From syntactic to semantic and clinical interoperability

HIC 2012, Sydney
August 2012

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NEHTA’s purpose

Lead the uptake of eHealth systems of national significance; and coordinate the progression and accelerate the adoption of eHealth by delivering urgently needed integration infrastructure and standards for health information.
From Syntactic to Semantic & Clinical Interoperability

Agenda

- Why interoperability is hard?
- What is clinical interoperability?
  - Why is it harder?
- Strategies to achieve interoperability
- NEHTA CTI new modelling approach
- Results
  - Archiving interoperable reuse without repurposing
A Matter of Syntax & Semantics?

Semantic interoperability has dominated eHealth discussions since early 2000

Important question: is it simply a matter of syntax and semantic?

Problems: Discourses express contents and meanings. They mirror and enact disparate interests of different parties. They are always in potential or actual conflicts

Communication is interpretive in nature. So is information modelling.

Kiwi as an example of homonym. It can be used to mean:
- a fruit
- a native NZ bird
- a NZ-lander (person)

Source: Stephen Chu
Challenges

- Complexity of healthcare, health languages, fuzziness of clinical statements
- Issues of expressivity vs precision
- Exponential expanding and changing health knowledge
- Demands for large scale sharing and reuse
- Rapidly changing health technology landscape
- Health services consumer demands
Syntactic and Semantic Interoperability

- Syntactic interoperability – the challenges continues ...
  - Everyone likes to make their own “nuts and bolts”
  - The issue of boundaries between structure & terminologies
    - Expressivity versus precision (and computability; reusability)

Why is it hard?
Different systems represent the same data in different ways – everyone likes to make their own nuts, bolts and widgets in software engineering
The “my way is more correct” syndrome

Model source: Dr Stan Huff, Intermountain Healthcare
And … along came Clinical Interoperability

Why clinical interoperability is SO DIFFICULT: some example

Complexity (processing, … etc)

Medication History List
Medication Review Record
Medication Profile
Medication Management Plan

Data components

Prescribed √
Dispensed √
Administered ???

Medication administration details versus Administration / conformance Profile:
- Omission frequency + reasons
- Dose variation frequency + reasons
- Frequency variation frequency + reasons
- Intermittent + PRN frequency + reasons

Past versus Current Medications:
How to represent them?
view vs data store
How clinically safe are these concepts to be used?

Medication administration
What is clinically more useful?
What are the costs of:
- Implementation?
- Utilization (time & medico-legal)?
Interoperability

Achieving syntactic, semantic and clinical interoperability

- What are the answers?
- Achieving the ultimate goal of information architecture
  - To be “prophetic”, to take things that are unknown and make them known, understandable, useful and reusable to the benefits of healthcare community (the KUUR principle)
Achieving Interoperability

Starting point – the separation of concerns as a new modelling paradigm

- Documentations and exchanges
- Individual needs and expectations
- Organisational and business constraints
- Continuity of care and efficient collaborative care
- Improved clinical safety and quality
- More effective and efficient healthcare

Conceptual/Business

- Standardised health concept representation
- Capture admin, financial, regulatory or legislative + Clinical requirements
- Independent content models and supporting implementation options
- High reusability – without need for fragile and costly repurposing at each reuse

Logical/Platform Independent

- Comply with national and international standards
- Leverage on COTS products
- Leverage existing expertise
- Ensure data and extend of change is manageable
- Support competitive commercial environment

Implementable

Traceability
Achieving interoperability

Critical Factor: achieving correct balance between information structure and terminologies

- The what and how information is used will determine what to include and how to model the information
  - Significant challenges to analysts and modellers
- Separation of interface layer design from technical layer design
  - Significant challenges to software developers
Achieving Interoperability: New strategies

- New modelling and specification development strategies
- Wide clinical stakeholders engagement to improve clinical interoperability
- Robust governance framework:
  - Requirements: clinically approved use cases and clinical stories
    - MUST consider what the information will used for and how it will be used
  - Governance structure: who, roles and accountability
  - Editorial rules, decision, approval and accountability principles
  - Quality criteria
  - Transparent decision and arbitration processes especially in issues resolution: how to reach consensus?
- Tooling:
  - Web-based collaborative environment: NEHTA CKM
  - Rule-based transformation + traceability
  - Round trip transformation validation
Achieving Interoperability

From conceptual to implementable

Agile, iterative modelling

Archetype/DCM modelling:
- Clinical driven
- Collaborative
- Comprehensive validation
  - Iterative
  - Adequacy, accuracy, reliability, consistency (AaRC principle)
- Good editorial policy
- Good clinical governance

Logical content specifications & Technical Impl Guides
- Domain requirements driven
- Iterative
- Reuse of DCMs: consistency
- Round trip validation: accuracy & reliability
Achieving Interoperability

The Result – achieving reuse without repurposing
Achieving Interoperability

- Results of NEHTA CTI new modelling approach available at:
  - Archetypes
  - Logical Contents Specifications & Technical Specifications (CDA Implementation Guides)
July 2012 – the Australian Government has commenced rolling out the national eHealth records system and Australians have starting registering for their eHealth record.
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www.ehealth.gov.au
Thank you and Questions

Any further questions please contact:

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