



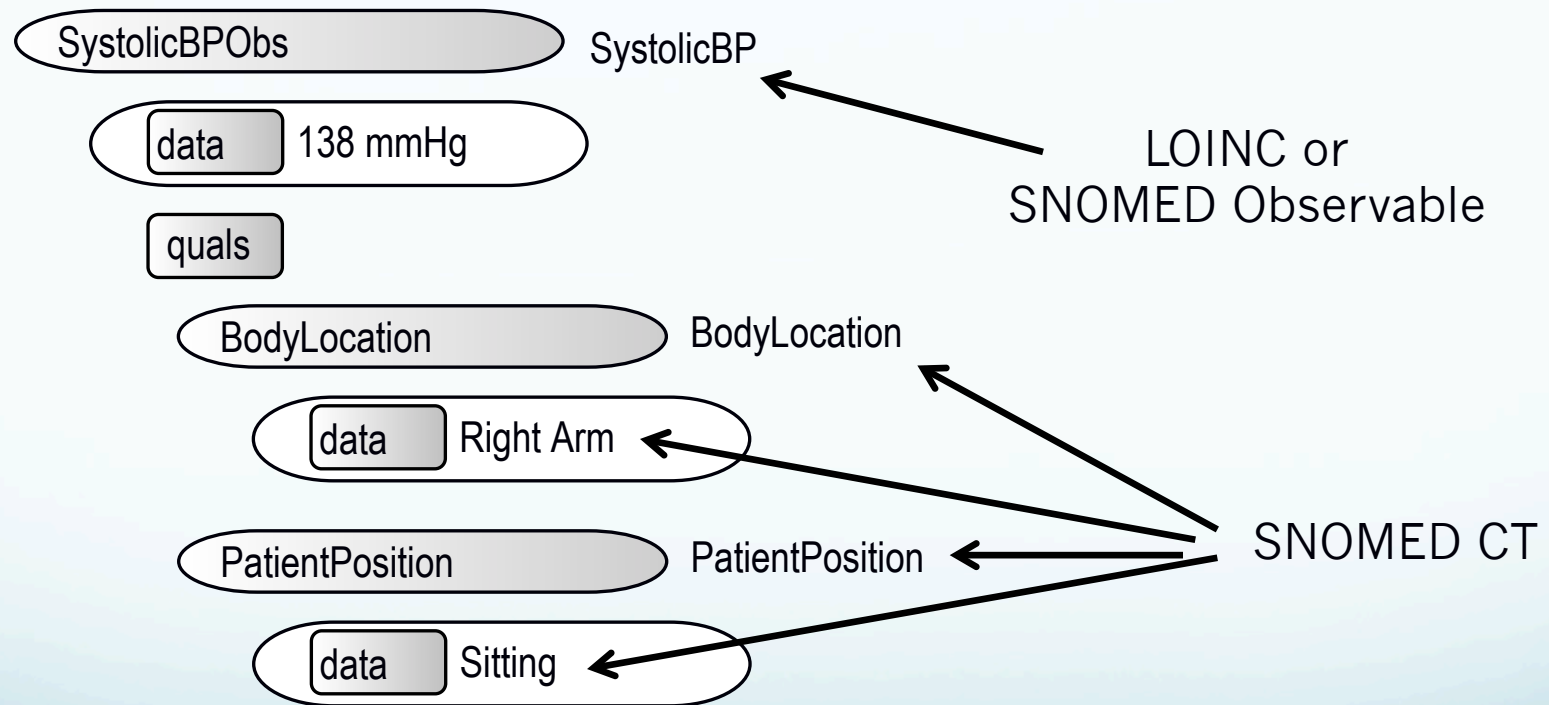
Enabling Semantic Interoperability using SNOMED CT

SNOMED CT Expo 2016
October 27, 2016
Wellington, New Zealand

CIMI

- The Clinical Information Modeling Initiative (CIMI) is an HL7 Work Group that is producing detailed clinical information models to enable interoperability of health care information systems
- CIMI was initiated during a “Fresh Look” session at an HL7 meeting in 2011
- CIMI models are free for use for all purposes
- See <http://www.opencimi.org/> for more details

Graphic of a Detailed Clinical Model



CIMI Goals

- Create a shared repository of detailed clinical information models
- Repository is open to everyone and models are licensed free for use at no cost
- Where the models:
 - Are expressed in an approved formalism
 - Archetype Definition Language (ADL)
 - Archetype Modeling Language (AML)
 - Are based on a core reference model, including a set of base data types
 - Have formal bindings to standard coded terminologies

CIMI Model Development Lifecycle

Standards Infusion

CIMI RM



SOLOR

CEMs

DCMs

CDA
Templates

openEHR
Archetypes

ISO EN 13606
Archetypes

Model Review

Repository of
Shared Models
in an approved
Formalism

LRA
Models

FHIR
Resources

Initial Loading of Repository

V2 “|”

