Patient Empowerment, mHealth, eHealth

mHealth, eHealth and Health/Medical Devices as components of the connected health system
Current Mobile App ecosystem in health

Mobile App for health professionals

Patient access App to a portal (appointments, reminders, access to results and records).

Personal health management app either stand-alone or connected

Specific Healthcare IT system or device within a care delivery organization: EMR, PACS/RIS, etc.

Portal of a specific Healthcare delivery organization: hospital, insurance, laboratory, etc.

Device specific cloud-based personal health management application

Mobility increases number of silos

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Mobile Health and FHIR
First: mHealth needs eHealth!
mHealth needs eHealth

Consumer challenge: “Proliferation” of Apps
mHealth needs eHealth interoperability to enable “portable” generic Apps.

Replaces the proprietary interfaces of the Apps with a standardized interface.

mHealth needs eHealth
mHealth needs eHealth

➤ eHealth interoperability to provide an integrated and ubiquitous patient health view
mHealth needs eHealth interoperability to provide an integrated and ubiquitous patient health view

mHealth most effective as “edge” information access/source
Second: mHealth needs …
(1) international standards
(2) profiling!!!
What is HL7 FHIR?

• FHIR means “Fast Healthcare Interoperability Resources”
  – Hot, cool, loved and hyped

• FHIR is defining content!
  – resources = content definitions
  – And how it’s transported from A to B (like HL7v2)
  – This is only a part of the whole

• FHIR is an important addition to the standards portfolio
  – But it remains complex to deploy at a multi-system level
  – The more FHIR matures and expands the more its complexity becomes apparent

• Bad news: The complexity of use-cases does not disappear, just because you invent a new standard
  – “The complexity must reside somewhere”
Currently

• **Current critical situation**
  – Many little Implementation projects are popping up
  – Similar situation as in 1999 when IHE was started to clear that …
    • … “everyone is implementing on standards, and nothing is interoperable”

• **Important to realize:**
  – An interoperability use-case requires so much more than just content definitions!
  – FHIR is no different than any other base standard
  – It needs serious profiling and combination with other standards
Third: Continue the sustainable approach and take what’s already there!
IHE Profiles available and widely accepted for eHealth interoperability.

New IHE Profiles being developed for mHealth interoperability … … using FHIR.
IHE is profiling FHIR

• **IHE profiling of use-cases using FHIR is already done (see list later)**
  – We admit: much remains to bring it to a deployment maturity level it has not yet reached
  – Tricky situation for IHE: “IHE is profiling existing (= stable) standards”
    • FHIR is still STU3 (still subject to change!), but everyone is implementing
    • We took the situation as it is and started profiling anyway

• **Collaboration with HL7 FHIR working groups**
  – Shape up FHIR resources by experiences of IHE “before” they are released

• **Attention: A “FHIR profile” is not a profile in IHE sense**
  – It’s used to constrain FHIR resources
  – It’s just a “part” of an IHE profile
Where is FHIR?

- **Interoperability Specifications**
- **Projectathon Remaining 20%**
- **eHealth Projects**

**IHE Conformity Assessment**
Covers 80%

**Profiles**
- Use-case
- Actors
- Transactions
- Content
- Workflow

**Standards**

**Product**

**Product**

**Test Report**

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Mobile Health and FHIR
Fourth: Pick from the list!

- IT-Infrastructure
- Patient Care Coordination
- Pharmacy
- Quality Research and Public Health
Mobile Patient Identifier Cross-referencing (mPIX)

Mobile patient ID cross referencing

PIX Query [ITI-9]

mPIX [FHIR]

Patient Identifier Cross-reference Consumer

Patient Identifier Cross-reference Manager

Mobile Patient Identifier Cross-reference Query [ITI-83]
Mobile Patient Demographics Query (mPDQ)

Patient Demographics Query [ITI-21]

Mobile patient demographics query

Patient Demographics Consumer

Patient Demographics Supplier

mPDQ

Patient Demographics Consumer

Mobile Patient Demographics Query [ITI-78]
Health information sharing relies on different granularity of exchanges:

**Document-Level Granularity:** optimum to ensure that contained data has clarity of context in care delivery and reflects source attestation (responsibility) of clinical data shared.

**Data Element-Level Granularity:** optimum when list of Data Elements relevant to a “time span” or a set of encounters are of interest (e.g.: the list of allergies at the time of medication dispensation, or information reconciliation at the time of hospital admission).
Mobile access to Health Documents (MHD)

mHealth

MHD Document Recipient

MHD Document Source

FHIR

MHD Document Responder

FHIR

MHD Document Consumer

eHealth
MHD – the „XDS on FHIR“

MHD Document Recipient
MHD Document Source
XDS Document Source
XDS Document Registry
XDS Document Repository
XDS Document Consumer

mHealth
MHD

mHealth
MHD

MHD Document Source
MHD Document Consumer

eHealth
XDS

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Mobile Health and FHIR
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mXDE combines MHD & QEDm

mXDE = Mobile Cross-Enterprise Document Data Element Extraction

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→ Both granularity levels deliver different benefits and their efficient **coexistence** is the objective of the mXDE profile
mXDE combines XDS & MHD with QEDm

Point of Care System

- Document Consumer
- Clinical Data Consumer
- Data Element Provenance Consumer
- Mobile Query for Existing Data
- Data Element Extractor

Document Sources

- Query and Retrieve Documents
- Publish Documents

Document Repository

- Clinical Data Source

Registry

Mobile Health and FHIR
Fifth: IHE is not alone!
IHE and Personal Connected Health Alliance (PCHA) are each focused on improving the ways health IT systems share information.

