

The Importance of Standards and its Use in Healthcare

Traditionally, the health-care environment consisted of a set of loosely-connected, organizationally-independent units. Health-IT standards provide the foundation for institutional data sharing with disparate healthcare systems and integration of this clinical data with diagnostic equipment such as CT scan, USG, Auto analyzer, etc.



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The health-care environment has traditionally consisted of a set of loosely-connected, organizationally-independent units. Patients receive care across primary (first level of contact such as Primary Health Centres, PHCs), secondary (first referral level such as district hospitals), and tertiary (medical colleges and advanced medical research institutes) care settings, with little bi-directional communication and coordination among these services. There is also little coordination and sharing of clinical data between in-patient care and out-patient care.

The answer to this low level of interaction is the implementation of Health-IT Standards. Health-IT standards provide the foundation for institutional data sharing with disparate healthcare systems and integration of this clinical data with diagnostic equipment such as CT scan, USG, Auto analyzer, etc. We examine the different functional aspects of the Health-IT Standards.

INTEROPERABILITY

Interoperability is the ability of two or more systems or components to interchange information and use predictably the information that has been exchanged.

CATEGORIZATION OF INTEROPERABILITY

Technical Interoperability

It is the ability to move data from system A to system B and vice versa. It defines the degree to which the information can be successfully "transported" between the systems.

Semantic Interoperability

This ensures that both systems understand the data in the same way. The sent information remains unaltered in its meaning.

Process Interoperability

It enables business processes and

organizations like system A and system B to work together. It defines the degree to which the integrity of workflow processes can be maintained between the systems. This includes maintaining/conveying information such as user roles between systems.

In order to realize clinical data sharing i.e. system interoperability among disparate healthcare systems and integration with healthcare devices, all Health Information Systems have to adhere to the same standards.

Today, there are various Standards Development Organizations (SDOs), Special Interest Groups (SIGs) and other initiatives to address the IT standards in healthcare systems.

SOME STANDARDS DEVELOPMENT ORGANIZATIONS (SDOS) AND TOOLS

HL7 (Health Level Seven) is a standard for sharing of clinical and administrative data. The main objective of HL7 is to provide standards for exchange, management and integration of data that support clinical patient care and the management, delivery and evaluation of healthcare services. Specifically, to create flexible, cost effective approaches, standards, guidelines, methodologies, and related services for interoperability between Healthcare Information Systems.

- HL7 Messages transfer electronic data between disparate healthcare systems. Each HL7 message sends information about a particular event such as patient registration, admission, discharge, physician order entry etc.
- HL7 v2.x Messages mostly uses a textual, non-XML encoding syntax based on delimiters as exemplified in box.
- Order Message from HIS to external LIS/ Auto Analyzer
- The HL7 version 3 messaging standard defines a series of electronic messages (called interactions) to support all

Order Message from HIS to external LIS/ Auto Analyzer:

```
MSH|^~\&{HIS|HIE|LIS|HIE|20060307110114||ORM^O01|MSGID20060307110114|P|2.3
```

```
PID|||12001||Sharma^Anil^^Mr.||19670824|M|||West Tripura.
```

```
^^Kunjaban^CO^799006^INDIA|||||PV1||O|OP^PAREG^||||2342^Sharma^Ram||OP|||||||2|||||||20060307110111|
```

```
ORC|NW|20060307110114
```

```
OBR|1|20060307110114||003038^Urinalysis^L|||20060307110114
```

Response Message from external LIS/ Auto Analyzer to HIS:

```
MSH|^~\&{LIS|HIE|HIS|HIE|20060307110114||ORU^R01|MSGID20060307110114|P|2.3
```

```
PID|||12001||Sharma^Anil^^Mr.||19670824|M|||West
```

```
Tripura^^Kunjaban^CO^799006^INDIA|||||PV1||O|OP^PAREG^||||2342^Sharma^Ram||OP|||||||2|||||||20060307110111|
```

```
ORC|NW|20060307110114
```

```
OBR|1|20060307110114||003038^Urinalysis^L|||20060307110114
```

```
OBX|1|NM|013060^Specific Gravity^L||1.010||1.005-1.030||N|F|...
```

```
OBX|2|CE|013045^Urine-Color^L||Y^Yellow^L||Y||N|F|...
```

```
OBX|3|ST|013052^Appearance^L||Hazy||Clear|A||N|F|...
```

healthcare workflows. HL7 v3 messages are based on an XML encoding syntax.

INTERNATIONAL CLASSIFICATION OF DISEASES

The International Classification of Diseases (ICD) is the standard diagnostic tool for epidemiology, health management and clinical purposes. This includes the analysis of the general health situation of population groups. It is used to monitor the incidence and prevalence of diseases and other health problems.

List of standard code provided by ICD

ICD-9 (Ninth Revision), ICD-10 (Tenth Revision), ICD-9-CM (Ninth Revision, Clinical Modification), ICD-10-CM (Tenth Revision, Clinical Modification), ICF (International Classification of Functioning, Disability and Health), Classification of Death and Injury Resulting from Terrorism

LOGICAL OBSERVATION IDENTIFIERS NAMES AND CODES (LOINC)

It is a universal coding system for identifying laboratory and clinical observations. LOINC has standardized terminology for all kind of observations and measurements that enables exchange and aggregation of electronic health data from many independent systems.

INTERNATIONAL HEALTH TERMINOLOGY DEVELOPMENT ORGANIZATION (IHTSDO)

IHTSDO is a not-for-profit association that

owns and maintains SNOMED CT (Systematized Nomenclature of Medicine Clinical Terms). SNOMED CT is a clinical healthcare terminology, essential for electronic health records, a terminology that can cross-map to other international standards.

DIGITAL IMAGING AND COMMUNICATIONS IN MEDICINE (DICOM)

DICOM is a specification and format for storing medical images in a digital file. It defines a method of communication among various equipments of digital medical imaging devices/software ("modalities"). This standard is now in use by the majority of medical imaging hardware manufacturers.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS STANDARD 1073

IEEE 11073 Health informatics - Medical / health device communication standards enable communication between medical, health care and wellness devices and with external computer systems.. They

1. provide real-time plug-and-play interoperability for citizen-related medical, healthcare and wellness devices.

2. facilitate efficient exchange of care device data, acquired at the point-of-care, in all care environments.

UNIFIED MEDICAL LANGUAGE SYSTEM (UML)

The UMLS, or Unified Medical Language System, is a set of files and software that

brings together many health and biomedical vocabularies and standards to enable interoperability between computer systems.

MEDICAL VOCABULARIES

Medical Vocabularies like ICD, SNOMED-CT, LOINC are the tools to standardize information in order to capture, store, exchange, search and analyze data. It reduces ambiguity that is inherent in normal human languages eg. heart attack, myocardial infarction, and MI may mean the same to a physician, but have no relation to a computer, which can be represented by one unique code i. e I21.0 of ICD-10.

WHY HEALTH IT INTEROPERABILITY IS IMPORTANT?

1. Improve exchange of information between Health IT systems
2. Make improved health decisions based on complete clinical standard data
3. Superior healthcare for the patients
4. Reduce cost and complexity in order to provide quality health care services
5. Enable future-ready solutions for health care

For Further Information:

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