OMG TECHNICAL MEETING SPECIAL EVENT

Semantics - Crossing the Chasm Workshop

Reston, Virginia

March 26, 2014

Standards and Semantics for Biomedicine

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U.S. National Library of Medicine

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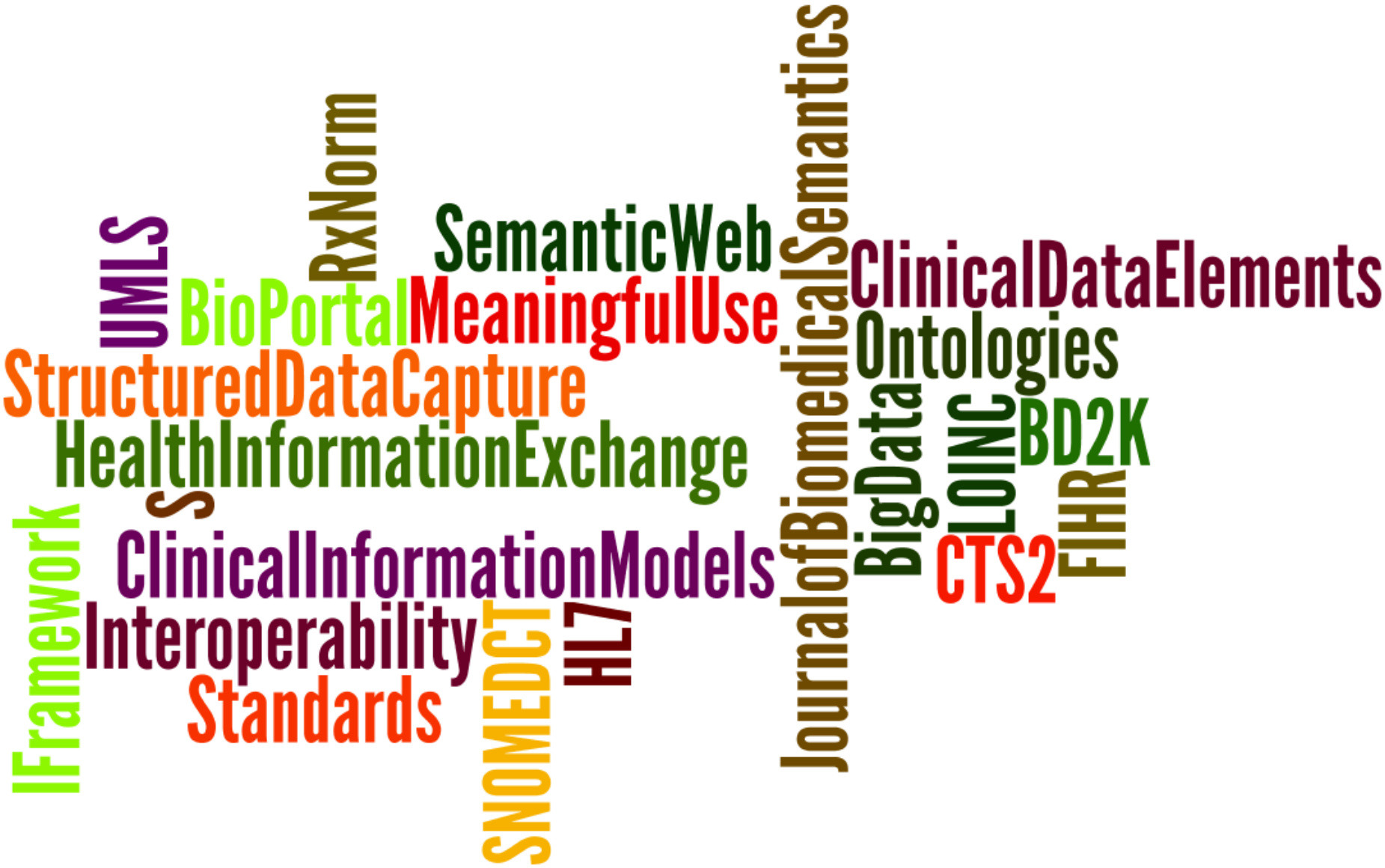
Standards and Semantics for Biomedicine



Standards and Semantics for Biomedicine

- Standard vocabularies
- Data elements
- Information models
- Document markup standards
- Protocols
- Interfaces

Biomedical standards and semantics in action

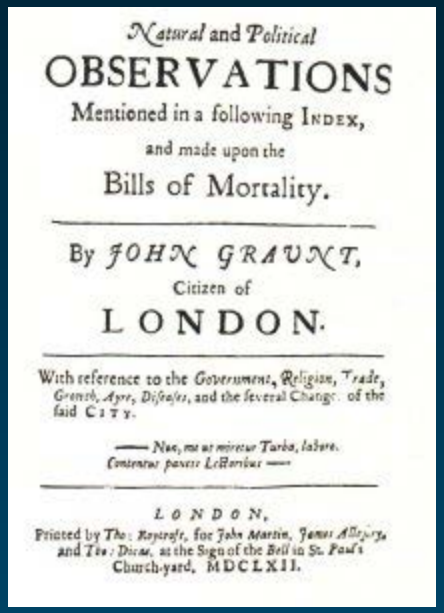
- Clinical quality measures (Meaningful Use)

- Standard vocabularies
- Data elements
- Information models
- Document markup standards

Standard vocabularies

Standards to support epidemiology

- John Graunt (1620-1674)
  - Analyzes the vital statistics of the citizens of London
- William Farr (1807-1883)
  - Medical statistician
  - Improves Cullen's classification
  - Contributes to creating ICD
- Jacques Berthillon (1851-1922)
  - Chief of the statistical services (Paris)
  - Classification of causes of death (161 rubrics)



Natural and *Political*

OBSERVATIONS

Mentioned in a following INDEX,

and made upon the

Bills of Mortality.

By *JOHN GRAUNT*,

Citizen of

LONDON.

