Mobile Health Standards

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MHD: Mobile access to Health Documents
XDS: Cross-enterprise Document Sharing
SOAP: Simple Access Object Protocol
JSON: JavaScript Object Notation
Mobile Medical App

1. **Input data**
2. **Device interface**
3. **Input Data Validation & Generate specified format**
4. **Network interface**
5. **Transaction**
6. **Health Information System**
Issues

• Data format
  – simple and lightweight data representation is necessary to quickly process health information in mobile devices

• Transaction
  – Simple transaction methods are necessary for data exchange between mobile device and health information system
mHealth Platform

Simple Data Mode

Useful Transaction Protocol / Method

Easy Representation
Criteria

• For Mobile Health, new criteria should be developed for the following use cases
  • Education and awareness
  • Remote data collection
  • Remote monitoring
  • Communication and training for health workers in rural area
  • Disease and epidemic outbreak tracking
PniP (Proximity-based Neighbor Identification Protocol)
PnP (Proximity-based Neighbor Identification Protocol)

Mobile ID device (ex. watch)

Broadcasting LF wake-up signal

Mobile ID and Proximity information

Match appropriate device with service profile

Measured data communication

Resource device (ex. Sphygmomanometer)

Press start button
PnP (Proximity-based Neighbor Identification Protocol)

Broadcast the wakeup signal within the predefined service profile.
Thank you

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Standardization for the Next Door
Future Direction of IMIA Standardization

Beatriz de Faria Leão, MD PhD
IMIA Standards Working Group Chair
ISO TC 215 WG1 Vice-Convener
BLEAO Informática em Saúde, Porto Alegre, Brazil

MEDINFO 2013, Copenhagen, August 2013
Introduction

- The “silod” approach of developing vertical applications that do not interoperate is still very common
- The SDOs have very few members from LMIC
- Donors and agencies working in Global Health continue to impose data that is not harmonized creating an additional burden to low resource settings
- Access to HI is still limited (exception HL7)
- WHO resolution WHA 66.24 urge countries to work on standards an interoperability
eHealth Standards and Interoperability: on-going activities

- eHealth Connection Meeting, Bellagio 2008
- eHealth Resolutions (WHA66.24 and WHA58.28) and other WHO eHealth documents including the ITU/WHO Toolkit
- OPEN HIE, HINGX, MHEALTH Alliance, HIWIKI
- ISO Public Health TF recommendations and ISO TR 14639 Capacity model on Ehealth Architecture
- On-line training programs on eHealth Standards and Interoperability
Meeting the Demand for Results and Accountability: A Call for Action on Health Data from Eight Global Health Agencies

Margaret Chan¹*, Michel Kazatchkine², Julian Lob-Levyt³, Thoraya Obaid⁴, Julian Schweizer⁵, Michel Sidibe⁶, Ann Veneman⁷, Tadataka Yamada⁸


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Eight Agencies Working in Global Health

- Bill & Melinda Gates Foundation
- GAVI
- Global Fund to Fight AIDS, Tuberculosis & Malaria
- UNAIDS
- UNFPA
- UNICEF
- World Bank
- World Health Organization
Health Donor Agencies Action Plan

- Investing in developing norms and standards for all aspects of a common data architecture, which includes involvement of UN agencies, academia, and the private sector;
- Developing a global health indicator registry with standards for data, indicators, metadata, and references to analytic methods that builds upon work done in health and disease programs, promotes the implementation of the standards, and focuses on a core minimal indicator set;
- Developing and promoting interoperability standards for the health sector at both the level of individual and aggregate records.
The eight agencies commit themselves to acting upon this goal immediately by:

- Working together and enhancing investments in developing a common standard for health information, including a common indicator and metadata registry and interoperable databases.
WHO Forum on Health Data Standardization and Interoperability
Questions from the WHO Forum on eHealth Data Standardization and Interoperability

- What would be some of the appropriate funding models to access standards by countries?
- How can we improve access, dissemination and adoption of health data standards?
- How can health data standards help donor programmes?
- How do we increase in-country capacity of health workforce to manage issues related to health data standardization and interoperability?

The big issues have already been identified, Countries understand the need to adopt HI standards, However ..
How to select the proper HI standards?

What road do I take?

Well where are you going?

