MIE 2014
31.08 - 03.09.2014
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HL7 CDA Around the World:
Many Patient Summaries one Standard

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www.trilliumbridge.eu

EFMI
EUROPEAN FEDERATION
for MEDICAL INFORMATICS
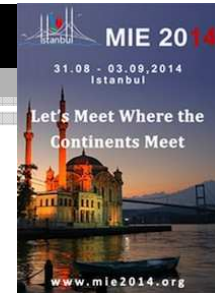
HL7 Leads HIT Standards development since 1987

- **Mission:** build the best most widely used HIT standards
- **History:**

  Since 1987 HL7 grows exponentially - demand outstrips capacity, HL7 v3, HL7 CDA, 40+ WGs, 50+ standards products in use; HL7 is supported by over 35 national/regional Affiliates and members in over 55 countries

- **1997: first national affiliate on board/ IHIC conference**
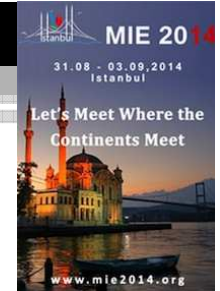- **2004: HL7 CDA is adopted**
- **2009: HL7 International, USA on the International Council**
- **2010: HL7 International Foundation in Europe established**
- **2012: 25 years youth celebration with FHIR, HL7 Asia**
- **2013: HL7 makes standards available under free license**

1987 1997 2004 2009 2010 2012 2013

Overview

- Patient Summaries around the world in HL7 CDA
- Patient Summaries in CDA
  - Europe
  - Asia-Pacific
  - Americas
- EU: European Patient Summary Guideline
  - Cross border care in the European Union
  - Across the Atlantic with Trillium Bridge
- Trillium Bridge: Some early findings
- The problem with standards
- Conclusions / outlook

HL7 CDA in Germany

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Slides Curtesy of: Kai Heitmann
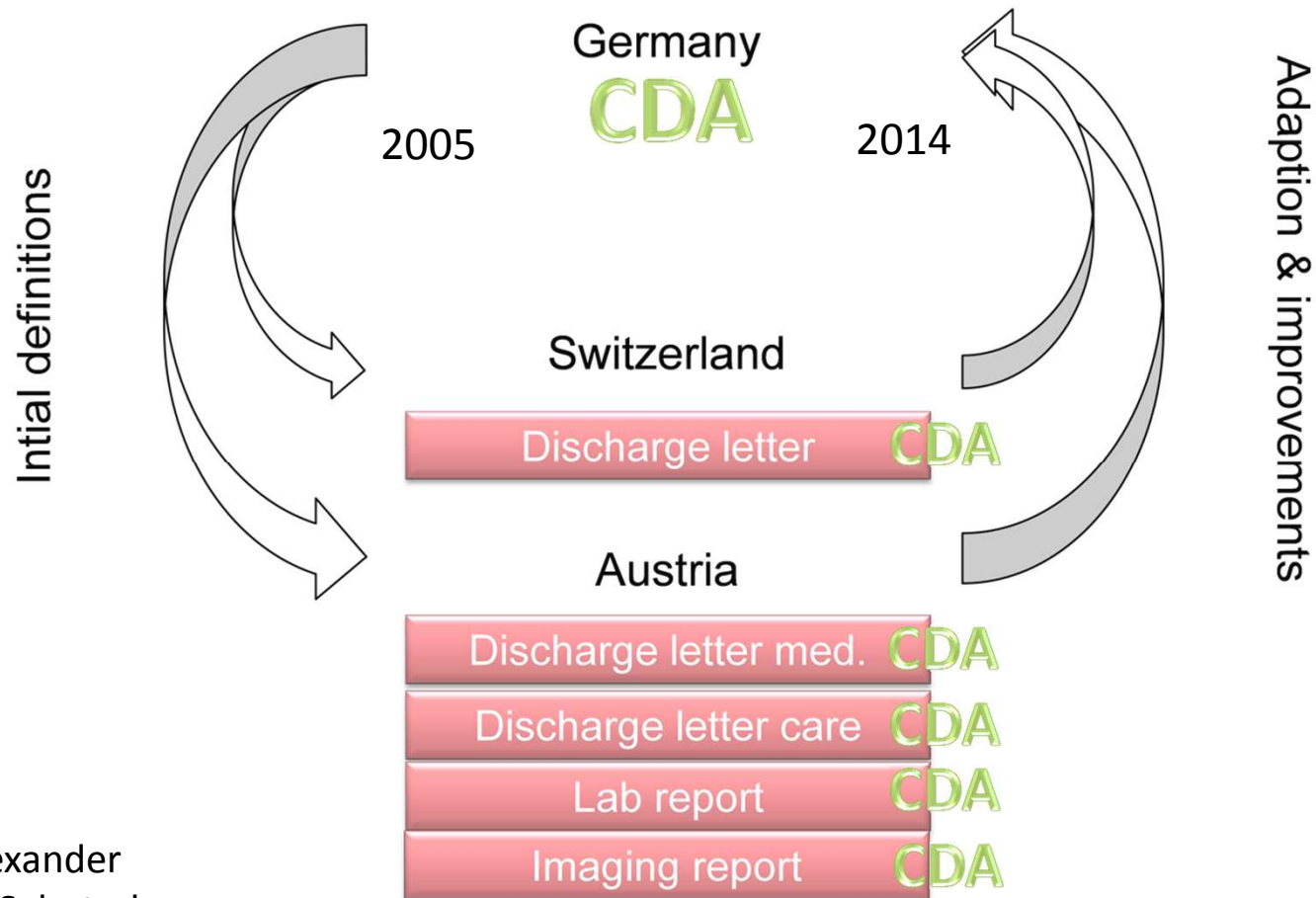Past Chair HL7 Germany

Sciphox (sky-fox) Project (DE)

- Introduction of CDA in the year 2000+ in Germany, as a cooperation between general practitioners and hospitals
- Lead later in 2005 to the first CDA R2 **Discharge Letter** definition
  - With ~ 15 vendors involved
  - Large show case, implementations
- Was input to similar definitions in Austria (national infrastructure ELGA) and Switzerland around 2008-2010

CDA

German Discharge Letter
Genesis, influence, cooperation

Germany
CDA

2005

2014

Intial definitions

Adaption & improvements

Switzerland

Discharge letter **CDA**

Austria

Discharge letter med. **CDA**

Discharge letter care **CDA**

Lab report **CDA**

Imaging report **CDA**

Courtesy of Alexander Mense, Stefan Sabutsch, Bernd Blobel, modified

ART-DECOR Tool

- **DECOR**
  - Data Elements, Codes, OIDs and Rules
- **ART**
  - Advanced Requirement Tooling

Healthcare Providers and Medical Experts	Terminologists	Analysts, Modellers and Template Creators	Vendors and Interface Specialists

