Introduction to HL7 and Interoperability

Supachai Parchariyanon, M.D., MBI, BBA

Informatics Division, Faculty of Medicine Ramathibodi Hospital

Certified HL7 CDA Specialist

Supachai Kid Parchariyanon - MD

Mahidol University

» **Profile**:

Dr. Supachai Parchariyanon is a medical doctor who's passionate about information technology and turn himself to be informatician and serial entrepreneurs.

He earned master in Biomedical Informatics from Oregon Health and Science University, USA and doctor of medicine from Mahidol University and Business Management from Ramkamhaeng university.

He led the team to certify both HL7 Reference Information Model (RIM) and Clinical Document Architecture (CDA). His interest is now on standards and interoperability, clinical informatics and project management.

» **Keep in touch**

  » **Twitter : @supachaiMD**

  » **Instagram : supachaiMD**

  » **http://www.facebook.com/supachaiMD**

Outline

Mahidol University
Wisdom of the Land

- Background

- What is a standard?

- Why do we need standard?

- Health Level 7

- Other Standard

  - National Drug Codes (NDC)

  - RxNorm

  - Logical Observation Identifiers Names and Codes (LOINC)

  - Diagnosis Related Groups (DRG)

  - Digital Imaging and Communications in Medicine (DICOM)

  - Systematized Nomenclature of Medicine--Clinical Terms (SNOMED-CT)

Background

In today's healthcare industry, there are goals to drive patient related information to be exchanged freely between the various systems in the continuum of care.

What is a standard?

There are many definitions of a 'standard'. Very generally, a standard might simply be defined as '*a set of rules for ensuring quality*'.

Why do we need standard ?

Standards can be found throughout our daily lives but why do we need them?

Rather than asking why we need standards, we might usefully ask ourselves what the world would be like *without* standards.

Why do we need standard ?

Mahidol University
Wisdom of the Land

Standardized products and services are valuable User 'confidence builders', being perceived as:

- safe
- healthy
- secure
- high quality
- flexible

Standard in Health IT

    In addressing the standards in Health IT, today there are already in existence the various Standards Development Organizations (SDOs), Special Interest Groups (SIGs) and other initiatives that support the Healthcare industry.
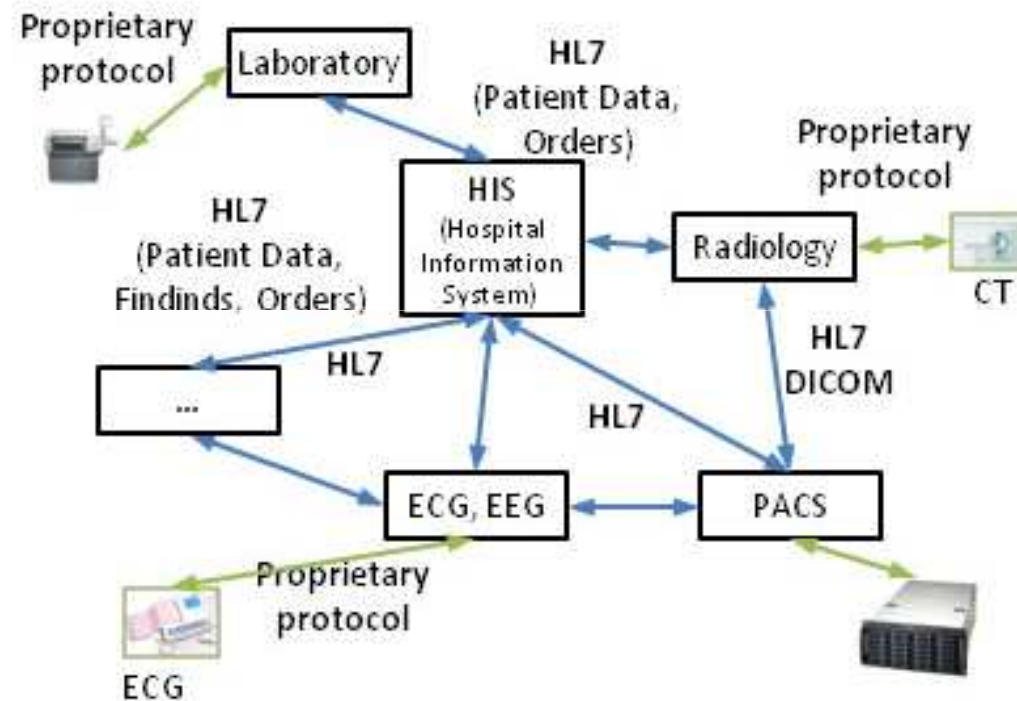
IHE uses existing standards