I don’t know

Then it doesn’t matter. If you don’t know where you are going, any road will get you there.
Main stakeholders in HI standards

- ISO TC 215  Health Informatics Committee
- HL7
- CDISC -Clinical Data Interchange Standards Consortium
- GS1
- IHE -Integrating the Healthcare Enterprise
- European Committee for Standardization CEN 251
- IHTSDO (International Health Terminology Standardization Organization)
- JIC – Joint initiative Council
Main stakeholders in HI standards

- IMIA – International Medical Informatics Association
- WHO – World Health Organization
- PHDSC – Public Health Data Standards Consortium
- International Telecommunications Union (ITU)
Health informatics — Core eHealth architecture roadmap

Part 1:
Overview of national eHealth initiatives

Informatique de santé — Feuille de route eHealth : Architecture fondée sur la capacité —

Partie 1: Aperçu des initiatives de santé
The Challenges

- Most LMIC are not represented in the SDOs, therefore:
  - Their needs are not reflected in the standards
  - There is no in-country capacity on HI
  - Donors through projects implemented by local NGOs play the role of providing technical assistance
  - In most cases more siloed systems are created with no national interoperability policy

What is the role of the IMIA Standards for HI WG in this scenario?
The International Medical Informatics Association (IMIA) is the world body for health and biomedical informatics. As an 'association of associations', IMIA acts as a bridging organisation, bringing together the constituent organisations and their members. IMIA provides leadership and expertise to the multidisciplinary, health focused community and to policy makers, to enable the transformation of healthcare in accord with the world-wide vision of improving the health of the world population.
IMIA Working Groups and Special Interest Groups

- IMIA Working Groups and Special Interest Groups (WG and SIG) are the primary mechanism through which IMIA pursues its scientific activity in specific fields of the wider domain of health and biomedical informatics. A WG or SIG comprises a group of experts with a particular interest, and its activities are reported to, and approved by, the IMIA General Assembly each year.

- Each WG or SIG has a designated leadership (Chair and Vice Chair, and sometimes other officers). The Chair is the main link to the IMIA General Assembly and to the IMIA Vice President for Working Groups and Special Interest Groups.

- The current IMIA VP for WG/SIG is Dr. Hyeoun-Ae Park (Korea).
IMIA Working Groups

- Biomedical Pattern Recognition
- Consumer Health Informatics
- Critical Care Informatics
- Dental Informatics (inactive)
- Francophone Special Interest Group (SIG)
- Health and Medical Informatics Education
- Health Geographical Information Systems (GIS)
- Health Informatics for Development
- Health Informatics for Patient Safety
- Health Information Systems
IMIA Working Groups

- Human Factors Engineering for Healthcare Informatics
- Informatics in Genomic Medicine (IGM)
- Intelligent Data Analysis and Data Mining
- Medical Concept Representation
- Mental Health Informatics (inactive)
- Open Source Health Informatics
- Organizational and Social Issues
- Primary Health Care Informatics
- Security in Health Information Systems
- SIG NI Nursing Informatics
- Smart Homes and Ambient Assisted Living
- Social Media
- Standards in Health Care Informatics
- Technology Assessment & Quality Development in Health Informatics
- Telehealth
- Wearable Sensors in Healthcare
IMIA WG Performance Evaluation

- **What will be measured**
  - Participation
  - Outreach
  - Collaboration
  - Outcome

- **Standards (benchmarks) to compare performance of WGs/SIGs**
  - Demonstrate that the WG/SIG has been able to recruit at least 10 members from at least three different IMIA regions, and has a formal link with WG/SIGs within IMIA regions.
  - Produce a work plan every 3 years.
  - Produce an annual report.
  - Organize at least one virtual business group meeting every year, or physical business group meeting every year at an IMIA Medinfo conference or one of the IMIA regional meetings.
  - Publish a paper related to WG activities by a member of the WG/SIG every 3 years.
  - Collaborate with other organizations within IMIA or IMIA regional or member societies every 2 years.
Figure 1. ISO, HL7 and IMIA membership categorized by country economic grouping.
“There is no healthcare without management. There is no management without information.”