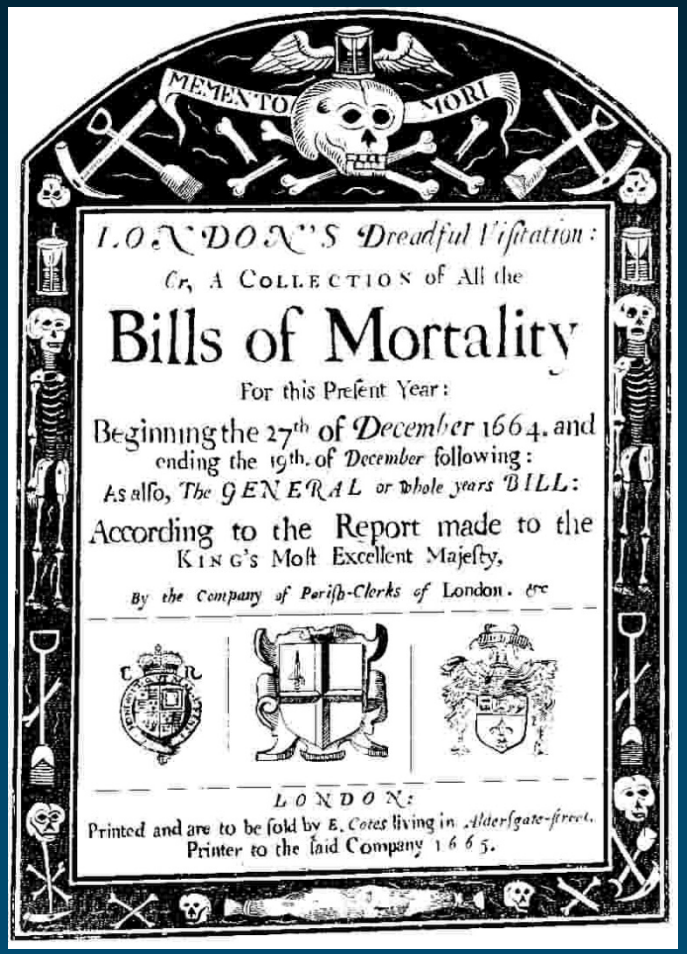
With reference to the *Government*, *Religion*, *Trade*, *Growth*, *Ayre*, *Diseases*, and the several Changes of the said CITY.

—— *Nec, me ut miretur Turba, labore.*
Contentus paucis Lectoribus ——

LONDON,

Printed by *Tho: Roycroft*, for *John Martin*, *James Allestry*, and *Tho: Dicas*, at the Sign of the *Bell* in St. *Paul's* Church-yard, MDCLXII.

London Bills of Mortality



A generall Bill for this present year, ending the 19 of December 1665. according to the Report made to the KINGS most Excellent Majesty.

By the Company of Parish Clerks of London, &c.

The Diseases and Casualties this year.

Abortive and Stilborne	617	Executed	21	Palsie	30
Aged	1545	Flux and Small Pox	655	Plague	68596
Ague and Feaver	5257	Found dead in streets, fields, &c.	2[illegible]	Planet	6
Appoplex and Suddenly	116	French Pox	86	Plurisie	15
Bedrid	10	Frighted	23	Poysoned	1
Blasted	5	Gout and Sciatica	27	Quinsie	35
Bleeding	16	Grief	46	Rickets	157
Bloody Flux, Scowring & Flux	185	Griping in the Guts	1238	Riling of the Lights	397
Burnt and Scalded	8	Hangd & made away themselves	7	Rupture	34
Calenture	3	Headmouldshot & Mouldfallen	14	Scurvy	1[illegible]7
Cancer, Gangrene and Fistula	56	Jaundies	1[illegible]	Shingles and Swine pox	2
Canker, and Thrush	1[illegible]	Impostume	227	Stores, Ulcers, broken and bruised	
Childbed	625	Kild by severall accidents	46	Limbs	82
Christomes and Infants	1258	Kings Evill	86	Spleen	14
Cold and Cough	68	Leprosie	2	Spotted Feaver and Purples	1929
Collick and Winde	134	Lethargy	14	Stopping of the stomack	33[illegible]
Consumption and Tissick	48[illegible]8	Livergrown	2[illegible]	Stone and Strangury	[illegible]8
Convulsion and Mother	2056	Meagrom and Headach	1[illegible]	Surfet	[illegible]
Distracted	[illegible]	Measles	7	Teeth and Worms	2614
Drouse and Tympany	1476	Murthered and Shot	9	Vomiting	[illegible]
Drowned	[illegible]	Overlaid & Starved	45	Venn	[illegible]

Christned { Males 5114, Females 4853, In all 9967 }

Buried { Males 48568, Females 48737, In all 97306 } Of the Plague 68596

Increased in the Burials in the 130 Parishes and at the Pest-house this year 79009

Increased of the Plague in the 130 Parishes and at the Pest-house this year 68590

Standard vocabularies in the era of Meaningful Use

- Diagnoses / Diseases / Conditions
  - International classification of diseases (ICD)
  - SNOMED CT
- Procedures
  - Current Procedural terminology (CPT)
  - ICD10-PCS
  - SNOMED CT
- Drugs
  - RxNorm
- Laboratory tests
  - LOINC

SNOMED Clinical Terms

SNOMED CT Characteristics (1)

- Current version: January 31, 2014 (2 annual releases)
- Type: Reference terminology / ontology
- Domain: Clinical medicine
- Developer: IHTSDO
- Funding: IHTSDO
- Availability
  - Publicly available: Yes* (in member countries)
  - Repositories: UMLS
- URL: http://www.ihtsdo.org/

SNOMED CT Characteristics (2)

- Number of
  - Concepts: ~300,000 active concepts (Jan. 31, 2014)
  - Terms: ~1.1M active “descriptions”
- Major organizing principles:
  - Utility for clinical medicine (e.g., assertional + definitional knowledge)
  - Model of meaning (incomplete)
  - Rich set of associative relationships
  - Small proportion of defined concepts (many primitives)
- Formalism: Description logics (EL++)

SNOMED CT Top level

Hierarchy | Subtype hierarchy

138875005	SNOMED CT Concept
362981000	qualifier value
106237007	linkage concept
370115009	special concept
48176007	social context
419891008	record artifact
363787002	observable entity
308916002	environment or geographical location
123038009	specimen
254291000	staging and scales
123037004	body structure
272379006	event
78621006	physical force
404684003	clinical finding
260787004	physical object
410607006	organism
71388002	procedure
373873005	pharmaceutical / biologic product
243796009	situation with explicit context
105590001	substance

SNOMED CT Example

Hierarchy | Subtype hierarchy

- 27010001 partial excision of large intestine
- 8613002 operation on appendix
  - 80146002 appendectomy
    - 82730006 incidental appendectomy
    - 49438003 appendectomy with drainage
    - 174036004 emergency appendectomy
    - 174045003 interval appendectomy
    - 6025007 laparoscopic appendectomy
    - 235313004 non-emergency appendectomy
    - 235314005 inversion appendectomy
    - 1299000 excision of appendiceal stump

Definition: Fully defined by ...