Communication in a hospital

Interoperability

Provides standards for data exchange to allow *interoperability* between healthcare information systems
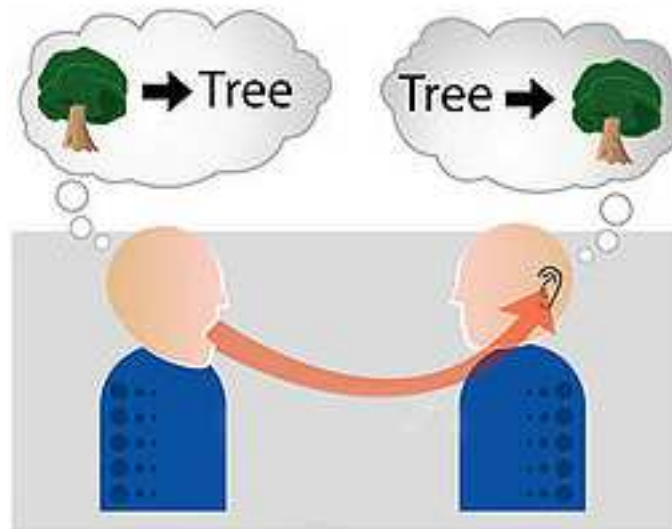
What is interoperability?

It is the ability of two or more systems or components to exchange information, and to use the information that has been exchanged predictably *(IEEE Standard Computer Dictionary)*
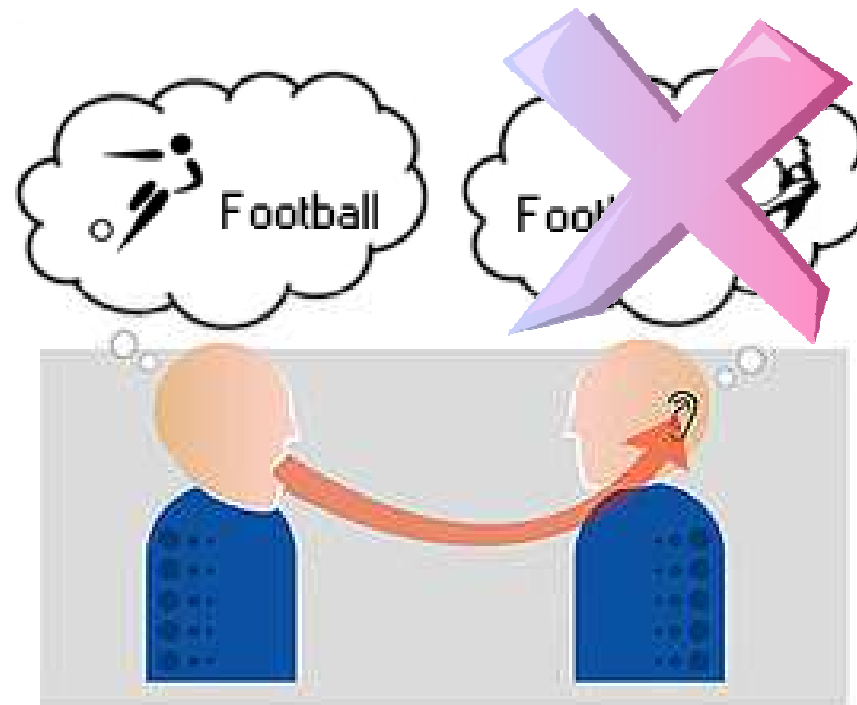
Goal of interoperability

- **HL7's key goal of interoperability has two aspects:**
  - Syntactic interoperability has to do with structure
  - Semantic interoperability has to do with meaning

Things that can go wrong in message exchanging

Standards are not equal Interoperability

Mahidol University
Wisdom of the Land

Standards only create the opportunity for interoperability and are not equal to interoperability

Standards and Interoperability

Standards and Interoperability are in many ways the key to unlocking the collaboration so needed in the complex healthcare network. Many of the issues that the healthcare system faces, high cost and uneven quality, are due to the isolated islands of information caused by a lack of standards and interoperability.

Categories of standards

- Data Standards (Vocabularies and terminologies)
- Information Standards (Reference Information Model)
- Information Exchange Standards (Message-based and structured document-based)
- Identifier Standards (e.g. National ID No.)
- Privacy and Security Standards (e.g. Access Control, audit, electronic consent)
- Functional Standards (e.g. work processes, workflow, data flow model)
- Other Standards (Internet Standards, etc.)

Health Level Seven (HL7)

- HL7 is an ANSI-accredited Standards Development Organization (SDO) operating in the healthcare arena.

- It is a non-profit organization made up of volunteers – providers, customers, vendors, government, etc.

- HL7 organization defines 2 versions of the messaging standard:
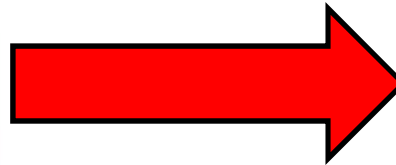 - HL7 v2.x
  - HL7 v3.0

What is HL7? (Cont.)