Gonzalo Vecina, São Paulo, 2005

Mission

To support countries in the adoption, adaptation and/or development of HI standards stimulating the creation of national eHealth standards and Interoperability foruns specially for LMIC
IMIA Standards in Health Care informatics

• To provide a forum for affiliated countries and invited experts to collaborate on standards activities
• To develop an on-line eHealth Standards and Interoperability Training Program, leveraging from existing initiatives
• To facilitate the development of a common data architecture information for global health agencies, multilateral organizations, bilateral organizations, and private foundations.
• To identify and propose work items relevant to low-income countries (LIC) and public health to the SDO organizations
• Represent other LIC interests in standards development including facilitation of standards adoption/ adaptation.
• To facilitate global dialogue on eHealth Standards and Interoperability (meetings in WHO selected regions)
Premises

- To coordinate with
  - IMIA WGs specially Education and HI for Development
  - WHO/ WHO CCs
  - SDOs

Funding

- PPP based funding models
Invitation for the IMIA Standards for HI WG Meeting

Friday Aug 22\textsuperscript{nd}, Room 19, 08h00 – 09h25 AM
Standardization for the Next Door

Beatriz de Faria Leao, Jun Nakaya
IMIA Standards in Health Care Informatics
Agenda (Day1)

13:50-13:55  Michio Kimura, former Chair of IMIA Standardization WG.
13:55-14:10  Jun Nakaya, Co-chair of IMIA Standardization WG, Japan
13:55-14:10  Jun Nakaya, Director and Prof. of School of Med., Tohoku University, Japan
14:10-14:20  Tom Oluoch, CDC Kenya, Kenya

14:50-15:00  Beatriz de Faria Leao, Chair of IMIA Standardization WG.
              Health Informatics Consultant at Bleao Informática em Saúde, Brazil
15:00-15:15  Roundtable discussion (continue to Day2)
15:00-15:15  Roundtable discussion (continue to Day2)
              Ending remarks Beatriz de Faria Leao
Agenda (Day 2)
(Tomorrow Morning)

8:00 – 9:25 Conference Room 19

• Discussion about IMIA strategy
  MC: Beatriz de Faria Leao with Jun Nakaya

• Ending remarks: Beatriz de Faria Leao
Message from Prof. Michio Kimura

- Former STD WG chair sends his regrets.....
- from room next door, chairing a session

Michio Kimura, MD. PhD, FACMI, Hamamatsu University, School of Medicine
Updates from Japan

- 140 hospitals are storing prescriptions, lab results, disease classifications in HL7 v2.5
  - Big data? Covering 2M patients
  - To be used to detect drug adverse events

- Hospitals are OK, how to export data from clinic systems
  - XDS.b based pilot program through online claim network (covering 95% of clinic)

Michio Kimura, MD. PhD, FACMI, Hamamatsu University, School of Medicine
Updates from Japan (2)

- DICOM are used for
  - Radiology, of course
  - Endoscopy, Ultrasound, .......
  - Digital camera? Movies?
    - How, who handles these?
      - radiology vendors pays no attention

- EHR without metadata
  - current Japanese EHR doesn't help doctors

Michio Kimura, MD. PhD, FACMI, Hamamatsu University, School of Medicine
What I did as chair

- **Awareness**
  - Workshop in MEDINFO, MIE, AMIA, APAMI
  - Directory of standards ..difficult to update

- **Claimed to avoid re-invention**
  - Project before standard makes proliferation of proprietary standards
    - and they become challenges for standards coming late

- **IMIA WG should**
  - educate developing/developed country leaders through failures

Michio Kimura, MD. PhD, FACMI, Hamamatsu University, School of Medicine
Please ask any questions or comments directly to Prof. Michio Kimura.
Japanese National Projects
around
Great East Japan Earthquake
toward
Standardization

Jun Nakaya
Co-Chair of IMIA Standardization WG
Tohoku University School of Medicine
Tohoku University Hospital, Medical IT Center
Tohoku Medical Megabank Organization
The beginning is • • •

Great East Japan Earthquake
Happened 2 and half Years ago
For Successful Reconstruction

We required Symbolic “Core” toward Reconstruction/Regeneration

- We designed 2 huge core national projects for regeneration/reconstruction in the field of Life Science.
  1. MMWIN (Miyagi Medical and Welfare Information Network) which covers all areas of Miyagi pref. with MI network to make disaster area better place than before earthquake.
     (National Budget: 60 Million Dollars)
  2. ToMMo (Tohoku Medical Megabank Organization) which develops/supplys Future innovation in Japan from Tohoku Region.
     Medicine and related required technologies to start a new leading Medical
     (National Budget: 600 Million Dollars)