Internet: art-decor.org

HL7 CDA legacy:
patient summaries in Finland

Slides Curtesy of: Prof. Juha Mykkänen
Chair HL7 Finland

HL7 Finland in context

- Finland: 5,5M population, steep aging curve

- Health care system:
  - public health care organized by 320 municipalities and joint boards on three levels: reform decision in 2014 → five major regions as organizers of health and social services, municipalities as service providers
  - private and third sector: occupational health services, private clinics and hospitals

- eHealth in Finland
  - 100% EPR penetration in public services, long-term development of eHealth systems and services, from local to regional and national-level
  - "at a world-level benchmark in eHealth" (EHTEL review 2013)

- New national eHealth strategy preparation underway: interoperability as a central part of infrastructure strategy
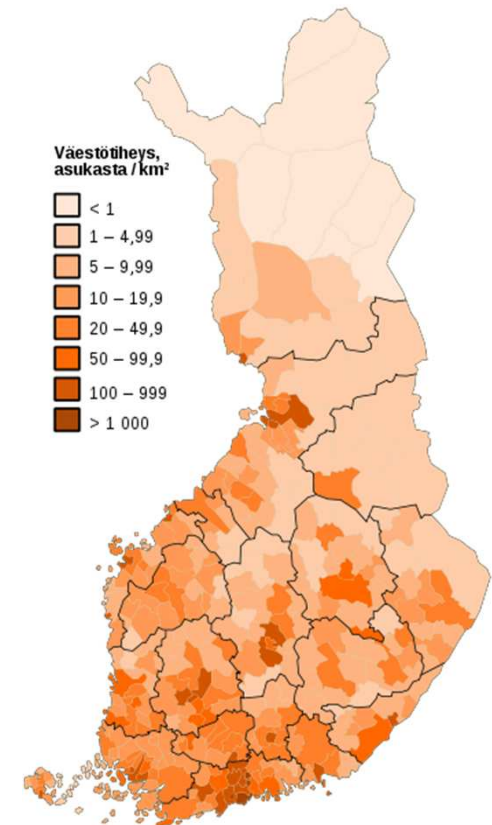
HL7 Finland (est.1995): long history in HL7 messages and IGs, active technical committees, integrated IHE and personal health SIGs, etc. One of the very first implementation of HL7 CDA (2004-5)

Väestötiheys, asukasta / km²

< 1
1 – 4,99
5 – 9,99
10 – 19,9
20 – 49,9
50 – 99,9
100 – 999
> 1 000

HL7 FINLAND ry

HL7 CDA in Finland

- CDA R1 was used in regional information systems for information sharing
- CDA R2 was selected for national eHealth infrastructure (~2005)
  - Kanta services: National EPR archive, ePrescription centre, national code server, etc.
  - Transport using HL7 v3 Medical Records Messages (in future: also IHE infrastructure)
- CDA R2 localized implementation guides in Finland for:
  - ePrescription (prescriptions, dispensations)
  - EPR
    - core dataset = **patient summary**, providers, diagnoses and concerns, procedures, examinations, results, service events, aids, blood group, functional status, medical certificates, queuing, follow-ups, goals, risks, nursing core dataset including summaries
    - lab, medication, imaging reference and report, referral and discharge, scanned documents, dental records
- Use of CDA in national ePrescription IGs made it easier to study, understand and comply with the international ePrescription specifications
  - According to epSOS experience from the National Insurance Institute (Kela)

HL7 FINLAND ry

HL7 CDA legacy in ELGA:
patient summaries in Austria

Information Curtesy of Dr Stefan Sabutsch, *Chair HL7 Austria*

HL7 CDA in ELGA

- The ELGA GmbH is responsible for defining nation-wide HL7 CDA Implementation Guides in Austria.
- The process of creating HL7 CDA Implementation Guides was intense:
  - 3 years of harmonization work in working groups
  - Inclusive process including Austrian stakeholders
- Resulted in nation-wide harmonized and detailed technical specifications and Implementation Guides
  - Discharge Summary (Physician)
  - Discharge Summary (Nurse)
  - Laboratory report
  - Radiology report
- All documents are available from http://www.elga.gv.at/index.php?id=28 (German language only).

Global IHE Implementation Guides in the Austrian context

- **Use of International standards is a fundamental requirement for ELGA**
  - IHE profiles are adapted to Austrian demands
- **Why was it impossible to adopt as is the IHE specifications?**
  - Austrian constraints demanded changing parts of templates
  - working group experts considered better alternatives.
- **What type of changes?**
  - stricter or relaxed options of CDA Level 3 entries based on value-sets for code-lists
  - New content template that matched perfectly the Austrian needs.

ELGA discharge summaries

Physician and Nursing discharge summary parts

➡ separate CDA documents and Implementation Guides (IGs)

➡ relevant information is responsibity of Physician or Nurse

➡ both accessible in ELGA by both parties.

Austrian Health Record (ELGA) includes documents that follow the ELGA Implementation Guides.

 Organizations must upgrade the information systems to conform to ELGA IGs to connect to ELGA

➡ Three ELGA Interoperability Levels (EIS)

➡ to enable quick & easy connection of providers, min data quality

➡ The ELGA legislation act mention that in the future the Austrian MoH will enforce interoperability levels through ordinances.

ELGA Interoperability levels (EIS)

- **EIS "Basic" / "Structured" minimum requirement**
  - coded information for document registry, access control system.
  - medical content may be unstructured data, e.g. embedded PDF object.
  - CDA documents conform to the Common Implementation Guide (IG) and CDA Header-constraints in Specialized IGs
- **EIS "STRUCTURED" indicates that the human readable content of an embedded PDF meets the requirements of Specialized IGs**
- **EIS "Enhanced" further to EIS "Basic/Stractured"**
  - documents have to additionally follow the CDA Body constraints of Specialized IG
  - Unstructured content is not allowed in this level.
  - CDA Body is generally structured in CDA 2 sections, may contain CDA L3 elements
- **EIS "Full support" further to EIS "Enhanced"**
  - CDA documents conform to CDA Body constraints of Specialized IGs
  - Additional CDA Level 3 entries are required in most of the sections.

Patient summaries in ELGA

- ELGA to serve as platform for Patient summary
- Patient Summary could be automatically created out of existing documents in ELGA
  - discharge summary
  - lab+radiology report
- Requirements for ELGA patient summaries
  - all ELGA documents in EIS "full support"
  - more documents types to a complete patient summary.