CEM

LRA

V2 XML

DCM
UML

HTML

V3 XML

FHIR

AML

ADL

CDA

OWL

SOA
Payload

CEN
Archetype

CDISC
SHARE

Translators

Localization
& Context
Specialization

Model Dissemination

CIMI Accomplishments

- CIMI core principles
- CIMI reference model
 - Data types
 - Core constructor types – clusters, elements
- Reference patterns
- 3,529 CIMI clinical laboratory models

CIMI and SNOMED

- Information models are often developed independent of terminology models
- The HL7 CIMI Working Group aims to ensure that the CIMI information model is aligned with the SNOMED CT concept model
- Terminology alignment occurs at two levels in CIMI
 - At the attribute semantic level
 - At the attribute value set, or 'range' level

Alignment with SNOMED Occurs at the Core of the CIMI Model

- CIMI's foundational class is the Clinical Statement
- The Clinical Statement Class aligns with SNOMED's Situation with Explicit Context
- The CIMI Clinical Statement is composed of two core *components*:
 - The *topic* of the statement
 - The *context* of the statement

Mapping Clinical Statement Attributes with SWEC Attributes

CIMI	SNOMED SWEC
ClinicalStatement.subjectOfInformation	408732007 Subject relationship context (attribute)
ClinicalStatement.topic	Either: 246090004: Associated finding 363589002: Associated procedure
ClinicalStatement.context	Either: 408729009: Finding context 408730004: Procedure context

Clinical Statement Action Context

- Indicates whether an action was performed, not performed, requested, planned, etc...
- Context class supports additional attributes pertaining to the context specified (e.g., who requested the procedure, timing or performance time, current status)
- Context code attribute includes descendants of 288532009 | Context values for actions (qualifier value) |
- Intended to be further constrained in specializations (e.g., ProcedureProposal, ProcedureNotPerformed)

Clinical Statement Finding Context

- Indicates whether a finding is known or suspected present or absent
- Context class supports additional attributes pertaining to the context specified
- Context code includes descendants of 410514004 | Finding context value (qualifier value) |
- Intended to be further constrained in specializations

Clinical Statement Topic

- Clinical focus of the statement
- Class representing a clinical action (e.g., an imaging procedure), an assessment (e.g., a patient problem), or an evaluation (e.g., a clinical measurement or lab result)
- Attributes of topic class aligned with the corresponding SNOMED Concept Model (e.g., Clinical Finding, Procedure, Observable Entity)
- Work currently in progress

Example: Procedure Proposal

- A CIMI ClinicalStatement class
- ClinicalStatement.topic attribute mapped to 363589002 | Associated procedure (attribute) |
- ClinicalStatement.context attribute mapped to 408730004 | Procedure context (attribute) |
- ClinicalStatement.context.actionContext attribute *value* constrained to 385644000 | Requested (qualifier value) |
- The ClinicalStatement topic attribute points to a CIMI *Procedure* class whose attributes are mapped to the SNOMED CT Procedure Concept Model when such an alignment exists

Strategy for Mapping CIMI Attributes and Their Values to SNOMED

- Align CIMI class attributes to SNOMED CT concept model attributes when a correspondence exists
- Align CIMI class attribute values to SNOMED CT allowable values for the corresponding concept model attribute when feasible
- Identify gaps and propose new concepts to IHTSDO or within a CIMI extension
- Not all CIMI attributes have equivalents in the SNOMED Concept Model
- CIMI attributes that have no equivalent in the SNOMED Concept Model may still have their values bound to SNOMED

CIMI Browser Demo

[http://www.clinicalelement.com/cimi-
browser/#/](http://www.clinicalelement.com/cimi-browser/#/)

- ABO
- CIMI-CORE-ITEM_GROUP.abo_group_bld.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bld_bpu.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bldco.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_bld.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_bld_nb.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_p_transf_rx_b
- CIMI-CORE-ITEM_GROUP.cabot_rings_bld_ql_smear.v1.0.
- CIMI-CORE-ITEM_GROUP.laboratory_panel.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_report_header.v3.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_results_report.v2.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_document.v1.0.
- CIMI-CORE-ITEM_GROUP.laboratory_test_narrative.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_nominal.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_ordinal.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_ordqn.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_other.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_quantitative.v1.
- CIMI-CORE-ITEM_GROUP.laboratory_test_request_action.
- CIMI-CORE-ITEM_GROUP.laboratory_test_request_summi

Compiled Tree ADL Source ODIN Source JSON Source XML Source YAML Source Mindmap

abo_group_bld (laboratory_test_nominal)