Emergency Headquarter of Graduate School of Medicine of Tohoku University
Immediately Started on March 25, 2011
Basic concept of MMWIN (Miyagi Medical and Welfare Information Network)

Problems before 3.11
- Shortage of doctors and medical resources
- Aging
- Falling behind in construction of highway traffic network

An elucidated problem after 3.11
- Loss of Medical Information makes Medical practice entirely impossible

First we established Human Network (MMWIN) before constructing ICT network, which is always necessary in both disaster and peace time.

Based on this ‘All Miyagi Human Network’, We aim to achieve not just restoration but reconstruction to better society than before 3.11.

We summarized our concept and experiences as a typical model of Regional Healthcare Network in Japan, which is called as ‘Miyagi Model’.

Then we are in construction of Regional Medical & Welfare Information Network which has both disaster robustness and usefulness in time of peace.

To reduce the burden on medical workers
For relief of patients and their families in disaster areas
Basic Concept of Regional Medical and Welfare Information Network

Miyagi Model (3 layer Model)

**Prefecture Layer**
- Cooperation among Central Hospitals and Regional Hospitals for high advanced medical treatment
  - Prefectural Flagship Hospital
  - University Hospital

**Administrative Regional Medical Area Layer**
- Cooperation among hospitals and clinics in regional medical area for hospital treatment
- Standards
  - SS-MIX2
  - CDA R2
  - GSVML
  - ICD11

**Daily Life Medical Area Layer**
- Seamless cooperation among home care, nursing care, and medical care for daily life

**RegionalCore Hospital**
- ASP type EHR
- SS-MIX2
- Green CDA
- GSVML
- ICD11

**Medical Administration Area Medical Data Center**
- SS-MIX2
- en13606
- HL7 V3
- CDA R2
- GSVML
- ICD11

**Private Cloud**
- Medical Information Inquiry
- Inspection Reservation
- Accumulated Data Sharing

**Temporary Houses Support Center**
- Care Zone
- Small & Medium sized Hospitals/Clinics Zone
- Core Hospital
- Regional Data Center
- Daily Life Medical Area

- Cooperation among home care, nursing care, and medical care for daily life
- Cooperation among hospitals and clinics in regional medical area for hospital treatment
- Seamless cooperation among Central Hospitals and Regional Hospitals for high advanced medical treatment
Features of ToMMo (Tohoku Medical Megabank Organization) Project

- Construction of Medical Megabank as combined Bio-Bank can be a long-term base of all biomedical researches toward future medicine
- Prospective Cohort Study in conjunction with whole genome analysis can be a basis of designing future medicine
- Establishment of standardized network model of regional healthcare can be a direct help for disaster suffers’ healthcare and also can be a base of next generation regional healthcare
- Linking with education of disaster suffers to have medical skills in these projects can be direct help for disaster suffers
- Job creation and industrial accumulation around these projects in disaster area can be a life support for disaster suffers.
Ground ICT Design of ToMMo & MMWIN

Medical megabanks analysis and storing ICT Network

Biobank publication ICT Network

Internet

ToMMo Phase 1, Phase 2:
(under construction)

ToMMo Phase 3: Designing

ToMMo Phase 0: Operating

Health Check Up and Cohort ICT Network

Prefecture Layer

MMWIN:
Operating at 74 facilities
Constructing at 300 facilities

Regional healthcare ICT Network (Miyagi Model)
Unified viewpoint for Construction (in Tohoku Region)

Regional Medical • Nursing care • Welfare Information

MMWIN

Integrated Clinical Information including Research & Education from all Tohoku region

Tohoku Univ. Hospital HIS

Tohoku Medical Information Highway

Foundation of Regional Medical Network Model

Accumulated with respect to providing each medical care

ToMMo

Groundwork of Advanced Research

Information around Future Medicine

Information around Bio-bank

Multi-viewpoint of Advanced Medical Information

Tohoku Univ. School of Med. ICT Infrastructure

Prospective Cohort Analysis Information

Whole Genome Sequence Analysis Information

Research/Analysis Information From Multi Medical fields

New Plan

Information Pipeline

Tohoku Univ. Hospital HIS

Tohoku Univ. Hospital HIS

Info. of Integrated Clinical Trials

Accumulated with respect to performing each analysis
Then
Road Map from Tohoku Medical Information Highway to Standards