- If these basic prerequisites are not fulfilled, an automatically generated patient summary remains wishful thinking…
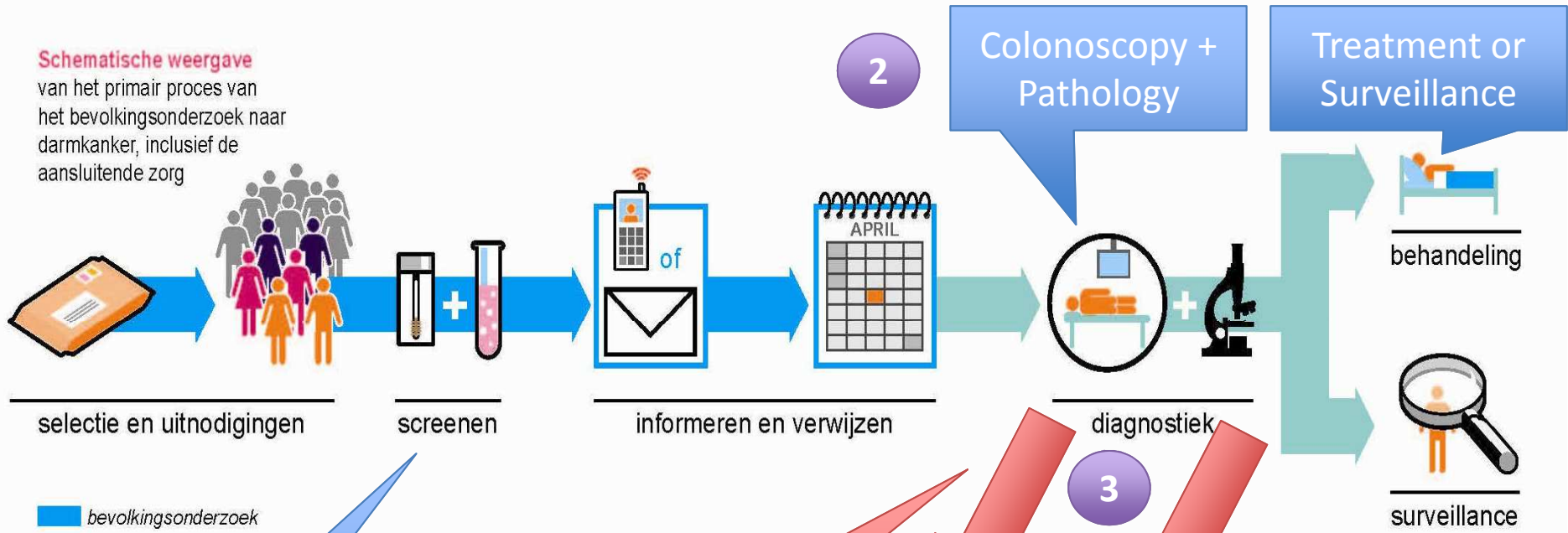
HL7 CDA & Patient summaries in the Netherlands

Slides Curtesy: Kai Heitmann, Past Chair HL7 Germany Information on Patient summaries Curtesy of Dr Michiel Springer, *NICTIZ*

Colon Cancer Screening (NL)

Schematische weergave van het primair proces van het bevolkingsonderzoek naar darmkanker, inclusief de aansluitende zorg

selectie en uitnodigingen | screenen | informeren en verwijzen | diagnostiek | behandeling | surveillance

bevolkingsonderzoek
aansluitende zorg

1 Population Screening

2 Colonoscopy + Pathology

3 Data Exchange Colonoscopy Pathology via HL7 CDA Documents

4 Treatment or Surveillance

CDA

COLONIS
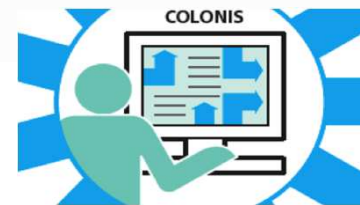
Quality insurance and data center

Screening Data set

- RIVM (National Institute for **Public Health** and the Environment) specifies set of data for
  - Screening process
  - Data warehousing
  - Monitoring (quality, financial, etc.)
- **Cooperation** between Medical Specialists and IT-Professionals result:
  - **dataset** in ART-DECOR + **CDA document specifications** for the exchange of information

Definition of a dataset

Dutch Discharge summary project

- **8 University Medical Centers (UMCs) and Nictiz define patient summary for patient referrals**
  - outreach to 90 general hospitals in the country
  - extend to sectors like mental health and nursing homes
- **Patient Summary in HL7 CCR/CCD, v1.0, Apr 2013.**
  - 37 clinical templates or building blocks
  - DCM methodology (light) SMOMED and LOINC
  - Documentation in English is available.

    4 of the 8 UMCs build new EHR s, and will add capability of exchanging CDA patient summaries.
- **Refinement and maintenance procedure (summer 2014)**
  - Handle 90 change requests
  - Add templates specific to nursing, quality reporting.
  - C-CDA referral document.

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CDA life in New Zealand
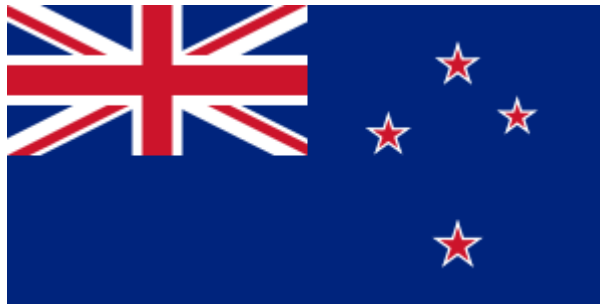
Slides Curtesy of Dr Alastair Kenworthy
MoH New Zealand