- is a
  - D partial excision of large intestine
  - D operation on appendix
- *Group*
  - method
    - D excision - action
  - procedure site - Direct
    - D appendix structure
- *Qualifiers*
  - access
    - surgical access values
  - priority
    - priorities

appendectomy - Definition

Concept Status: **Current**

- *Descriptions*
  - F appendectomy (procedure)
  - P appendectomy
  - S excision of appendix
  - U appendicectomy

Codes

- *Original SnomedId : P1-57450*
- *Read Code (Ctv3Id) : X20Wz*

RxNorm

RxNorm Characteristics (1)

- Current version: March, 2014 (monthly releases)
- Type: Controlled terminology
- Domain: Drug names
- Developer: NLM
- Funding: NLM
- Availability
  - Publicly available: Yes*
  - Repositories: UMLS
- URL: http://www.nlm.nih.gov/research/umls/rxnorm/

RxNorm Characteristics (2)

- Number of
  - Concepts: 120,000 drug entities (March 2014)
  - Terms: ~1.3 term per concept
- Major organizing principles:
  - Generic vs. brand
  - Combinations of Ingredient / Form / Dose
  - No hierarchical structure
  - Links to all major US drug information sources
  - No clinical information
- Formalism: UMLS RRF format

RxNorm Normalized form

Strength	Ingredient	Dose form
4mg/ml	Fluoxetine	Oral Solution

Strength | Ingredient

Semantic clinical drug component

Ingredient | Dose form

Semantic clinical drug form

Strength | Ingredient | Dose form

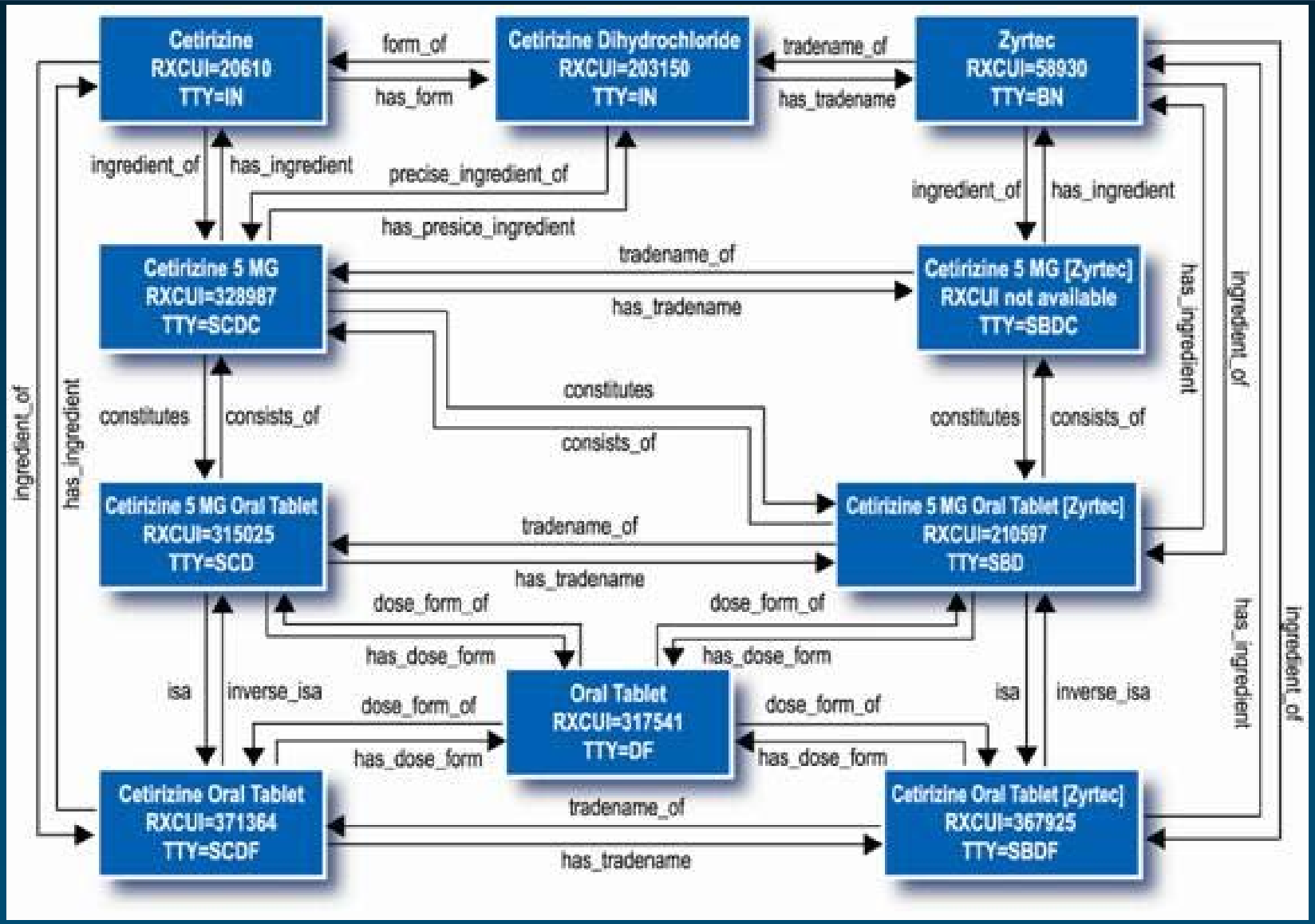
Semantic clinical drug

Rx Norm Generic *vs.* Brand

- Generic
  - Ingredient (IN)
  - Clinical drug form (SCDF)
  - Clinical drug component (SCDC)
  - Clinical drug (SCD)
- Brand
  - Brand name (BN)
  - Branded drug form (SBDF)
  - Branded drug component (SBDC)
  - Branded drug (SBD)

tradename_of

RxNorm Relations among drug entities



Logical Observation Identifiers, Names and Codes (LOINC)

LOINC®

Logical Observation Identifiers Names and Codes

LOINC Characteristics (1)

- Current version: 2.46 (Dec. 2013)
- Type: Controlled terminology*
- Domain: Laboratory and clinical observations
- Developer: Regenstrief Institute
- Funding: NLM
- Availability
  - Publicly available: Yes
  - Repositories: UMLS
- URL: www.regenstrief.org/loinc/loinc.htm

LOINC Characteristics (2)

- Number of
  - Concepts: ~70k active codes (2.46) (2 annual releases)
  - Terms: n/a*
- Major organizing principles:
  - No hierarchical structure among the main codes
  - 6 axes
    - Component (analyte [+ challenge] [+ adjustments])
    - Property
    - Timing
    - System
    - Scale
    - [Method]
- Formalism: “DL-like”

LOINC Example

- *Sodium:SCnc:Pt:Ser/Plas:Qn*
  [the molar concentration of sodium is measured in the plasma (or serum), with quantitative result]

Axis	Value
Component	Sodium
Property	SCnc – Substance Concentration (per volume)
Timing	Pt – Point in time (Random)
System	Ser/Plas – Serum or Plasma
Scale	Qn – Quantitative
Method	--