ToMMo
Tohoku Univ.
HIS
Tohoku Univ.
Network
Tohoku Univ.
TRI
MMWIN

Tohoku Medical Information Highway

Typical Construction by unified view point

3 years

Other Japanese Regions
MI Highways

5 years

Spread to other Japanese regions

10 years

Japan Medical Information Highway

Standard Packaging

Integration of other Japanese projects

Export of disaster area
Healthcare Industry

Integration of other Japanese projects

National integration

Standards for the Future Medicine

New industry creation in disaster area

ISO

WHO

J-MIPs: Japanese Medical ICT Package for Standardization
Tomorrow’s discussion issues

What are the requirements to standards in Disaster Medicine? in Future Medicine?

How do we combine/utilize our standards in Disaster Medicine? in Future Medicine?
Thank You

Jun Nakaya
Tohoku University,
School of Medicine
Ground ICT Design

メディカル・メガバンク解析保存情報基盤
スーパーコンピュータ、オントロジー、分散クラウド、といった最新の技術レベルを結集した
世界初の統合生命医療情報－解析・保存基盤

バイオバンク公開情報基盤
公平な分配原則に基づいた
セキュリティーに配慮した
バイオ・バンク公開情報基盤

4つの情報基盤を統合的に組み合わせた
世界最高峰の
次世代生命医療情報基盤

健康管理

健診・コホート情報基盤
被災者とその子供たちの未来に向けた
健康管理とコホートデータ収集のため
の生命健康情報基盤

収集

地域医療福祉連携情報基盤（みやぎモデル）
災害に強く、利用者にとって役に立つ
被災前より良い医療を実現しうる
地域医療福祉連携情報基盤・情報収集基盤

公開

追跡医療福祉

Ministry of Education, Culture, Sports, Science and Technology budget (ToMMo)

Ministry of Internal Affairs and Communications,
Ministry of Health, Labor and Welfare budget (MMWIN)
Reflections on today’s challenges for e-health interoperability

Suggestion for the IMIA Standards WG

Charles Parisot

IHE International Board
GE Healthcare
Observation: we have most of the standards we need for the next 10 years, but we seem to make slow progress in deploying them.

- Why is progress so slow?
- Would an agreed standards adoption process help?
- With globally adopted and proven prefabricated building blocks, it helps but remains complex.
Realize the interop standards promise......

Many of the projects die or fail here
Realize the interop standards promise……

Why slow progress?
• Apply the integration recipe from hospitals
• Mix data sharing and workflow
• Scale require “infra/info structure” architectures
• Not invented here…
• Deploy and sustain
• Focus on tomorrow’s debates
• …etc.

Many of the projects die or fail here
The different classes of standards related specifications (1)

From an art to an industry
Interoperability: From a problem to a solution

Base Standards

Profile Development & testing

Project Specific Extensions

eHealth Projects

Profiling Organizations are well established
The different classes of standards related specifications (2)

- **Interoperability Specifications:**
  - specific to a project, based on Profiles
  - addresses the business-level use case

- **Profiles:**
  - intermediate level of “interoperability building blocks”

- **Base Standards:**
  - Either (1) very specific or (2) quite generic
Use of IHE Profiles in eHealth Projects

Key health systems objectives

Interoperability

Use case A
Use of IHE Profiles in eHealth Projects
Selecting Profiles for Interoperability Specification

Key health systems objectives

Interoperability Use case A

Profiles for Use Case A

Content & Terms
- Patient summary
- Lab Report
- Imaging Info Exchange
- ECG Report

Services
- Patient Demographics
- X Document sharing
- Health Provider Directory

Security and Privacy
- Consent management
- Audit Trail
Use of Profiles in eHealth Projects
Selecting Profiles for Interoperability Specification

Key health systems objectives

Interoperability Use case A

Profiles for Use Case A

Content & Terms
- Patient summary
- Lab Report
- Imaging Info Exchange
- ECG Report
- ...

Services
- Patient Demographics
- X Document sharing
- Health Provider Directory
- ...

Security and Privacy
- Consent management
- Audit Trail
- ...

Reuse!