ithealthboard.health.nz/standards

Our three pillars of interoperability in NZ
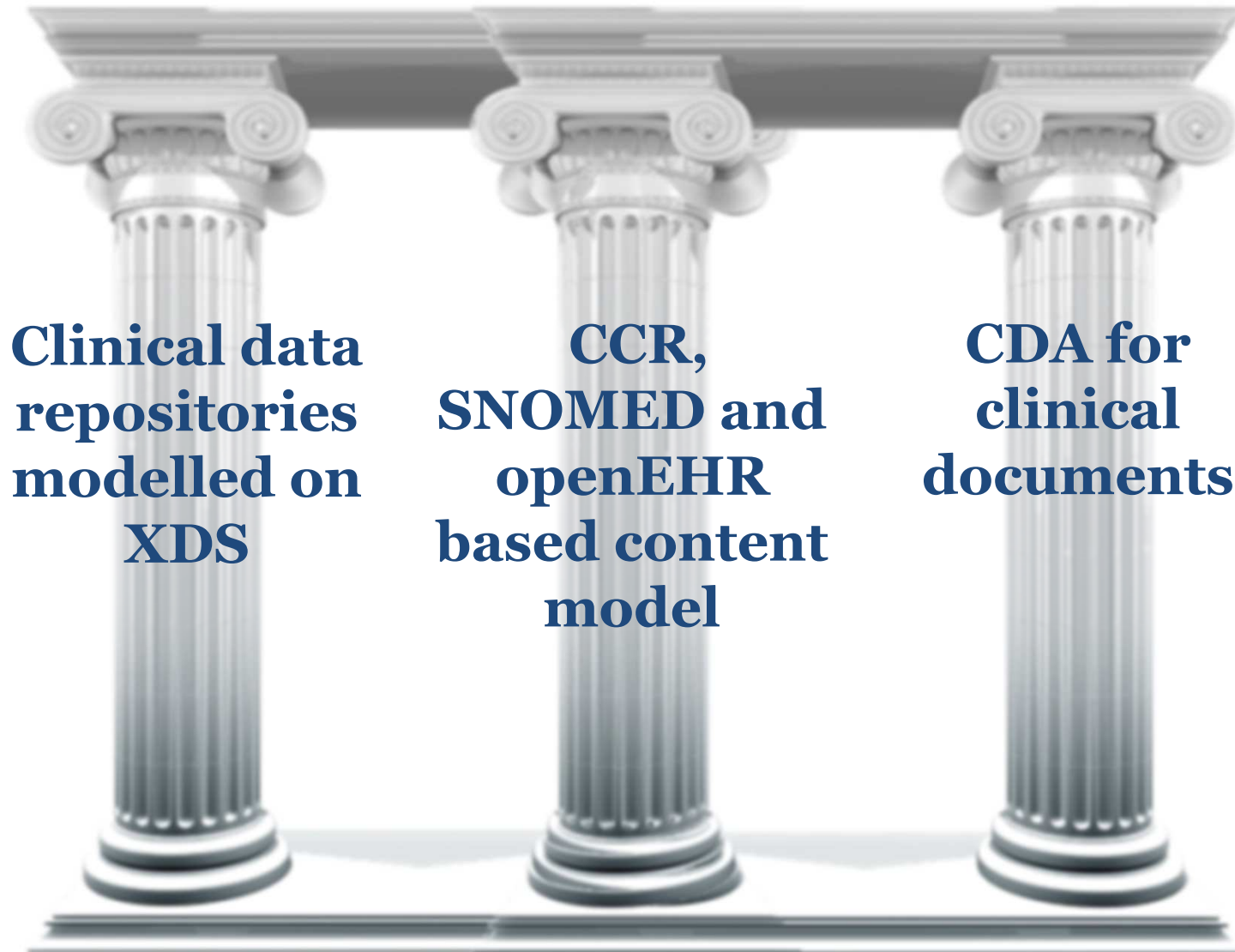
Clinical data repositories modelled on XDS

CCR, SNOMED and openEHR based content model

CDA for clinical documents

Where CDA life in NZ came from ...
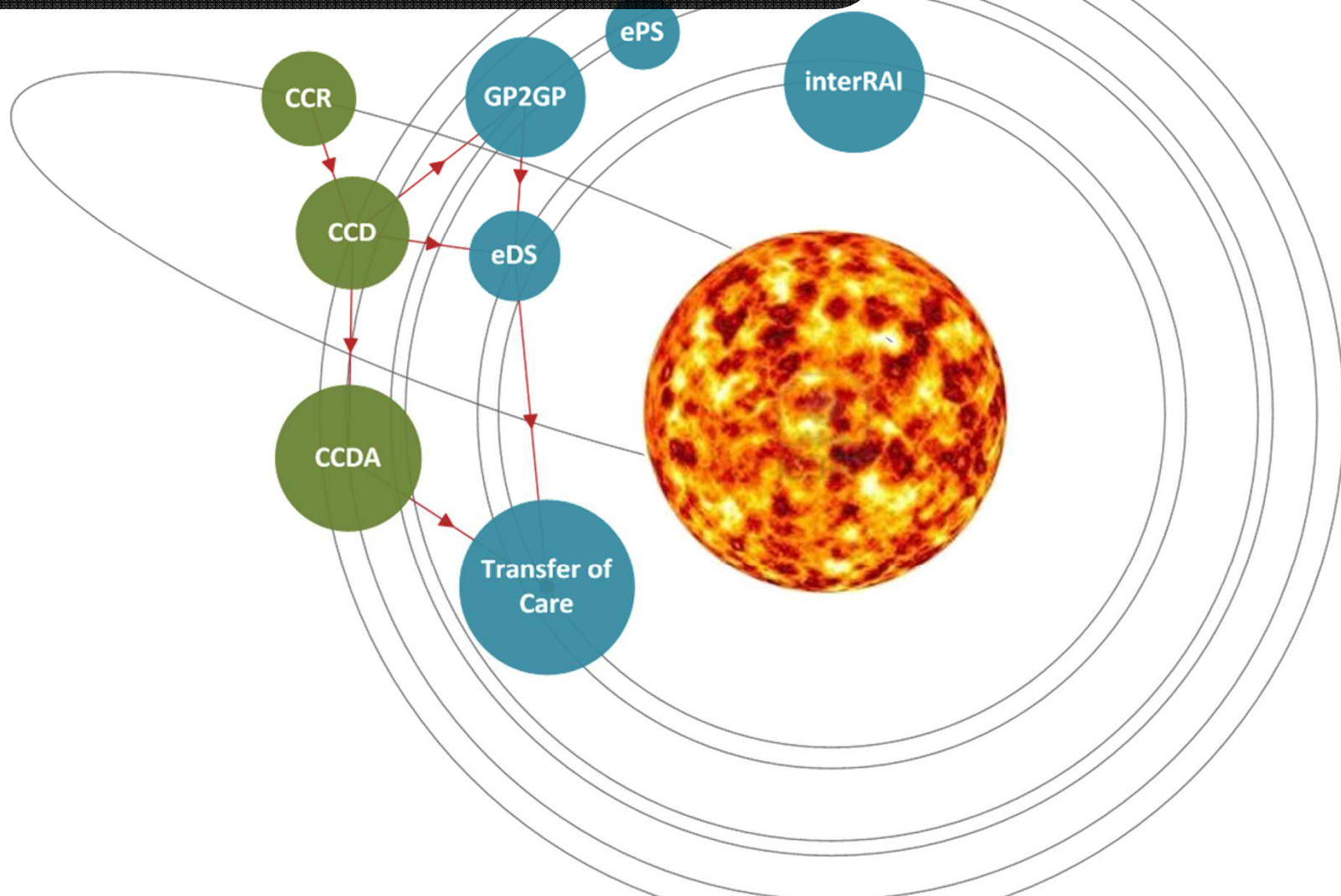
NZ will use CDA at all points on the circle of care

NZ is rapidly moving from HL7 v2 transport to RESTful web services

Summer of CDA

NZ has developed a core set of CDA document types ...