Semantics across standards

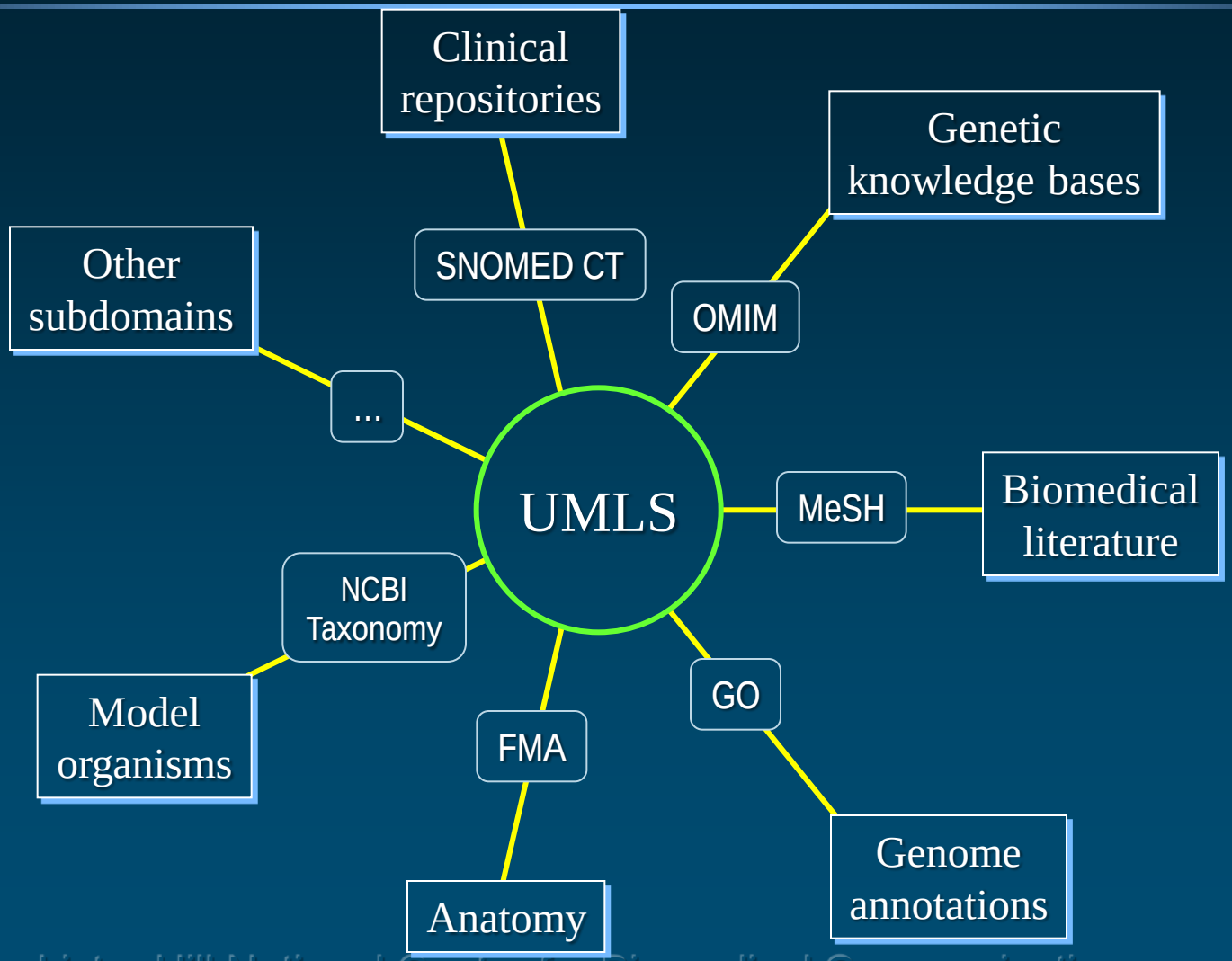
Terminology integration systems

Addison's disease – Different names

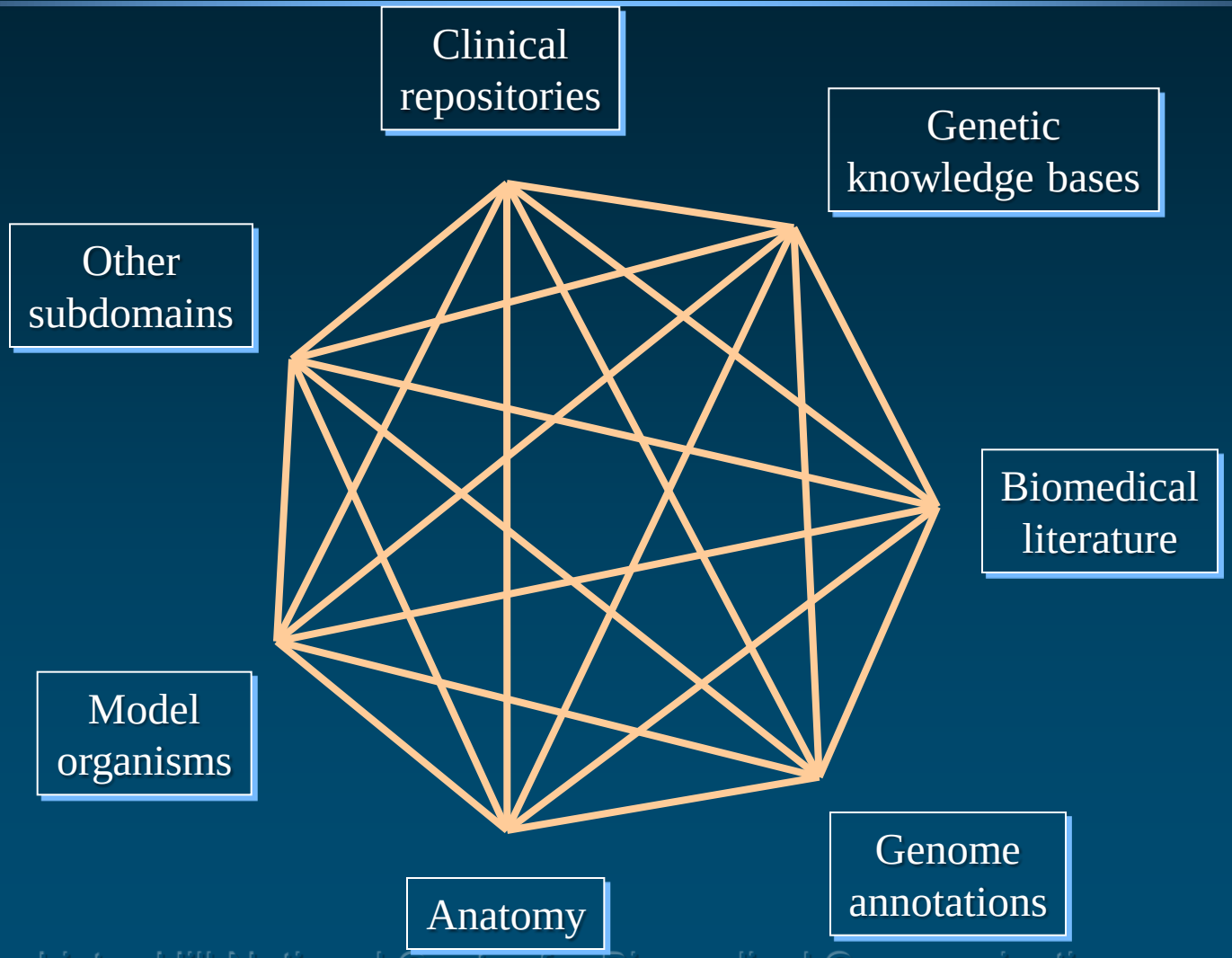
Addison Disease	MeSH	D000224
Primary hypoadrenalism	MedDRA	10036696
Primary adrenocortical insufficiency	ICD-10	E27.1
Addison's disease (disorder)	SNOMED CT	363732003

