Open Standard API’s as Infrastructure for Innovation

The case of the HL7 FHIR International Patient Summary

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HL7 Foundation:

- HL7 the best and most widely-used eHealth standards since 1986
  - HL7 v2, Clinical Document Architecture, HL7 FHIR
  - 20 National Affiliates in Europe (~38 worldwide)
  - European HL7 foundation established in 2010

- European Funded Research Projects
  - eHGI, Antilope, Semantic Healthnet, Trillium Bridge, Expand, Trillium-II
  - PHC34: ASSESS CT, OpenMedicine, eStandards

- Annual HL7 in Europe Newsletter
  - Website: www.HL7.eu

- eHealth policy & Research
  - eHealth stakeholders group; mHealth Guidelines; ENISA expert group
  - EFMI council (2012-): EFMI Board (2016-)
  - HIMSS Europe

- SDO Joint Initiative Council

Open Standard APIs as Infrastructure for Innovation: The Case of the H:7 FHIR IPS
By 2014, 75% of the Fortune 500 will open APIs 
Empower their customers to do more. 
Build highly valuable partner ecosystems. 
Become increasingly more agile 
src: Forrester Research
Application programming interfaces (API) 
An emerging (API) Economy

APIs are specifications or protocols that allow software applications to share data.

- Allow third parties to write software that accesses data and drives transactions.
- Internal systems in the enterprise are restructured to uniformly support innovative new projects—reducing maintenance costs and increasing agility.

APIs enable organizations to become platforms:

- Reduce complexity: provide uniform data and transaction interfaces to internal and external entities
- Improve change management: allow development of new functionality and create value by third parties
- Create new opportunities: generate new ways to reach customers, generate revenue and build partnerships
- Control access to partners, customers, and contractors
- Bottom line: innovate more rapidly – APIs are a new means of creating value by third-party led innovation

API economy: economic effects enabled by companies, governments, non-profits & individuals using APIs to provide programmable access to systems and processes.

- new classes of applications with the potential to transform the way business is done.
- New business models based on API profit and revenue sharing: e.g. Amazon Web Services sales Q2 2018, $5.44B, 11% of total revenue (1.4B operating income, 49% growth)
- Warren Buffet (2017): “Here you take cloud services, Bezos thought he would have two years of runway. He got seven years. You do not want to give Jeff Bezos a seven-year head start.”
What about APIs in HealthCare?

Interoperability and easier access to health care data through open standard APIs
- Companies can share data
- Serve better people needs
- Use APIs for internal and external innovation.

Potential impact on
- the quality and cost of care
- the patient’s experience
- and innovation could be enormous.

Translates to concrete benefits for patients and caregivers
- Avoid multiple provider portals
- Tailored apps of improved usability for clinicians and patients alike

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The Untapped Potential of Health Care APIs
by Robert S. Huckman and Maya Uppaluru
DECEMBER 23, 2015
Power of APIs in Healthcare: The case of Apple

- Apples leads the way towards an IT enabled health ecosystem

- January 24, 2018: “Apple and 13 prominent health systems, …, disclosed an agreement that would allow Apple to download onto its various devices the electronic health data of those systems’ patients — with patients’ permission…”

- End to the inability to make electronic data liquid
  - follow the patient throughout the health system, available for sophisticated analysis for improved patient care and research.

- After long time efforts to liberate and exchange health data focused on doctors and hospitals to share..

- Apple entered with area around 2014 with citizen focus
  - HealthKit – developer tool that allows apps to contribute/share data, e.g. Nike+, AliveCor, DexCom glucose monitor, etc.
  - ResearchKit – developer kit for scientists to carry Human studies
  - CareKit, developers creating apps to let people manage long-term conditions
  - Health Records, access to your own health records across providers
Stanford Apple Heart Study

Apple Heart Study

Today at 10:00 AM
Your Statistics

Heart Rhythm Data Contributions

12 Days in Study

Samples will be collected when you are wearing your Apple Watch. Depending on how active you are, one or more samples may be collected per day.

Welcome and Thank You

https://med.stanford.edu/appleheartstudy/faq.html

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The case of Apple Health: health records

Apple's HealthKit already gives the company a foothold in the healthcare market.

- Apple Watch and iPhone is a conduit for micro-level data e.g. heart rate, activity, etc.

Leading medical data players are on board with Health Records.

- Apple's launch hospital partners, John Hopkins, Penn Medicine, etc. run on Epic and Cerner for the most part, leading players in the medical records space

Apple is going along with standards.

- Health Records is based on **HL7 FHIR (Fast Healthcare Interoperability Resources)**, which is a standard for transferring electronic medical records, supported by Argonaut.

The healthcare industry is prepared

- Electronic medical records exchange heavy work occurred with meaningful use.
- Apple just brings healthcare data to consumer devices.

Privacy.

- Apple has differentiated itself from Google's cloud and the data centric approach. Health Records will be encrypted and protected under a user's iPhone passcode.
FHIR is FREE!!

F – Fast (design & implement)
H – Healthcare
I – Interoperable
R – Resources (Building blocks)
What’s so great about HL7 FHIR?

- Flexible to document-level and data-level exchange
- Sometimes individual data elements are important, sometimes entire documents are appropriate
  - Based on modern internet conventions
- RESTful API – same browser-based approach as used by Facebook, google, twitter, etc
- Infinitely extensible to detailed resources/profiles to meet any use case
- Supports push and pull use cases
  - Attractive to developers from outside of healthcare
- Brings new voices into health care
  - pushes the industry to innovate at internet speed
Argonaut Project

The Argonaut Project is an implementation community comprising leading technology vendors and provider organizations to accelerate the use of FHIR and OAuth in health care information exchange.