10043 CDA Common Templates
\10041.1 Discharge Summaries
10047 Clinical Assessments
10052 Ambulance ePRF
10030 Prescriptions
GP2GP

hiso Health Information Standards Organisation
PAEREWA P...

NZ is still busily developing CDA based standards

10052.1 **Ambulance Care Summary Data Set**

10052.2 **CDA Templates for Ambulance Care Summary**

SNOMED coded clinical impressions and procedures for ambulance ePRF

In development

Patient Summaries in Korea

Slides Curtesy of Prof. Il Kon Kim

Medical information exchange for Worker's Compensation Hospital

Ref. ezCareTech, Korea

Project Team

Fund
Ministry of Science, ICT and Future Planing

Project Administrator
National Information Society Agency

Subproject Administrator
National IT industry Promotion Agency

Project Manager
ezCareTech

BIT Computer

Seoul National University Bundang Hospital

Incheon and Ansan Workers' Compensation Hospital

UcareSoft

OnSicurity

VAIM Consulting
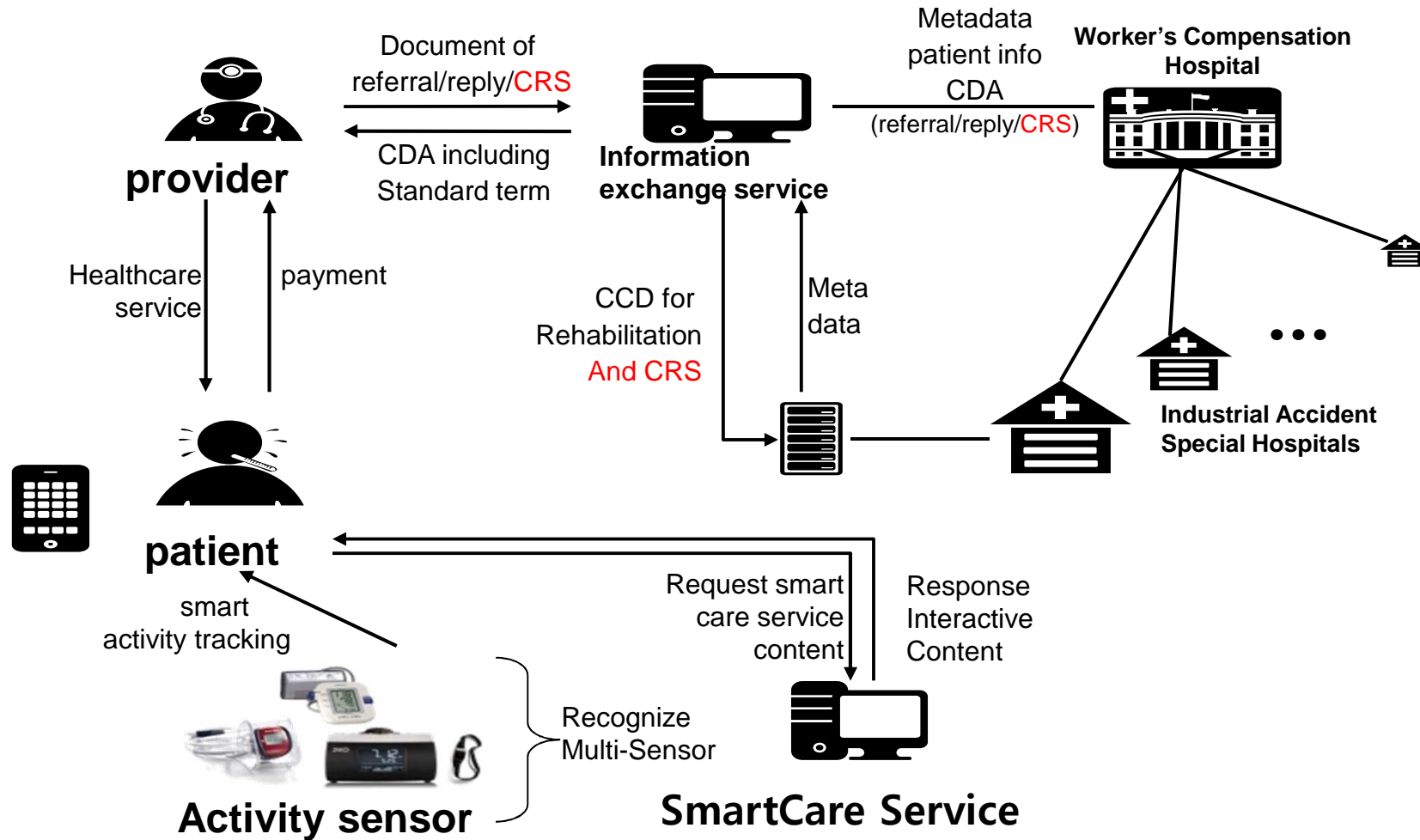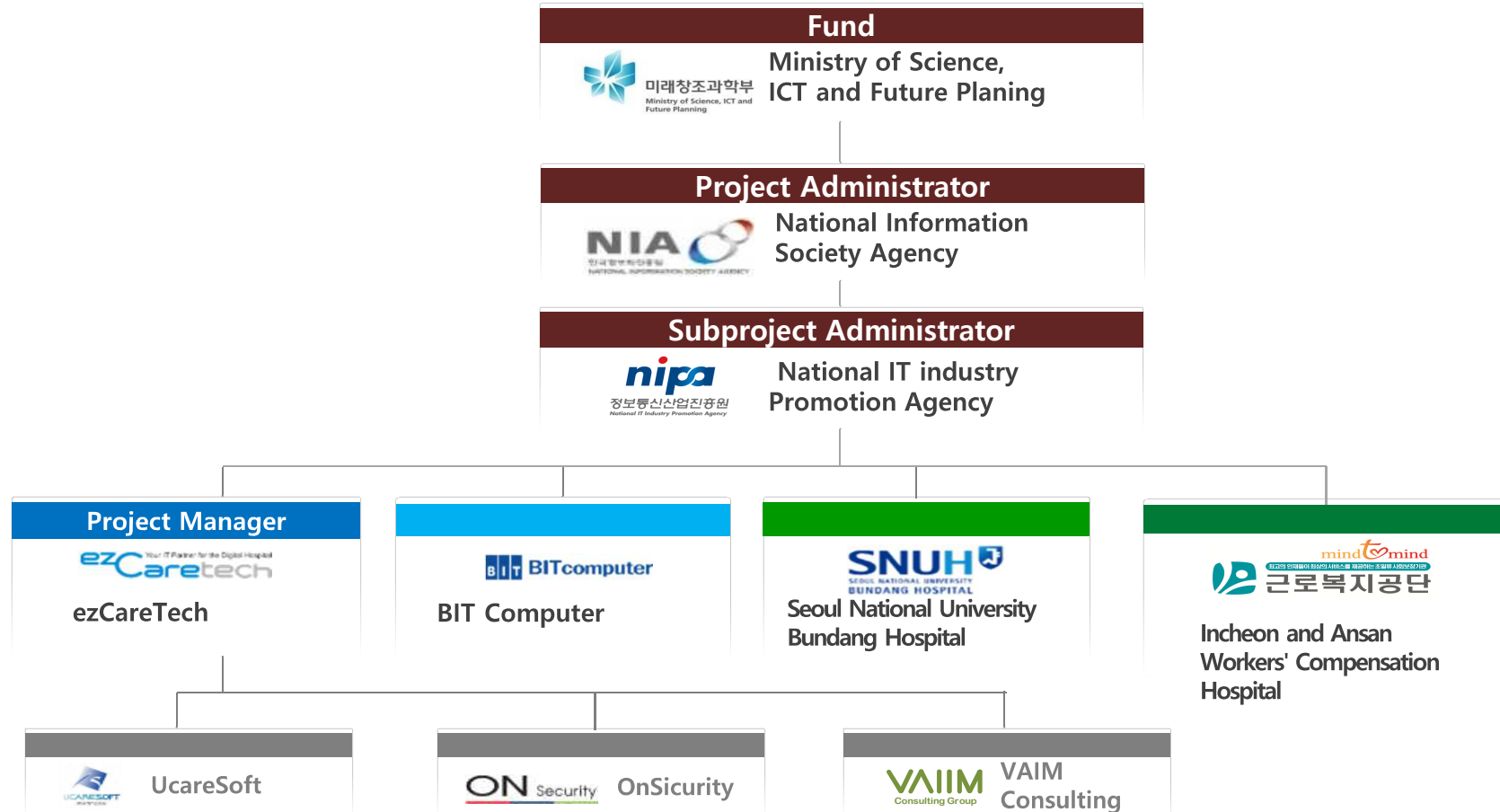
Care Record Summary Sections/Entries

