TRILLIUM BRIDGE AND BEYOND: STATE OF PLAY AND FUTURE PROSPECTS

Catherine Chronaki, Giorgio Cangioli, Alex Berler, Dipak Kalra

Follow us @eHealthWeekEU #eHW15
Trillium Bridge Project

- **What:**
  - Pragmatic Feasibility study on the exchange of Patient Summaries across the Atlantic

- **How:**
  - Comparing, analyzing, and mapping patient summaries starting with Meaningful Use 2 C-CDA/CCD and EU patient summaries (epSOS)

- **When:**
  - From: July 2013 to June 2015

- **Who:**
  - A stellar consortium comprising EU member state ministries, provider networks, industry, associations, SDOs
Trillium Bridge Use Cases

• One Value proposition:
  – When patient needs unplanned care overseas, a EHR summary fit for the purpose of safe and efficient health care is available.
  – After the health care encounter, patient receives encounter report in a format and language that can be understood back home.

• Two use cases:
  – Provider mediated (citizen controlled, provider initiated)
  – Patient mediated (citizen initiated, citizen controlled)

• Blazing the transatlantic path – constraints and assumptions
  – Translation of narrative unstructured content (not in scope)
  – Incorporate patient summary elements in EHR or PHR (not in scope)
  – Preconditions: citizen empowerment
    • EU Citizens have access to their EU Patient Summary (e.g. epSOS PAC, HECR)
    • US Citizens have access to their Clinical Summary in C-CDA/ CCD
Achievements of Trillium Bridge

Selecting Grounds:
- Pilot Use Cases
- Business Architecture
- Gap Analysis

Building the Bridge:
- Aligning Structure & Terminology
- Trust Agreements
- Interoperability assets

Testing the Bridge:
- Testing Tools
- Data Sets
- Validation Reports

Policy Convergence:
- Feasibility Analysis
- Cross-vendor integration
- Incentives
- Standardization
- Innovative Business models
- eIdentification
- Security and privacy
- Education
- Clinical Research

We are here
Under the Hood

Transformer Gateway

Transformer Components

Open Source Software

TBXform

CCD

Structure Transformation

Language Translation

Code Mapping

CCD

EPSOS

CTS-2

Follow us @eHealthWeekEU #eHW15

11 - 13 MAY 2015 RIGA, LATVIA
<table>
<thead>
<tr>
<th>epSOS Value Set</th>
<th>epSOS Code System</th>
<th>concepts with correspondence/concepts present/ ( % covered)</th>
<th>CCD Value Set</th>
<th>CCD Code System</th>
<th>concepts with correspondence/concepts present/ ( % covered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>epSOSActiveIngredient</td>
<td>ATC</td>
<td>606/5592 (6%)</td>
<td>Medication Drug Class</td>
<td>NDF-RT</td>
<td>1365/10699 (13%)</td>
</tr>
<tr>
<td>epSOSActiveIngredient</td>
<td>ATC</td>
<td>2836/5592 (51%)</td>
<td>Medication Brand Name</td>
<td>RxNorm</td>
<td>3329/13885 (24%)</td>
</tr>
<tr>
<td>epSOSActiveIngredient</td>
<td>ATC</td>
<td>2836/5592 (51%)</td>
<td>Medication Clinical Drug</td>
<td>RxNorm</td>
<td>9642/31214 (31%)</td>
</tr>
<tr>
<td>epSOSAllergenNoDrugs</td>
<td>SNOMED CT</td>
<td>79/112 (71%)</td>
<td>Ingredient Name</td>
<td>UNII</td>
<td>5315/63996 (8%)*</td>
</tr>
<tr>
<td>epSOSRoutesofAdministration</td>
<td>EDQM Standard Terms</td>
<td>55/73 (75%)</td>
<td>Medication Route FDA</td>
<td>NCI Thesaurus</td>
<td>57/118 (48%)</td>
</tr>
<tr>
<td>epSOSDoseForm</td>
<td>EDQM Standard Terms</td>
<td>28/457 (6%)</td>
<td>Medication Product Form</td>
<td>NCI Thesaurus</td>
<td>99/153 (65%)</td>
</tr>
<tr>
<td>epSOSIllnessesandDisorders</td>
<td>ICD-10</td>
<td>1775/9525 (19%)</td>
<td>Problem</td>
<td>SNOMED CT</td>
<td>7204/16443 (44%)</td>
</tr>
<tr>
<td>epSOSIllnessesandDisorders</td>
<td>ICD-10</td>
<td>1147/9525 (12%)</td>
<td>Problem</td>
<td>SNOMED CT</td>
<td>6914/16443 (42%)</td>
</tr>
<tr>
<td>epSOSVaccine</td>
<td>SNOMED CT</td>
<td>27/31 (87%)</td>
<td>Vaccine Administered</td>
<td>CVX</td>
<td>87/163 (53%)</td>
</tr>
</tbody>
</table>
Trillium Gateway facilitates clinical content exchange between the US and EU