Addison's disease

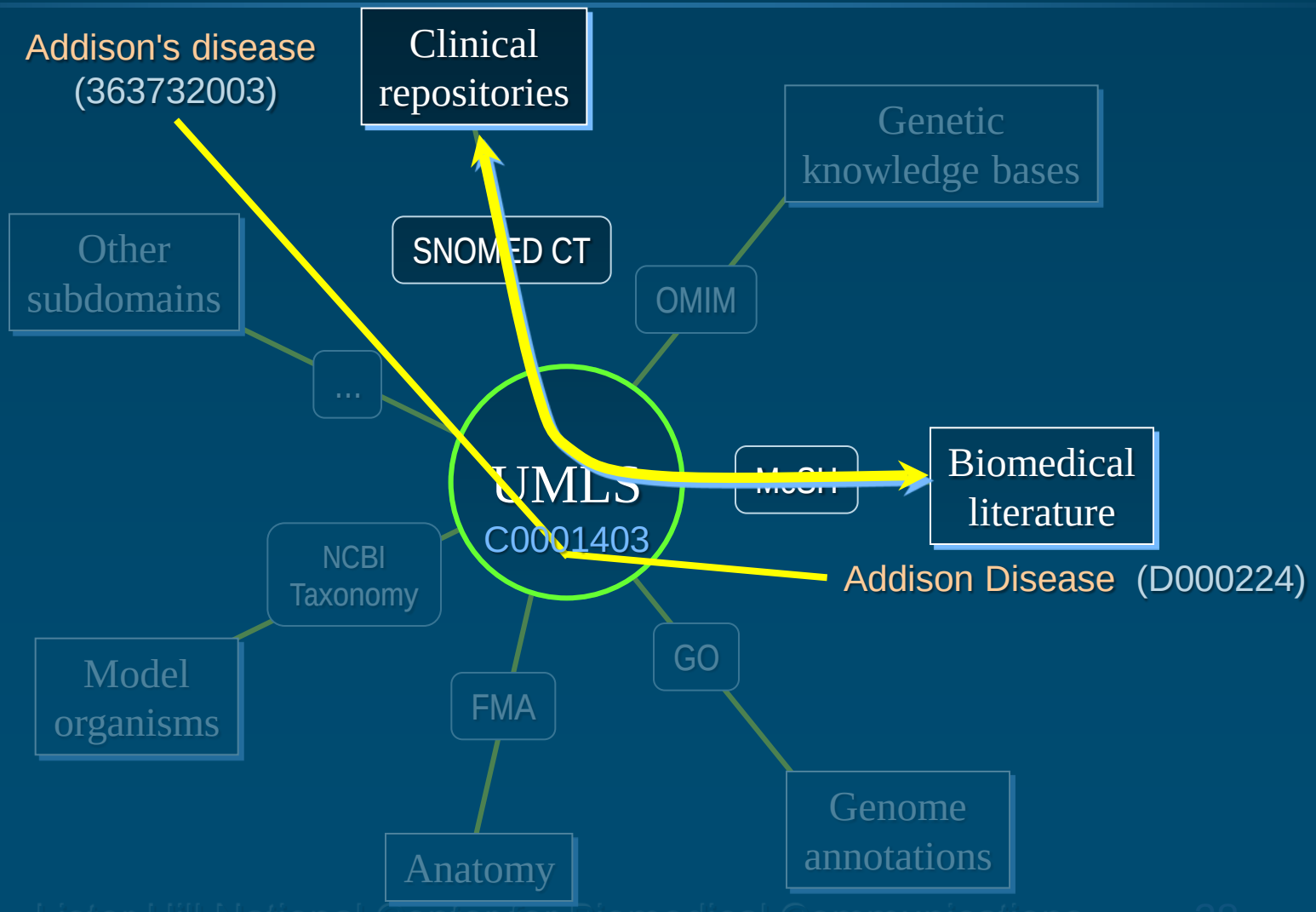
Integrating subdomains



Integrating subdomains



Terminology integration



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Unified Medical Language System®

UMLS Terminology Services

UTS Home Applications SNOMED CT Resources Downloads Documentation UMLS Home

- Welcome »
- Request a License
- News/Announcements
- Training
- Supported Browsers

Welcome to the UTS

The UMLS Terminology Services (UTS) allows you to:

- Request a UMLS Metathesaurus License and create a UTS account
- Search and display content from UTS Applications including:
  - Metathesaurus Browser
  - Semantic Network Browser
  - SNOMED CT Browser
- Download data files including:
  - UMLS Knowledge Sources
  - RxNorm weekly and monthly updates
  - SNOMED CT
  - CORE Problem List and Route of Administration Subsets of SNOMED CT
- Query data remotely via Web Services (see API Documentation)
- Complete UMLS Annual Report and SNOMED CT® Affiliate Reports

https://uts.nlm.nih.gov/

NCBO BioPortal

http://bioportal.bioontology.org/

BioPortal | Browse | Search | Mappings | Recommender | Annotator | Resource Index | Projects | Sign In | Help | Feedback

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Advanced Search

Find an ontology

Enter ontology name, e.g. NCI Thesaurus [Explore]

Browse Ontologies >

Search resources

Enter a concept, e.g. Melanoma [Search]