	Data Element Name	LOINC Code	Item / Entry	TemplateID
Header	**Document Information**		**Templateid / ID / Code / EffectiveTime**	
	RecordTarget		**Name/ Gendercode / Telecom /Birthtime/ address/ ID /**	
	Author Information		**Time / ID / Address / Telecom / AssignedPerson**	
	Custodian		**ID / Name / Address / Telecom**	
Body	**Encounter Section**	46240-8	**Encounters Activities**	2.16.840.1.113883.10.20.22.2.22
	Problem Section	11450-4	**Problem ConcernAct/Problem Observation**	2.16.840.1.113883.10.20.22.2.5.1
	Medications Section	10160-0	**Medication Activity / Medication Information / Medication Supply Order**	2.16.840.1.113883.10.20.22.2.1.1
	Results Section	30954-2	**Result Organizer / Result Observation**	2.16.840.1.113883.10.20.22.2.3.1
	Immunizations Section	11369-6	**Immunization Activity / Immunization Medication Information**	2.16.840.1.113883.10.20.22.2.2
	Allergies Section	48765-2	**Allergy Problem Act / Allergy Observation / Reaction Observation**	2.16.840.1.113883.10.20.22.2.6
	Procedures Section	47519-4	**Procedures Activity Act / Indication**	2.16.840.1.113883.10.20.22.2.7.1
	Plan of Care Section	18776-5	**Instruction / Plan of Activity Act / Plan of Activity Encounter / Plan of Care Activity Observation / Plan of Care Activity Procedure / Plan of Care Activity Substance Administration / Plan of Care Activity Supply**	2.16.840.1.113883.10.20.22.2.10
	Vital Sign (Optional) Section	8716-3	**Vital Signs Organizer Vital Signs Observation**	2.16.840.1.113883.10.20.22.2.4

Ref. IHIS & Ucaresoft, Korea

Patient Summaries in Japan

Information Curtesy of
Massaki Hirai

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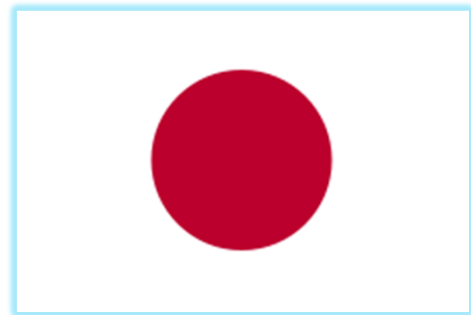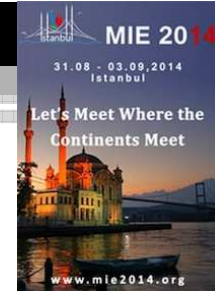
Patient Summaries in Japan

- HL7 CDA has been adopted in Japan

- HL7 Japan work on summary standard using CDA.

- no paper base summary standard in Japan.

- Many researchers have tried to develop the standard but they are not yet success.

- Current approach is that the standard is using narrative part and automatically generated contents.

Patient Summaries in the EU

European Patient Summary Guideline (*based on epSOS*)

Contact point

Contact point

Clinical records

Terminology services

PS translated

PS

Clinical records

Is seen by

Country of treatment
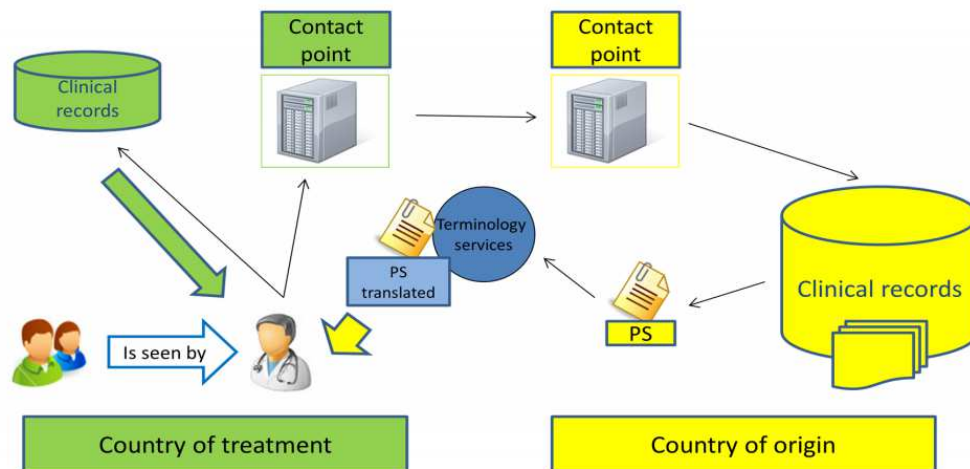
Country of origin

The patient feels sick and seeks healthcare in a country that is not his/her country of origin. As he/she frequently visits that country the health professional may have some clinical information about that patient in his/her own records. They will not normally have a language in common.