We are:

- Private sector initiated and funded
- Working collaboratively with other FHIR initiatives such as SMART-on-FHIR, the Health Systems Platform Consortium, and the FHIR Foundation
- Creating open industry Implementation Guides in high priority use cases of importance to patients, providers and the industry as a whole

We are NOT:

- A standards development activity
- A separate legal entity
- A proprietary activity
Why do we need the Argonaut Project to accelerate adoption of HL7 FHIR?

- Standards development process, by design, values comprehensiveness over speed-to-market
- Market input is needed to make standards relevant and usable
  - Identification of priority use cases to meet market needs
  - Development of well-packaged implementation guides
  - Facilitation of testing and implementation community
  - Coupling with other standards or protocols needed for implementation (e.g., security)
- Implementers need to have greater input (i.e., deeper, earlier) into standards development
- Need to get as much collaboration as early as possible in the cycle to head off problems of heterogeneous implementations down the road
Patient summary as Health data navigator

Think of the Patient summary as a window to a person’s health or dashboard to support the stakeholders in the ED:

- Medications, allergies, vaccinations, problems and procedures,
- labs, diagnostic imaging, recent or planned encounters, implantable devices
- advance directives

“Bring the Power of Platforms to Health Care” using data to drive:

- administrative automation, networked knowledge, and resource orchestration [Bush & Fox, HBR November 2016]

eStandards need to

- help build trust
- unlock the power of health data
- facilitate decision support
- navigate the health system
International Patient Summary (IPS) Implementation Guide: Purpose & Scope

Goal: identify the required clinical data, vocabulary and value sets for an international patient summary.

Scope: “The IPS specification shall focus on a minimal and non-exhaustive Patient Summary, which is specialty-agnostic and condition-independent, but still clinically relevant.”

The primary use case is to provide support for cross-border or cross-jurisdictional emergency and unplanned care:

- Cross-jurisdictional patient summaries (through adaptation/extension for multi-language and realm scenarios, including translation).
- Emergency and unplanned care in any country, regardless of language.
- Value sets based on international vocabularies that are usable and understandable in any country.
- Data and metadata for document-level provenance.
International Patient summary (IPS) standards

Think Patient summary as

• Active window to a person's health data across locations and jurisdictions
• Dashboard with key information on current situation & to navigate in detailed data to support decision making in the ED

We need to:

• Resources to accelerate implementation and sharing of experience
• Situations for the productive use of patient summaries
• Examine provenance, granularity, and decision power

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International Patient Summary

Vision

- “In order to further the care for citizens across the globe, we agree to collaborate on a single, common International Patient Summary (IPS) specification that is readily usable by all clinicians for the (cross-border) unscheduled care of a patient.”

Scope

- “The IPS specification shall focus on a minimal and non-exhaustive Patient Summary, which is specialty-agnostic and condition-independent, but still clinically relevant.”

Credits. G. Cangioli
The IPS «world»

Requirements → Design → Implementation

IPS: Guidance for European Implementation Technical Specification

Baseline requirements: e.g. EU guidelines

The Patient Summary for Unscheduled, Cross-border Care

Working Document (WD)- Item/Proposal-stage

CEN prEN

HL7 CDA IG

HL7 FHIR IG

Compliance / Traceability

ART DECOR®, Forge,...

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The IPS Sections

- Medication Summary
- Immunizations
- Allergies and Intolerances
- History of Procedures
- Problem List
- Medical Devices
- Diagnostic Results
- Past history of illnesses
- Pregnancy (status and history summary)
- Social History
- Functional Status (Autonomy / Invalidity)
- Plan of care
- Advance Directives
- Vital Signs

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The IPS Structure

**IPS Attribute Collection** (e.g. Patient Attributes)

**IPS Sections** (e.g. Allergies and Intolerances)

**Non-IPS Sections**

Credits: G. Cangioli
What is an IPS?

The IPS is a document!

Intended Use

As a document

Possible Future extensions and use

As a library

Allergies and Intolerances

Immunization

Plan of care

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Challenges to the use of APIs in health care

- Business case for both providers and their IT allies to invest in this new partnership.
  - Leverage consumer-facing apps that solve consumer health-related problems easily and cheaply.

- Risks of fraud and abuse in this new world of data access are daunting.
  - Most consumers will delegate to third parties accessing, storing, managing, and analyzing their data.
  - Need for voluntary but enforceable code of conduct to govern the behavior of private data stewards.

- Quality of customer-facing health applications could become an important issue.
  - If apps offer advice, it needs to be reliable.
  - If apps offer service, they need to deliver.
  - What is in scope of regulatory authorities?

How we can accelerate progress toward use of open APIs within the health and care industry:

- Policy makers encourage data exchange for better outcomes with financial incentives to providers.
- Managers address the security concerns of patients and providers.
- Vendors to implement open standardized APIs with transparent terms of use, policies, and developer fees.
- Address cultural and workflow issues within health systems.

Apple’s collaboration with leading American providers of health and information technology services likely signals a new era in health and medicine that echoes European and global citizen health needs.
Back to you innovators...
Conclusions

Digital health through data and information brings innovation and transforms health and care:
- Open API’s have a crucial role to play
- Collect and link data from different sources
- Offer a provenance framework

The FHIR IPS is at the junction of developments with Trillium-II
- Disaster management
- Healthy lifestyle – prevention: prediabetes, hypertension
- Rare disease passport
- Patients with an implantable devices
- Children with chronic or rare disease at school
Global Community for the practice of Digital Health Innovation

Let’s join forces to make digital health happen in all facets of health and care sharing and linking information productively starting with patient (health) summaries!

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Reinforcing the Bridges and Scaling up EU/US Cooperation on Patient Summary