Advanced Resource Search

Most Viewed Ontologies

Ontology	Views
SNOMED Clinical Terms	13,601
National Drug File	9,320
MedDRA	4,254
International Classification of Diseases	3,415
NCI Thesaurus	1,528

Latest Notes

test (Chemical Entities of Biological Interest Ontology)
about 17 hours ago by steschu
test by stefan to see whether bioportal notes arrive

New Term Proposal-JzXVqSUMoQCQc (Radiology Lexicon)
5 months ago by rboden

New Term Proposal-OqPnBnZbfGppdoi (Radiology Lexicon)
5 months ago by rboden

New Term Proposal-IttxKlyGottfkuQ (Radiology Lexicon)
5 months ago by rboden

New Term Proposal-WMPPrfBiLOEDqFyz (Radiology Lexicon)
5 months ago by rboden

Latest Mappings

Mixed ductal and lobular carcinoma of breast (SNOMEDCT) <=> Abnormal Cell (NCIT)
REST Mapping 03/05/2014 by catpes

synaptic dysfunctioning (ADO) <=> amyloid beta protein (ADO)
REST Mapping 12/26/2013 by dnjswns1988

Malignant neoplasm of bronchus and lung, unspecified (ICD9CM) <=> Non-small cell lung cancer (SNOMEDCT)
BioPortal UI 04/02/2013 by twicker

Malignant neoplasm of unspecified part of unspecified bronchus or lung (ICD10CM) <=> Non-small cell lung cancer (SNOMEDCT)
BioPortal UI 04/02/2013 by twicker

Statistics

Ontologies	375
Classes	5,903,413

Collaborations between SDOs

- SNOMED CT-LOINC
  - Description of lab tests and clinical measurements in reference to SNOMED CT concepts
- SNOMED CT-ICD11
  - SNOMED CT is being used as the ontological framework for ICD11

CTS2 – Common Terminology Services

CTS2
Common Terminology Services 2

http://informatics.mayo.edu/cts2/

- CTS2
  - Home
  - About CTS2
  - Primer
- Specification
  - FAQ
  - REST
  - SOAP
  - HL7 SFM
- Development
  - CTS2 Development Framework
  - Implementations
  - Github Page
- Community
  - Who is Using CTS2?
  - Get Help
  - Links

What is CTS2?

Latest CTS2 News

About CTS2

CTS2 is a model and specification for discovering, accessing, distributing and updated terminological resources on the internet.

A Specification

CTS2 is an Application Programming Interface (API) specification.

- It defines the semantics, syntax and valid interactions that can occur
- It is a "blueprint" for software
- If everyone follows the blueprint (and the blueprint is sufficiently precise) then CTS2 clients and services can interoperate

Get Started

Learn and Explore CTS2

GET STARTED NOW

See CTS2 In Action

Browse online demos to see CTS2 working on the Web!

Implementations

CTS2 Development Framework

The CTS2 Development Framework is a development kit for rapidly creating CTS2 compliant applications.

NCBO Bioportal Implementation

A CTS2 Implementation based on the NCBO Bioportal

...more implementations!

Learn more about the CTS2 implementation work being done!

OMG© Standard

WE SET THE STANDARD

CTS2 - an Object Management Group© (OMG) Standard

For the latest info on the CTS2 OMG© Specification, visit the specification page.

- Standard vocabularies
- Data elements
- Information models
- Document markup standards

Data elements

Individual variables

Common data elements at NIH

NIH U.S. National Library of Medicine

Search

Databases | Find, Read, Learn | Explore NLM | Research at NLM | NLM for You

Contact NLM

NIH Common Data Element (CDE) Resource Portal

Home | Resource Summaries | Glossary

Home

http://www.nlm.nih.gov/cde/

Home

NIH encourages the use of common data elements (CDEs) in clinical research, patient registries, and other human subject research in order to improve data quality and opportunities for comparison and combination of data from multiple studies and with electronic health records. This portal provides access to NIH-supported CDE initiatives and other tools and resources that can assist investigators developing protocols for data collection. What is a CDE?

NIH CDE Initiatives

Collections of CDEs that have been identified for use in particular NIH-supported research projects or registries after a formal evaluation and selection processes.

Summary Table | Subject Areas

NIH CDE Tools and Resources

Databases and repositories of data elements and case report forms that may assist investigators in identifying and selecting data elements for use in their projects.

Summary Table | Subject Areas

The CDE Resource Portal also includes Other CDE Resources and Relevant Standards. Descriptions of all four groups can be found in the

- Standard vocabularies
- Data elements
- Information models
- Document markup standards

Information models

Questionnaires, forms

Clinical research data

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CDISC Strength Through Collaboration

http://www.cdisc.org/

ABOUT CDISC | STANDARDS & INNOVATIONS | RESOURCES | NEWS | EDUCATION & EVENTS | MEMBERSHIP | MEMBERS ONLY

Mission & Principles

Mission Statement

CDISC is a global, open, multidisciplinary, non-profit organization that has established standards to support the acquisition, exchange, submission and archive of clinical research data and metadata. **The CDISC mission is to develop and support global, platform-independent data standards that enable information system interoperability to improve medical research and related areas of healthcare.** CDISC standards are vendor-neutral, platform-independent and freely available via the CDISC website.

The CDISC Vision is to Inform Patient Care & Safety Through Higher Quality Medical Research.

Core Principles

- Lead the development of standards that improve efficiency while supporting the scientific nature of clinical research.
- Recognize the ultimate goal of creating regulatory submissions that allow for flexibility in scientific content and are easily interpreted, understood, and navigated by regulatory reviewers.

Become a CDISC Member (Fee Based)

Become A Member

Member Log-in

user name *

•••••••• * Log In

Forgot my password

CDISC Newsletter Archive

Please note that we will be adding prior newsletters soon.

CDISC October Newsletter 2013.

CDISC December Newsletter 2013.

CDISC January Newsletter 2014.

Clinical information modeling initiative (CIMI)

- Information models for healthcare
  - Clinical decision support
- International consortium
  - SDOs
  - Clinical institutions
  - Governmental agencies
- Isosemantic models
  - Harmonization across models
  - Interface with terminology

http://informatics.mayo.edu/CIMI/

- Standard vocabularies
- Data elements
- Information models
- Document markup standards

Document markup standards

Information exchange

Clinical Document Architecture

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- Section 6: Rules and References
- Section 7: Education & Awareness
- IP Policy

Home > Standards > Product Brief

https://www.hl7.org/

Section 1: Primary Standards
Section 3: Clinical and Administrative Domains

CDA® Release 2

DESCRIPTION

The HL7 Version 3 Clinical Document Architecture (CDA®) is a document markup standard that specifies the structure and semantics of "clinical documents" for the purpose of exchange between healthcare providers and patients. It defines a clinical document as having the following six characteristics: 1) Persistence, 2) Stewardship, 3) Potential for authentication, 4) Context, 5) Wholeness and 6) Human readability.