GUIDELINES ON MINIMUM/NON-EXHAUSTIVE PATIENT SUMMARY DATASET FOR ELECTRONIC EXCHANGE IN ACCORDANCE WITH THE CROSS-BORDER DIRECTIVE 2011/24/EU

RELEASE 1

Status: **ADOPTED** by the eHealth Network
Version: 1.0
Date: 19 November 2013

Patient summaries in the USA

US Meaningful Use: Consolidated-CDA/CCD

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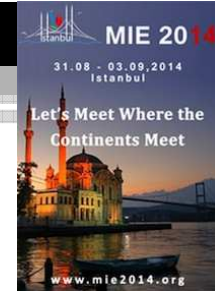www.mie2014.org

§ 170.205 Content exchange standards and implementation specifications for exchanging electronic health information.

170.205(a)(3)	**Consolidated CDA (C-CDA): Standardized representation of the Consult Note, Diagnostic Imaging Report, Discharge Summary, History and Physical, Operative Note, Procedure Note, Progress Note, and Continuity of Care Document (CCD).**
170.205(h)	CDA Guide for Quality Reporting Document Architecture, Category I
170.205(i)	CDA Guide for Reporting to Central Cancer Registries
170.205(k)	CDA Guide for Quality Reporting Document Architecture, Category III (QRDA-III)

CDAR2_IG_IHE_CONSOL_DSTU_R1.1_2012JUL

HL7
INTERNATIONAL

HL7 Implementation Guide for CDA® Release 2:
IHE Health Story Consolidation, DSTU Release 1.1

(US Realm)

Draft Standard for Trial Use

July 2012

Publication of this draft standard for trial use and comment has been approved by Health Level Seven International (HL7). This draft standard is not an accredited American National Standard. The comment period for use of this draft standard shall end 24 months from the date of publication. Suggestions for revision should be submitted at http://www.hl7.org/dstucomments/index.cfm.

Following this 24 month evaluation period, this draft standard, revised as necessary, will be submitted to a normative ballot in preparation for approval by ANSI as an American National Standard. Implementations of this draft standard shall be viable throughout the normative ballot process and for up to six months after publication of the relevant normative standard.

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HL7 CDA content exchange standards under Meaningful Use Stage II

§ 170.205 Content exchange standards and implementation specifications for exchanging electronic health information.	
170.205(a)(3)	Consolidated CDA (C-CDA): Standardized representation of the Consult Note, Diagnostic Imaging Report, Discharge Summary, History and Physical, Operative Note, Procedure Note, Progress Note, and Continuity of Care Document (CCD).
170.205(h)	CDA Guide for Quality Reporting Document Architecture, Category I (QRDA-I): Standardized representation of quality data for an individual patient. Data in a QRDA-I report can be consumed by a calculation engine to determine if the patient met the numerator or denominator criteria for a given quality measure.
170.205(i)	CDA Guide for Reporting to Central Cancer Registries: Standardized cancer registry reporting format.
170.205(k)	CDA Guide for Quality Reporting Document Architecture, Category III (QRDA-III): Standardized representation of aggregate quality data (e.g. number of patients meeting the numerator criteria for a given quality measure).

Blue Button+

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HL7 C-CDA Sections	Description
Header	Patient information demographics
Allergies, Adverse Reactions, Alerts	Includes status and severity of each.
Encounters	Surgeries, ED visits, etc.
Immunizations	Immunizations and vaccines
Medications	As prescribed by the provider
Care Plan	Planned activities and encounters
Discharge Medications	Part of hospital discharge summary
Reason for Referral	Written reason for referral
Problem List	Concerns, complaints, and observations
Procedures	History of procedures
Functional & Cognitive Status	List of impairments
Results	Includes laboratory tests
Social History	Observations like smoking, drinking, etc.
Vital Signs	Includes height, weight, blood pressure, etc
Discharge Instructions	Written discharge instructions

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 February 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

Milestones to success

We are here

Policy Alignment:

•Organizational, Legal, Regulatory Interoperability
- Feasibility Analysis
  - Cross-vendor integration
  - Incentives
  - Standardization
  - Innovative Business models
  - eIdentification,
  - Security and privacy
  - Education
  - Clinical Research

Testing the Bridge:

- Testing Tools
- Data Sets
- Validation Reports

Building the Bridge:

- Aligning Structure & Terminology
- Trust Agreements
- Interoperability assets

Selecting Grounds:

- Pilot Use Cases
- Business Architecture
- Gap Analysis

Comparing EHR Summaries:
EU Patient Summary vs US Clinical Summaries

- Same base Standard (HL7 CDA)

- Different philosophy: capture vs continuity of care

- Different IGs: C-CDA/CCD (US realm) vs epSOS IG

- Different technical approach: Open vs Closed Template
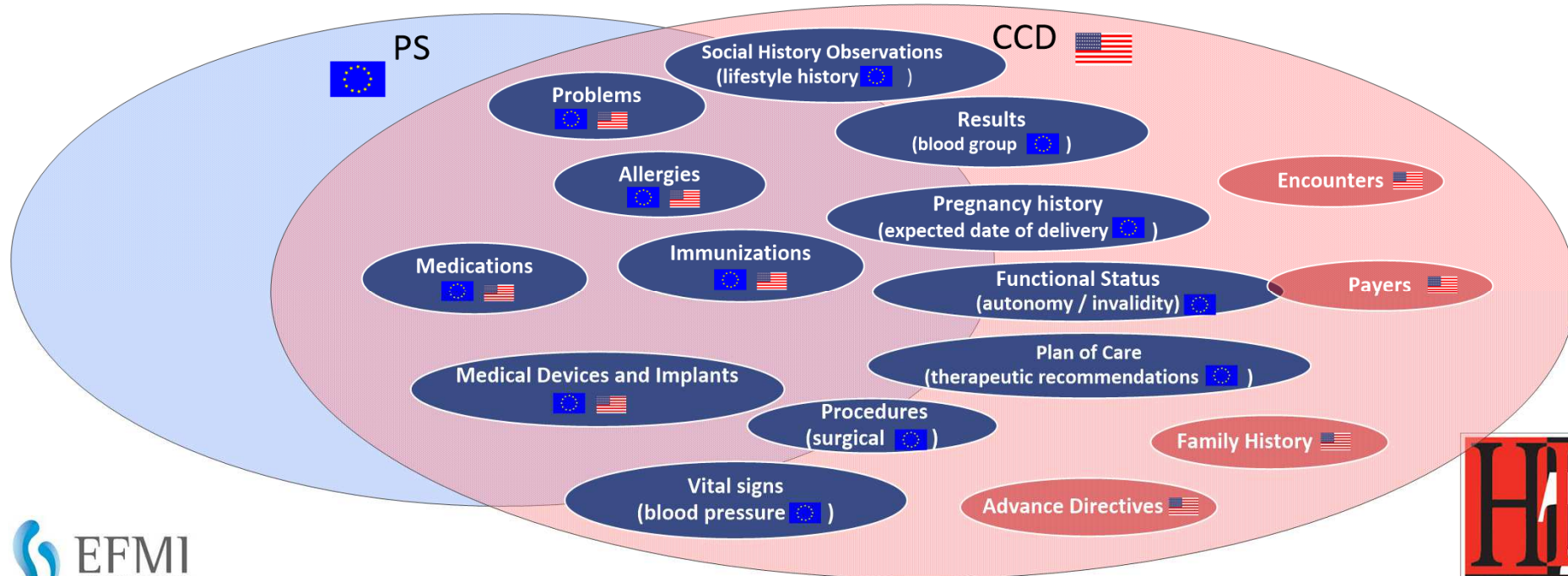
Gap Analysis: Clinical Comparison (Body)