- Remediate differences between IHE exchange specification implementation (epSOS and eHealth)
- Clinical content transformer service
- EU Continuity of Care Document to US Consolidated CDA patient summary
Trillium Exchange Demonstration

Proof of Concept Implementation Complete

Working bidirectional exchange between Kaiser Permanente, Spain, Portugal and Luxembourg

- Kaiser Permanente Exchange Platform
- Trillium Gateway and Transform Services
- Reference epSOS nodes representing the EU Countries
Trillium Exchange Lessons Learned

Team worked through differences in how the specifications (IHE XCPD and XCA) were implemented in order to achieve successful exchange across the Atlantic.

Examples of most significant issues with specification alignment

• **Certificates**: Self signed for purposes of demonstration
• **SAML**: Significant differences in the requirements for eHealthish versus epSOS implementation
• **Patient Discovery**: Demographics versus identifier based search
• **Document Query**: Difference in Class Code for Document Type used
• **Document Retrieve**: Country specific identifier is used to retrieve for epSOS
Future Prospects in Spain

- **Trillium Bridge fits eHealth Strategy:**
  - Testing and validating requirements
  - Automated generation for all citizens
  - All-bilingual approach - Multilingual terminologies
  - Stimulus for standards adoption
  - Solving practical legal issues
  - Complete semantic units approach fostering innovation

- **Moving forward**
  - Agreement levels: EU-USA, bilateral, patient led
  - “Convincing” industry about business added value of PS will require proof of feasibility and large-scale adoption
  - Population coverage measuring will be essential
  - Trillium Bridge documents may guide and teach
Portugal (about 3.5/9M Patient Summaries ready for exchange)

~ 10 million citizen
~ 50 Public Hospitals
~ 400 Primary Care Centres
~ 90% running SPMS ICT solutions (ADT and EHR)
~ 60 ICT Solutions (SPMS portfolio)

2014: American tourism in Portugal 227M€, (47.8M€, +26.7% from 2013): 156100 persons in 6 months, ~3548000 hotel nights (21.8%)
• Trillium Bridge fit with the eHealth strategy of Luxemburg?
  – By definition the eHealth Strategy of Luxembourg is cross border enabled
  – 45% of residents are expatriates
  – Luxembourg hosts many EU institutions
• How do Patient Summaries and Trillium Bridge work in Luxemburg?
  – Patient Summaries are part of the national strategy
  – The size of Luxembourg make it a perfect reference implementation and Large scale pilot
  – Trillium provides guidance on solving legal/organizational issues
• What are the prospects you see for the future?
  – Patient mobility will increase
  – Patient engagement is part of EU and US strategies
  – Patient role in his care both planned or unplanned

• ca. 550.000 Inhabitants
• Foreign nationals (45%)
• ca. 155.000 Commuters (FR/BE/GE)
• Three languages Luxembourgish French German
Global vision for citizens on the move

• Accommodate **new business models**
  - Create an interoperable “healthcare e-passport” service
  - Establish a **global encounter report** format compliant to standard based patient summaries
  - **Patient outsourcing**
  - **Patient mobility** –
    • break the m-health information silos
  - Focus on **prevention** and information flow

• Technology is not a barrier (i.e. Trillium Bridge)

What’s next?