A CDA can contain any type of clinical content -- typical CDA documents would be a Discharge Summary, Imaging Report, Admission & Physical, Pathology Report and more. The most popular use is for inter-enterprise information exchange, such as is envisioned for a US Health Information Exchange (HIE).

ALTERNATIVE NAMES

CDA® Release 2 may also go by the following names or acronyms:

"Clinical Document Architecture, R2", "Clinical Document Architecture, R2 (Reaffirmation)", CDAR2

TARGETS

- Healthcare Providers
- Healthcare IT Vendors

Exchanging information with patients Blue Button

Your Health Records

About Blue Button

About the Blue Button Movement

Benefits of Blue Button

How to begin downloading and using your health records

Join the Blue Button Movement

About Blue Button

Do you want to feel more in control of your health and your personal health information? Do you have a health issue? Are you caring for an elderly parent? Are you changing doctors? Do you need to find the results of a medical test or a complete and current list of your medications? Blue Button may be able to help.

Your Health Records

Millions of Americans can get easy, secure online access to their health records thanks to "Blue Button". Health information about you may be stored in many places, such as doctors' offices, hospitals, drug stores and health insurance companies. Blue Button is a way you can access your health records electronically so you can:

- Share them with your doctor or trusted family members or caregivers
- Check to make sure the information, such as your medication list, is accurate and

Quick Links

- Your health records
- Your rights
- What kind of information is available to you?

Getting relevant information – InfoButton

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- Section 5: Implementation Guides
- Section 6: Rules and References
- Section 7: Education & Awareness
- IP Policy

Home > Standards > Product Brief

https://www.hl7.org/

Section 3: Clinical and Administrative Domains
Section 7: Education & Awareness

HL7 Version 3 Standard: Context Aware Knowledge Retrieval Application ("Infobutton"), Knowledge Request

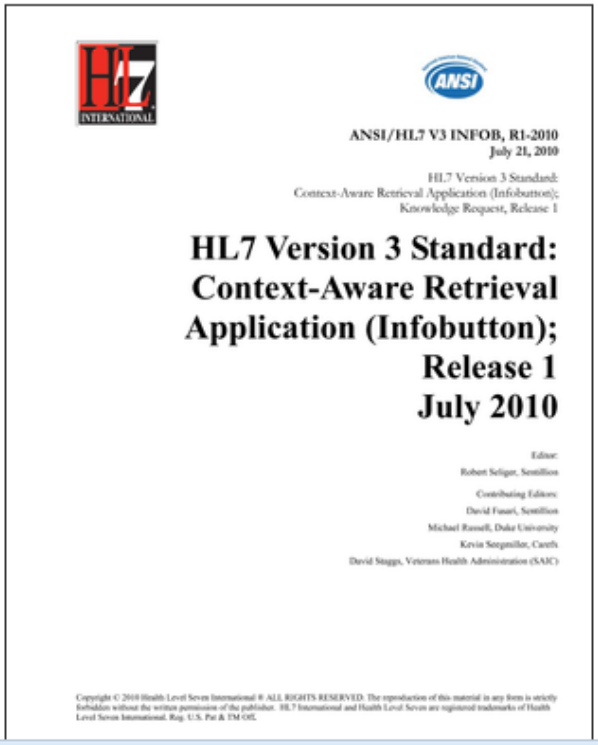
DESCRIPTION

Context-aware knowledge retrieval into clinical information systems (CIS), such as electronic health record (EHR) and personal health record (PHR) systems, is an increasingly promising approach for delivering relevant clinical knowledge to the point of care as well as patient-tailored educational material to support patient-centered care. These kinds of knowledge retrieval tools have been known as "Infobuttons." For example, an infobutton displayed in the context of a patient's problem list may allow a user to view directly educational material regarding the evaluation and treatment of a specific disease without having to leave the CIS and look up the knowledge elsewhere.

ALTERNATIVE NAMES

HL7 Version 3 Standard: Context Aware Knowledge Retrieval Application ("Infobutton"), Knowledge Request may also go by the following names or acronyms:

"HL7 Version 3 Standard: Context Aware Knowledge Retrieval Application



ANSI/HL7 V3 INFOB, R1-2010
July 21, 2010

HL7 Version 3 Standard:
Context-Aware Retrieval Application (Infobutton);
Knowledge Request, Release 1

HL7 Version 3 Standard: Context-Aware Retrieval Application (Infobutton); Release 1
July 2010

Editor:
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Biomedical standards and semantics in action

VALUE SETS
IN
CLINICAL QUALITY MEASURES

“Meaningful Use”

- Health Information Technology for Economic and Clinical Health (HITECH) Act
  - Eligible health care professionals and hospitals can qualify for Medicare and Medicaid incentive payments when they adopt certified EHR technology and use it to achieve specified objectives
- Two sets of regulations
  - *Incentive Program for Electronic Health Records*
    Medicare and Medicaid Services (CMS)
  - *Standards and Certification Criteria for Electronic Health Records*
    Office of the National Coordinator (ONC)

Meaningful Use stages

Stage 1	Stage 2	Stage 3
2011-2012	**2014**	**2016**
Data capture and sharing	Advance clinical processes	Improved outcomes

Stage 1: Meaningful use criteria focus on:	Stage 2: Meaningful use criteria focus on:	Stage 3: Meaningful use criteria focus on:
Electronically capturing health information in a standardized format	More rigorous health information exchange (HIE)	Improving quality, safety, and efficiency, leading to improved health outcomes
Using that information to track key clinical conditions	Increased requirements for e-prescribing and incorporating lab results	Decision support for national high-priority conditions
Communicating that information for care coordination processes	Electronic transmission of patient care summaries across multiple settings	Patient access to self-management tools
Initiating the reporting of clinical quality measures and public health information	More patient-controlled data	Access to comprehensive patient data through patient-centered HIE
Using information to engage patients and their families in their care		Improving population health

NATIONAL LIBRARY OF MEDICINE

Fact Sheets

Details for: CMS MEDICARE AND MEDICAID EHR INCENTIVE PROGRAMS: STAGE 2 FINAL RULE

Return to List

For Immediate Release: Thursday, August 23, 2012

Contact: CMS Office of Public Affairs
202-690-6145

CMS MEDICARE AND MEDICAID EHR INCENTIVE PROGRAMS: STAGE 2 FINAL RULE

On August 23, 2012, the Centers for Medicare & Medicaid Services (CMS) announced a final rule to govern Stage 2 of the Medicare and Medicaid Electronic Health Record (EHR) Incentive Programs. The rule specifies the Stage 2 criteria that eligible professionals (EPs), eligible hospitals, and critical access hospitals (CAHs) must meet in order to continue to participate in the EHR Incentive Programs.