- HL7 is an acronym for Health Level Seven
  - Seven represents the highest, or "application" level of the International Standards Organization (ISO) communications model for Open Systems Interconnection (OSI) networks.
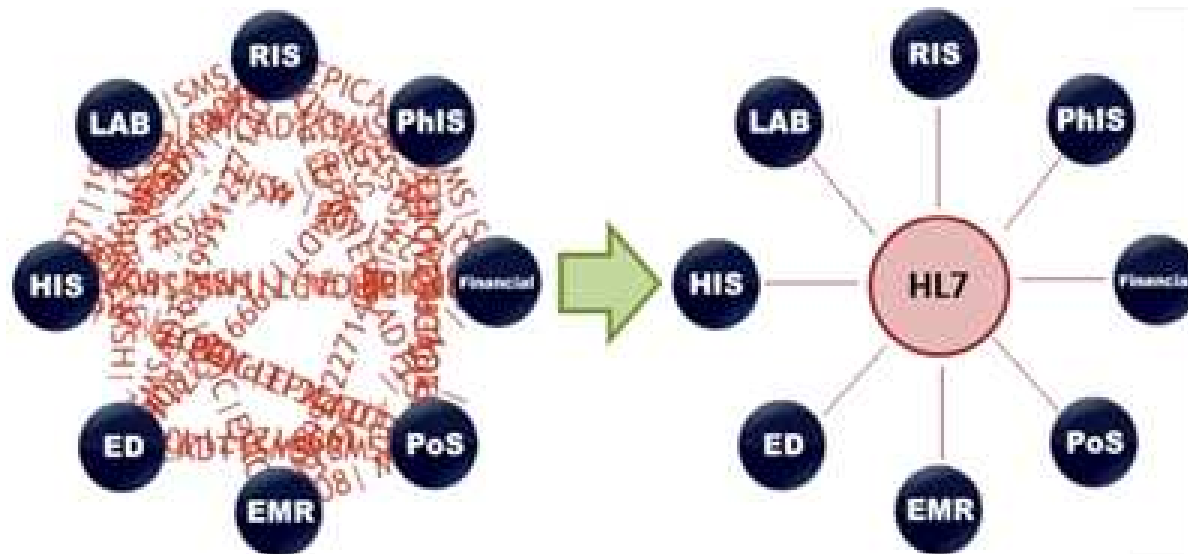
OSI Model

What HL7 does?

Example HL7 v2.x

MSH|^~\&|GHH LAB|ELAB-3|GHH OE|BLDG4|200202150930||ORU^R01|CNTRL-3456|P|2.4

PID|||555-44-4444||EVERYWOMAN^EVE^E^^^^L|JONES|19620320|F|||153 FERNWOOD DR.^ ^STATESVILLE^OH^35292||(206)3345232|(206)752-121||||AC555444444||67-A4335^OH^20030520

OBR|1|845439^GHH OE|1045813^GHH LAB|15545^GLUCOSE|||200202150730||||||||| 555-55-5555^PRIMARY^PATRICIA P^^^^MD^^|||||||||F|||||||444-44-4444^HIPPOCRATES^HOWARD H^^^^MD

OBX|1|SN|1554-5^GLUCOSE^POST 12H CFST:MCNC:PT:SER/PLAS:QN||^182|mg/dl|70_105|H|||F

Example HL7 v3

Mahidol University

```xml
<POLB_IN224200 ITSVersion="XML_1.0" xmlns="urn:hl7-org:v3" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <id root="2.16.840.1.113883.19.1122.7" extension="CNTRL-3456"/>
  <creationTime value="200202150930-0400"/>
  <!-- The version of the datatypes/RIM/vocabulary used is that of May 2006 -->
  <versionCode code="2006-05"/>
  <!-- interaction id= Observation Event Complete, w/o Receiver Responsibilities -->
  <interactionId root="2.16.840.1.113883.1.6" extension="POLB_IN224200"/>
  <processingCode code="P"/>
  <processingModeCode nullFlavor="OTH"/>
  <acceptAckCode code="ER"/>
  <receiver typeCode="RCV">
    <device classCode="DEV" determinerCode="INSTANCE">
      <id extension="GHH LAB" root="2.16.840.1.113883.19.1122.1"/>
      <asLocatedEntity classCode="LOCE">
        <location classCode="PLC" determinerCode="INSTANCE">
          <id root="2.16.840.1.113883.19.1122.2" extension="ELAB-3"/>
        </location>
      </asLocatedEntity>
    </device>
  </receiver>
  <sender typeCode="SND">
    <device classCode="DEV" determinerCode="INSTANCE">
      <id root="2.16.840.1.113883.19.1122.1" extension="GHH OE"/>
      <asLocatedEntity classCode="LOCE">
        <location classCode="PLC" determinerCode="INSTANCE">
          <id root="2.16.840.1.113883.19.1122.2" extension="BLDG24"/>
        </location>
      </asLocatedEntity>
    </device>
  </sender>
  <! -- Trigger Event Control Act & Domain Content -- >
</POLB_IN224200>
```

23

Take Home Message

- HL7 is not panacea and so does other standards

- People and processes matter most

- Do not aim to build HIS to comply with HL7 specification but do aim to let it be able to communicate to another systems via HL7

- Most specifications in standards and interoperability provide framework but not implementation guide, at times you need experts

Q/A