framework for negotiations of what is not in the standard
- Reduces implementation costs
- Generally backward compatible
- 95% of US healthcare organizations use HL7 V2.x
- More than 35 countries have HL7 V2.x implementations
V2.x Messaging

- HL7 version 2 defines a series of electronic messages. Since 1987 the standard has been updated regularly, resulting in versions 2.1, 2.2, 2.3, 2.3.1, 2.4, 2.5, 2.5.1, 2.6, and 2.7. The V2.x standards are backward compatible. V2.x messages use one-character delimiters.

- The following is an example of an admission record:

```plaintext
MSH|^~\&|MegaReg|XYZHospC|SuperOE|XYZImgCtr|20060529090131-0500||ADT^A01^ADT_A01|01052901|P|2.5
EVN||20060529090900
PID||56782445^^UARReg^PI||KLEINSAMPLE^BARRY^Q^JR||19620910|M||2028-9^HL70005^RA99113^XYZ|260 GOODWIN CREST DRIVE^^BIRMINGHAM^AL^35
209^M~NICKELL'S PICKLES^10000 W 100TH AVE^BIRMINGHAM^AL^35200^O
REDIT||010530001^99DEF^AN
PV1||W^389^1^UABH^3||12345|MORGAN^REX^J^MD^0010^UAMC^L|678
90^GRAINGER^LUCY^X^MD^0010^UAMC^L|MED||A0||13579|POTTER^SHER
MAN^T^MD^0010^UAMC^L|200605290900
OBX|1|NM|^Body Height||1.80|m|Meter^ISO+|||F
OBX|2|NM|^Body Weight||79|kg|Kilogram^ISO+|||F
AL1||^ASPIRIN
DG1|1||786.50^CHEST PAIN, UNSPECIFIED^9||A
```
V3 Messaging

- **The Reference Information Model (RIM)** is the cornerstone of the HL7 Version 3 development process and an essential part of the HL7 V3 development methodology. HL7 v3 messages are based on an XML encoding syntax.

- **Conceptual foundation** – a single, common reference information model to be used across HL7

- **Semantic foundation** – in explicitly defined concept domains drawn from the best terminologies

- **Abstract design methodology** that is technology-neutral – able to be used with whatever is the preferred technology: information resources, documents, messages, services, applications
Five core concepts of the RIM

- Every happening is an **Act**
  - Procedures, observations, medications, supply, registration, etc.

- Acts are related through an **ActRelationship**
  - composition, preconditions, revisions, support, etc.

- **Participation** defines the context for an Act
  - author, performer, subject, location, etc.

- The participants are **Roles**
  - patient, provider, practitioner, specimen, employee etc.

- Roles are played by **Entities**
  - persons, organizations, material, places, devices, etc.
Domains in the Normative HL7 V3 standard

- Accounting & Billing
- Claims & Reimbursement
- Materials Management
- Patient Administration
- Personnel Management
- Scheduling
- Blood bank
- Care Provision
- Clinical Decision Support
- Clinical Document Architecture
- Clinical Genomics
- Diagnostic Imaging
- Immunization
- Laboratory
- Medical Records
- Medication
- Orders and Observation
- Pharmacy
- Public Health
- Regulated Products
- Regulated Studies
- Specimen
- Therapeutic Devices
HL7 Messages and Documents

**Messages**

- A message is event driven and includes a specific workflow.
- It could include bi-directional flow of data.

**Documents**

- The Clinical Document Architecture (CDA) can facilitate clinical document exchange within and between medical institutions.
- CDA can be used to bring patient’s clinical documents into a patient-centric EHR.
- A collection of information about an encounter
- Can be digitally signed
Clinical Document Architecture (CDA)

- Interoperability
  - An approved standard way to exchange dictated, scanned, or electronic reports on a patient between various health information technology systems and platforms
  - Human readable
    - The “paper world” of clinical documents, forms, etc.
  - Computer readable
    - XML representation of document data
    - EHR discrete data storage
    - Clinical decision support
CDA is the Basis For ...

- Continuity of Care Document
- Consolidated CDA (C-CDA) templates (MU)
- Consult Note
- Diagnostic Imaging Report
- Discharge Summary
- Healthcare-associated Infections, Public Health Case Reports
- History and Physical
- Operative Note
- Personal Health Monitoring
- Plan-2-Plan Personal Health Record
- Quality Reporting Document
- Genetic Test Results
- Emergency Care Summary
- Patient Summary
- Patient Level Quality Data Document Using IHE Medical Summary (XDS-MS)
- Encounter Document constructs
- Clinical Oncology Treatment Plan
- Immunization Document
- Scanned document
- … and many more …
What is a Continuity of Care Document?

- A medical summary representing the continuity of care record core data set covering one or more healthcare encounters.
- A snapshot in time for a patient, in CDA form, containing the pertinent:
  - clinical,
  - demographic, and
  - administrative data
The EHR-S Functional Model

Is…

- A system specification
- An EHR system specification
- A reference list of functions that may be present in an EHR-S (the “what”)
  - Enables consistent expression of functionality
  - Provides flexibility for innovation and product differentiation
  - Gold standard, sensitive to what can practically be done by a system, future system development

Is Not…

- A messaging specification
- An EHR specification
- An implementation specification (not the “how”)
  - Does not prescribe technology
  - Does not dictate how functions must be implemented (e.g., via the user interface, database design)
# EHR-S Functional Model at a Glance

Functions describe the behavior of a system in user-oriented language so as to be recognizable to the key stakeholders of an EHR System.