epSOS/EU Patient Summary Guideline	EU PS Guideline	epSOS PS	CCD	
Section	Optionality	Optionality	Section	Optionality
Allergy	R	R	Allergies	R
Medical Alert Information (other alerts not included in allergies)	R	R	NA	
Vaccinations	O	O	Immunizations	O
List of resolved, closed or inactive problems	O	O	Problem	R
Surgical Procedures prior to the past six months	R	O	Procedures	O (R only for inpatients)
List of current problems / diagnoses	R	R	Problem	R
Medical Devices and implants	R	R	Medical Equipment	O
Major Surgical Procedures in the past six months	R	R	Procedures	O (R only for inpatients)

Gap Analysis: Clinical Comparison (Body)

epSOS/EU Patient Summary Guideline	EU PS Guideline	epSOS PS	CCD	
Treatment Recommendations	R	O	Plan of Care	O
Autonomy / Invalidity	R	O	Functional Status	O
List of current medicines	R	R	Medications	R
Social History Observations	O		Social History	O
Pregnancy history (Expected date of delivery)	O	O	Pregnancy Observation of the Social History	O
Physical findings (Vital Signs Observations)	O	O	Vital Signs	O
Diagnostic tests (Blood group)	O	O	Results Section	R
N/A			Advance Directives	O
N/A			Family History	O
N/A			Payer	O

Gap Analysis: Sample Sections & Terminologies

Coded Section (C-CDA/CCD)	C-CDA Code System	epSOS Value Set Name	epSOS terminology
Allergy/Adverse Event Type	SNOMED CT	epSOSAdverseEventType/ epSOSReactionAllergy	SNOMED CT
Medication Clinical Drug Name Value Set	RxNORM	epSOSActiveIngredient	ATC
Vaccine Admin Value Set	CDC Vaccine Code (CVX)	epSOSVaccine	SNOMED CT
Problem	SNOMED CT	epSOSIllnessesandDisorders	ICD-10
Medical Equipment	N/A	epSOSMEdicalDevices	SNOMED CT
Medication Route FDA	FDA RouteofAdministration	epSOSRouteofAdministration	EDQM
UnitsofMeasureCaseSensitive	UCUM	epSOSUnits	UCUM
Vital Sign	LOINC	epSOSBloodPressure	LOINC

Trillium Bridge: achievements/work ahead

Completed Gap analysis

➡ In collaboration with S&I WG EHR Interoperability work stream

➡ Released Deliverable D2.2: Comparing Patient Summaries in the EU and US: Gap Analysis and Pilot Use Case Definition
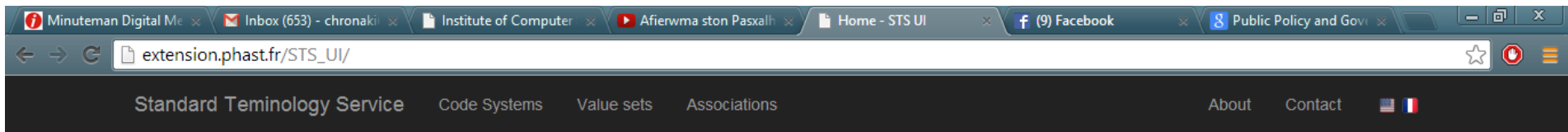
Identified interoperability Assets

➡ Established the basis for a terminology service to offer interoperability assets

➡ Plan to provide prototype CTS-2 service

Inform and support standardization efforts

**Refine assets, complete the puzzle**

Interoperability assets online

EU/US MoU Roadmap:
expected outcomes & Trillum Bridge

- Development of use cases/user stories

- Perform Vocabulary Analysis

- Perform Infrastructure Alignment

- Perform Healthcare provider Mediated Exchange analysis

- Semantic and syntactic mapping of scenario related
  health data

- Pilots

- A global standard or IG
  for patient summaries?

Trillium Demo..at the EU/US Marketplace in Boston October 20-21

European HL7 affiliate membership 957 orgs (2011)
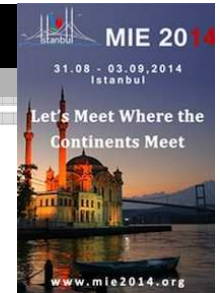
I hope you had the opportunity to see the demo of Martha and Paolo crossing the Trillium Bridge with their patient summary.

Stay tuned... for Boston.

email: Euoffice@HL7.org
List: Europe@HL7.org
Web site: www.HL7.eu

Many patient summaries, one standard

- Proliferation of templates or building blocks frequently incompatible to convey the same clinical content
- Attempts to construct the patient summary automatically
- Different coding systems and value sets
- SDOs have different financial models and there are overlaps and competition (sometimes unconstructive)
- National programs use standards creatively to meet local needs
- Sharing experience and knowledge advances interoperability – standards are not to be used in a vacuum
- Costs of interoperability hiking!
- Education is the way to improve interoperability

What the eHealth market needs...

- **HL7 CDA is a powerful tool for incremental interoperability**
  - Endorsed and adopted by several governments
  - Constrained with Templates and Implementation Guides
    - Developed independently... a cost to interoperability
- **eHealth market calls for agile processes and tools**
  - Interoperability to lower costs
  - plug-n-play interoperability assets
  - Intelligent user interfaces

- **How do countries and economic blocks deal with patient summaries?**
- **What can you do to help?**

Parting Thoughts...

- **eHealth standards are the safety net that strengthens the fabric of the global eHealth infrastructure.**
  - ➡ Interoperability at affordable cost
  - ➡ Built once used anytime and anywhere
  - ➡ Working across cultures and borders

- **Health IT is enabling safe informed health care**
  - ➡ Key to new market opportunities
  - ➡ Milestone in the path to a healthier world
  - ➡ Culture of collaboration, creativity, and understanding for the eHealth ecosystem.

Deploy or Die!
Joi Ito, Head MIT Media Lab