- item
 - Subject of information | CIMI-CORE-ITEM_GROUP.subject_of_information.v1
 - Cluster | CIMI-CORE-ITEM_GROUP.cluster.v1
 - Element [0..*]
 - ID Identifier [0..*]
 - Test code [1]
 - Diagnostic service [0..*]
 - Specimen | CIMI-CORE-ITEM_GROUP.specimen.v3
 - Poct indicator [0..1]
 - Diagnosis [0..*]
 - Conclusion [0..*]
 - Reason [0..*]
 - Method [0..*]
 - Status [0..1]
 - Priority [0..1]
 - Interpretation category [0..1]
 - Result value [1]
 - id5.0.8.0.1 | ELEMENT
 - Reference range [0..*]
 - Sequence [0..1]
 - Delta flag [0..1]
 - Signal flag [0..1]
 - Comment [0..*]
 - Action set | CIMI-CORE-ITEM_GROUP.observation_action_set.v1

- ABO
- CIMI-CORE-ITEM_GROUP.abo_group_bld.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bld_bpu.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bldco.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_bld.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_bld_nb.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_p_transf_rx_b
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- item
 - Subject of information | CIMI-CORE-ITEM_GROUP.subject_of_information.v1
 - Cluster | CIMI-CORE-ITEM_GROUP.cluster.v1
 - Element [0..*]
 - ID Identifier [0..*]
 - Test code [1]
 - Diagnostic service [0..1]
 - id1.1.1.1.1.1.1
 - loinc = http://loinc.org/id/883-9
 - snomed-ct expression =
 - 363787002 |Observable entity|
 - 246093002 |Component| = 106202009 |Antigen in ABO blood group system|,
 - 704318007 |Property type| = 410656007 |Type (property)|,
 - 704319004 |Inheres in| = 87612001 |Blood|,
 - 704327 008 |Direct site| = 119297000 |Blood specimen|,
 - 370132008 |Scale| = 117362005 |Nominal value|,
 - 370134009 |Time aspect| = 123029007 |Single point in time|
 - snomed-ct value set =
 - 112144000 |Blood group A (finding)|
 - 165743006 |Blood group AB (finding)|
 - 112149005 |Blood group B (finding)|
 - 58460004 |Blood group O (finding)|
 - Signal flag [0..1]
 - Comment [0..*]
 - Action set | CIMI-CORE-ITEM_GROUP.observation_action_set.v1

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- CIMI-CORE-ITEM_GROUP.abo_group_bld.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bld_bpu.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bldco.v1.0.0
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- CIMI-CORE-ITEM_GROUP.laboratory_test_quantitative.v1.
- CIMI-CORE-ITEM_GROUP.laboratory_test_request_action.
- CIMI-CORE-ITEM_GROUP.laboratory_test_request_summi

Compiled Tree ADL Source ODIN Source JSON Source XML Source YAML Source Mindmap Download File

```

>
term_bindings = <
  ["loinc"] = <
    items = <
      ["id1.1.1.1.1.1"] = <http://loinc.org/id/883-9>
    >
  >
  ["snomed-ct"] = <
    items = <
      ["id1.1.1.1.1.1"] = <"363787002 |Observable entity| : 246093002 |Component| = 106202009 |Antigen in ABO blood group system|, 704318007 |Property type| = 410656007 |Type (property)|, 704319004 |Inheres in| = 87612001 |Blood|, 704327008 |Direct site| = 119297000 |Blood specimen|, 370132008 |Scale| = 117362005 |Nominal value|, 370134009 |Time aspect| = 123029007 |Single point in time|">
      ["at0.0.0.0.0.2"] = <http://snomed.info/id/112144000> -- Blood group A (finding)
      ["at0.0.0.0.0.3"] = <http://snomed.info/id/165743006> -- Blood group AB (finding)
      ["at0.0.0.0.0.4"] = <http://snomed.info/id/112149005> -- Blood group B (finding)
      ["at0.0.0.0.0.5"] = <http://snomed.info/id/58460004> -- Blood group O (finding)
    >
  >
  ["opencem"] = <
    items = <
      ["at0.0.0.0.0.1"] = <http://opencem.org/id/BloodType_VALUESSET_CODE>
    >
  >
value_sets = <

```

ABO

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- CIMI-CORE-ITEM_GROUP.abo_group_bld.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bld_bpu.v1.0.0
- CIMI-CORE-ITEM_GROUP.abo_group_bldco.v1.0.0
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- CIMI-CORE-ITEM_GROUP.abo_plus_rh_gp_bld_nb.v1.0.0
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- CIMI-CORE-ITEM_GROUP.laboratory_test_ordqn.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_other.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_quantitative.v1.0.0
- CIMI-CORE-ITEM_GROUP.laboratory_test_request_action.v1.
- CIMI-CORE-ITEM_GROUP.laboratory_test_request_summary.v