<table>
<thead>
<tr>
<th>Direct Care</th>
<th>Supportive</th>
<th>Information Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1.0 Care Management</td>
<td>S1.0 Clinical Support</td>
<td>11.0 EHR Security</td>
</tr>
<tr>
<td>C2.0 Clinical Decision Support</td>
<td>S2.0 Measurement, Analysis, Research, Reporting</td>
<td>12.0 EHR Information and Records Management</td>
</tr>
<tr>
<td>C3.0 Operations Management and Communication</td>
<td>S3.0 Administrative and Financial</td>
<td>13.0 Unique identity, registry, and directory services</td>
</tr>
</tbody>
</table>

- 14.0 Support for Health Informatics & Terminology Standards
- 15.0 Interoperability
- 16.0 Manage business rules
- 17.0 Workflow
EHR-S Profiles Developed or Under Development

- Emergency Department
- Child Health
- Long Term Care
- Behavioral Health
- Records Management & Evidentiary Support
- Regulated Clinical Research (Clinical Trials)
- Vital Statistics Reporting

For more information:

- HL7 Electronic Health Record
  http://www.hl7.org/ehr/index.asp

- HL7 Functional Profile Registry
  http://xreg2.nist.gov:8080/ehrsRegistry/index.jsp
Working Group Meetings

Health Level Seven® International

May 2014 Working Group Meeting
Phoenix, AZ
May 4-9, 2014

Additional Information and Registration Coming!

Resort Information
Pointe Hilton Squaw Peak Resort
Reserve Your Room Today!

Meeting Information
Key Information
Add to Calendar

Activities
Networking Reception
Welcome to the HL7 Education Portal

The Education Portal aims to provide a gateway to training and education opportunities for the HL7 community. This dedicated space provides access to information about Professional Development and Certification Opportunities beneficial to Project/Product Managers, Implementers, Software Engineers, Clinicians and Business Analysts working in the HL7 space.

In addition, the portal links you to exam preparation materials and access to registration for any certification exam at locations around the world.
HL7 Overview
Consolidated CDA

- The development of a single implementation guide that represents harmonization of Health Story guides, HITSP C32, part of the IHE Patient Care Coordination, and the original CCD by HL7

- 9 different types of commonly used CDA documents
  - Continuity of Care Document
  - Consultation Notes
  - Discharge Summary
  - Imaging Integration, and DICOM Diagnostic Imaging Reports
  - History and Physical
  - Operative Note
  - Progress Note
  - Procedure Note
  - Unstructured Documents
Fast Health Interoperability Resources

This is the 1st DSTU version of FHIR. There's also a developmental version, and a Nightly Build.

Welcome to FHIR®

First time here? Read the high level summary and then the FHIR overview / roadmap. See also the open license.

Major Sections:

- General Documentation
- Implementation & Exchange
- Clinical Resources
- Administrative Resources
- Infrastructural Resources

Quick links:

- **Documentation**
  - Resource List
  - XML & JSON

- **Implementation**
  - Downloads
  - FHIR Schemas & Schematrons

- **External Links**
  - Support: Stack Overflow (When to use)
  - Public Test Servers & Software
Fast Health Interoperability Resources

HL7 has been addressing these challenges by producing healthcare data exchange and information modeling standards for over 20 years. FHIR is a new specification based on emerging industry approaches, but informed by years of lessons around requirements, successes and challenges gained through defining and implementing HL7 v2, v3 and the RIM, and CDA. FHIR can be used as a stand-alone data exchange standard, but can and will also be used in partnership with existing widely used standards. (See Comparing FHIR to other HL7 standards)
Standards and Select IP Are Now Freely Available

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HL7 Standards Soon to be Free of Charge
Health IT Standards Leader to Support Widespread Global Adoption by Making Standards and Select IP Freely Available

Ann Arbor, Michigan, USA – Sept. 4, 2012 – Health Level Seven® International (HL7®), the global leader in developing interoperability standards for healthcare IT, announced today its decision to make much of its intellectual property (IP), including standards, freely available under licensing terms. The landmark decision represents HL7’s commitment to the betterment of healthcare worldwide by ensuring that all stakeholders have equal access to its HIT standards. The new policy is expected to take effect in the first quarter of 2013.
New Member Benefits

Join Us!
How to get more info on HL7

- Web site:
  - [http://www.hl7.org](http://www.hl7.org)
- International Affiliates
  - [http://www.hl7.org/Special/committees/international/intl.htm](http://www.hl7.org/Special/committees/international/intl.htm)
- Education and Tutorials
  - [http://www.hl7.org/education/index.cfm](http://www.hl7.org/education/index.cfm)
- How to request and HL7 Ambassador speaker
  - [mailto:hq@hl7.org](mailto:hq@hl7.org)
- Contact info for HL7 HQ
  - [mailto:hq@hl7.org](mailto:hq@hl7.org)
- Product and Services Guide
Thank You

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