Interoperability? We make it available.
Trillium Bridge: achievements

- **Gap analysis**
  - Compared patient summary specifications in EU/US
  - Shared clinical elements: problems, medications, allergies

- **Interoperability Assets**
  - Established a terminology prototype CTS-2 service
  - Developed Transformer of Patient summaries

- **Validation activities: 4 EU countries/ Kaiser Permanente**
  - EU/US Marketplace; HIMSS 2015; IHE Europe Connectathon 2015

- **Feasibility study:**
  - Reflected upon standards, cross-vendor integration, incentives, clinical research, security and privacy, innovative business models, education

**Recommendation:**
develop an international patient summary standard for people to communicate their allergies, medications, and problems anytime and anywhere as needed.
The JIC will contribute to better global patient health outcomes by providing strategic leadership in the specification of sets of implementable standards for health information sharing.
Recommendations on future standardization for Standards Developing Organizations (SDOs)

- **Future Standardization**
  - Cooperate International Patient Summary (PS) standard
  - Offer Terminologies & value sets at least for problems, medications, allergies, etc. in a frame similar to U.S. VSA
  - Address PS for planned care and secondary use.

- **cross-Vendor integration**
  - Export PS as part of societal responsibility
  - Offer PS for at least problems, medication, allergies
  - Support Trustworthy transatlantic exchange and use of PS.
Recommendations on incentives, security & privacy

Incentives

- Incentives for keeping complete and up-to-date patient summaries (PS)
- Accreditation or training for health professionals on PS
- Staff appraisals or comparative reporting on quality PS

Privacy and Security

- Legal basis for safe and secure exchange of PS
- Clear security safeguards for EU/US exchange of PS
- International agreements for PS discovery
Recommendations for Innovation, education, research

Promote Innovation with Patient Summaries (PS)
- Showcase events with social value demonstrating PS, perhaps in Olympics
- Encourage trialability of Innovative business models for PS
- Promote patient engagement with PS and Personal Health Records

US and EC work on a joint Educational program with professional associations and patient advocacy groups
- develop guidance for health professionals on the creation, maintenance and use of high quality PS
- foster initiatives that motivate and engage patients with keeping PS

US and EU Joint Research program including items like
- advance the accurate risk analysis of patients based on PS
- demonstrate the value of sharing high-quality PS
Think of a global eHealth ecosystem where:

- **people** (digital natives and immigrants) enjoy timely safe and informed health, anywhere around the globe
- interoperability assets fuel **creativity, entrepreneurship, and innovation**

where **eStandards**:

- **nurture** large-scale eHealth deployments to strengthen **Europe’s voice** and impact locally on its citizens and globally on the world
- enable **co-creation** in interoperability where **trusted dialogs** on health, costs, and plans meet **great expectations**.
The How of eStandards

- Alignment of eHealth standards
  - accelerate knowledge-sharing, and promote wide adoption of standards.

- Evidence-based Roadmap
  - Convergence, iterative consolidation, broad acceptance of eStandards

- Quality Management System
  - interoperability testing & certification of eHealth systems.

- Coexistence of standards in large-scale eHealth deployment

- International interoperability action
  - EU/US MoU roadmap
  - Influence global standards
  - Boost competiveness
  - Fuel innovation

- Socio-economic aspects of interoperability
  - language for user/vendor co-making’ in trust
**eStandards** and its siblings
nurturing large scale eHealth Deployment

**Assess CT**: the challenge of terminologies
- problems

**OpenMedicine**: the challenge of medication identification and substitution
- medications

**eStandards**: co-existence, change narrative, focus on tools
- Allergies

- **valueHealth**: sustainable business models