IHE Profiles and PCHA’s Continua Design Guidelines are both standard-based, open specifications for health information exchange:

- Where they overlap they are consistent, resulting in a mature and interoperable information ecosystem.
- Together they ensure that device data whether captured by the patient or in a care delivery setting flows into electronic health records in the same format and coded content.
Where to deploy IHE Profiles and PCHA’s Continua Guidelines

- **Personal Health Device** (Health, Medical and Fitness devices)
- **Personal Health Gateway** (Hub, phone, tablet, etc)
- **Health Information Service Health & Fitness Service** (Care Management Services)
- **Hospital Device** (Nursing Station, Gateway)
- **Hospital Device Gateway**
- **Health Information Exchange**
- **Ambulatory EMR**
- **Hospital EMR**

Defined in IHE Profiles
Defined in Continua Guidelines
Defined & aligned in both Continua Guidelines & IHE Profiles
How We Are Leading Together
(3 pronged plan)

• **Collaborating on future Profiles and Guidelines development**
  – Coordinating work programs between the two organizations
  – Enabling seamless integration between products using IHE Profiles and the Continua Design Guidelines to ensure the combined deployment of fully interoperable systems

• **Collaborating with each other’s conformity testing and certification programs**
  – Aligning tools and processes

• **Collaborating on Communication, Education, and Product Interoperability Demonstrations**
  – Eliminating confusion among providers, vendors, and standards bodies about both organizations’ standards and tools
For your offline viewing
FHIR based profiles of IHE (ITI)

- **Mobile access to Health Documents (MHD)**: A profile on DocumentReference and DocumentManifest to provide a HTTP REST and Mobile application friendly API for the use cases profiled in XDS, XDR, and XCA. The MHD profile may be used as an API to these Document Sharing infrastructures, or may be used alone.

- **Patient Demographics Query for Mobile (PDQm)**: A profile of the FHIR Patient resource for simple lookup and reference. Following the functionality requirements profiled in PDQ (HL7 v2), and PDQv3 (HL7 v3).

- **Patient Identifier Cross-reference for Mobile (PIXm)**: An operation profile for retrieving just cross-referenced identifiers for a given patient.

- **RESTful Query to ATNA**: A profile on AuditEvent for query and reporting.

- **Mobile Cross-Enterprise Document Data Element Extraction (mXDE)**: Accesses data elements extracted from shared structured documents.
FHIR based profiles of IHE (ITI)

- **Mobile Alert Communication Management (mACM)** a profile on Communication for alert notifications
- **Mobile Care Services Discovery (mCSD)** provides a RESTful interface to discover Care Services: Organization, Location, Practitioner, and Health Services
- **Mobile Cross-Enterprise Document Data Element Extraction (mXDE)** accesses data elements extracted from shared structured documents
- **Non-patient File Sharing (NPFSm)** provides a RESTful interface enable sharing of non-patient files such as clinical workflow definitions, domain policies, and stylesheets
- **Internet User Authorization (IUA)** a profile of OAuth for use with HTTP REST access
- **IHE Appendix Z on HL7 FHIR** covers general constraints
FHIR based profiles of IHE (Other)

- **Query for Existing Data for Mobile (QEDm)** queries for clinical data elements, including observations, allergy and intolerances, conditions, diagnostic results, medications, immunizations, procedures, encounters and provenance.

- **Mobile Retrieve Form for Data Capture (mRFD)** describes the exchange of context data to allow a seamless form launch with supporting clinical context.

- **Dynamic Care Planing** (DCP) Profile provides the structures and transactions for care planning, sharing Care Plans that meet the needs of many, such as providers, patients and payers.

- **Mobile Medication Administration (MMA)** describes the requesting and registering of administration of medication in a mobile setting (under development).
Links

- IHE Homepage
  - http://www.ihe.net/
  - http://www.ihe-europe.net/
  - http://www.ihe-austria.at/

- IHE Wiki
  - http://wiki.ihe.net/

- IHE International Social Media
  - YouTube channel: https://www.youtube.com/user/IHEIntl
  - IHE Webinars: http://www.ihe.net/Webinars/
  - Twitter: https://twitter.com/IHEIntl

- Google groups
  - https://groups.google.com/forum/#!search/ihe
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