Rule Provisions

Through the Stage 2 requirements of the Medicare and Medicaid EHR Incentive Programs, CMS seeks to expand the meaningful use of certified EHR technology. Certified EHR technology used in a meaningful way is one piece of a broader health information technology infrastructure needed to reform the health care system and improve health care quality, efficiency, and patient safety. Highlights of the rule's provisions follow.

Stage 2 Timing

In the Stage 1 meaningful use regulations, CMS established an original timeline that would have required Medicare providers who first demonstrated meaningful use in 2011 to meet the Stage 2 criteria in 2013. The Stage 2 rule gives providers more time to meet Stage 2 criteria. A provider that attested to Stage 1 of meaningful use in 2011 would attest to Stage 2 in 2014, instead of in 2013. Therefore, providers are not required to meet Stage 2 meaningful use before 2014. The table below illustrates the progression of meaningful use stages from the first year a Medicare provider begins participation in the program.

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Clinical Quality Measures (CQMs)

Measure Sets and Reporting

The rule finalized that:

- EPs must report on 9 out of 64 total clinical quality measures (CQMs)
- Eligible hospitals and CAHs must report on 16 out of 29 total CQMs

In addition, all providers must select CQMs from at least 3 of the 6 key health care policy domains from the Department of Health and Human Services' National Quality Strategy:

- Patient and Family Engagement
- Patient Safety
- Care Coordination
- Population and Public Health
- Efficient Use of Healthcare Resources
- Clinical Processes/Effectiveness

The Office of the National Coordinator for
Health Information Technology

ONC Fact Sheet:
2014 Edition Standards & Certification Criteria (S&CC) Final Rule

Summary

The 2014 Edition S&CC final rule completes the Office of the National Coordinator for Health IT's (ONC) second full rulemaking cycle to adopt standards, implementation specifications, and certification criteria for EHR technology. This final rule complements the newly released Centers for Medicare & Medicaid Services (CMS) final rule which establishes Stage 2 of the Medicare and Medicaid Electronic Health Record (EHR) Incentive Programs, updates Stage 1, and includes other program modifications.

The 2014 Edition S&CC final rule reflects ONC's commitment to reduce regulatory burden; promote patient safety and patient engagement; enhance EHR technology's interoperability, electronic health information exchange capacity, public health reporting, and security; enable clinical quality measure data capture, calculation, and electronic submission to CMS or States; and introduce greater transparency and efficiency to the certification process.

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CLINICAL QUALITY MEASURES (CQMs)

Tools that help measure and track the quality of healthcare services provided by eligible professionals, eligible hospitals and critical access hospitals within our health care system

CQMs measure many aspects of patient care including: health outcomes, clinical processes, patient safety, efficient use of healthcare resources, care coordination, patient engagements, population and public health, and clinical guidelines

[cms.gov]

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93 CLINICAL QUALITY MEASURES

in 2014 Meaningful Use criteria

64

for

ELIGIBLE PROVIDERS

(NEED TO REPORT ON 9)

29

for

ELIGIBLE HOSPITALS

(NEED TO REPORT ON 16)

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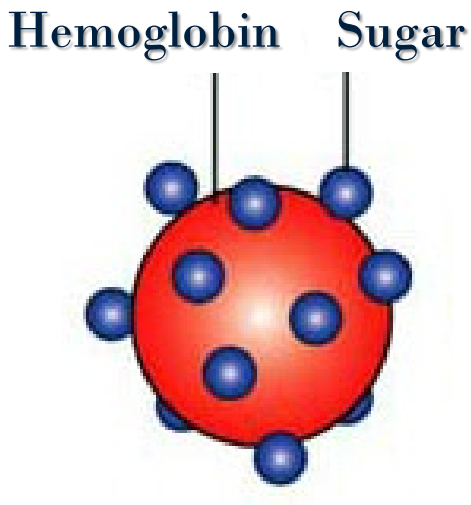
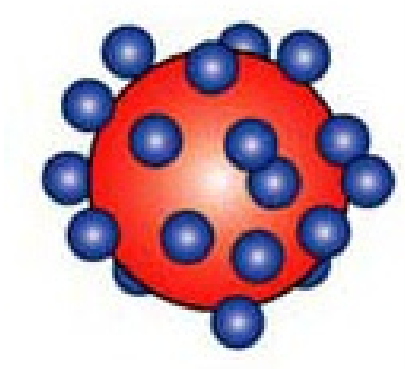
Clinical Quality Measure (example)

Hemoglobin A1c Test for Pediatric Patients





Normal glucose levels in blood
Low HbA1c concentration

High glucose levels in blood
High HbA1c concentration

Clinical Recommendations

1. American Association of Clinical Endocrinologists (2002): Recommends that a glycosylated hemoglobin be performed during an initial assessment and during follow-up assessments, which should occur at no longer than three-month intervals.

2. American Diabetes Association (2006): Recommends obtaining a glycosylated hemoglobin during an initial assessment and then routinely as part of continuing care. In the absence of well-controlled studies that suggest a definite testing protocol, expert opinion recommends glycosylated hemoglobin be obtained at least twice a year in patients who are meeting treatment goals and who have stable glycemic control and more frequently (quarterly assessment) in patients whose therapy was changed or who are not meeting glycemic goals.

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Clinical Quality Measure (simplified)

Hemoglobin A1c Test for Pediatric Patients

$$= \frac{\text{\# diabetic patients [age 5-17] } \textit{tested for HbA1c}}{\text{\# diabetic patients [age 5-17]}}$$

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CLINICAL QUALITY MEASURE (details)

Hemoglobin A1c Test for Pediatric Patients

Tests for HbA1c

$$= \frac{\text{\# diabetic patients [age 5-17] } \textit{tested for HbA1c}}{\text{\# diabetic patients [age 5-17]}}$$

- Type 1 or Type 2 diabetes
- Excludes gestational diabetes

- Requires date of birth

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CLINICAL QUALITY MEASURE (implementation)

Hemoglobin A1c Test for Pediatric Patients

List of LOINC codes

Tests for HbA1c

$$= \frac{\text{\# diabetic patients [age 5-17] } \textit{tested for HbA1c}}{\text{\# diabetic patients [age 5-17]}}$$

- Type 1 or Type 2 diabetes
- Excludes gestational diabetes

- Requires date of birth

Data element

List of SNOMED CT or ICD 10 codes

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Anatomy of a Clinical Quality Measure

Population criteria

- **Initial Patient Population** =
  - AND: "Patient Characteristic Birthdate: birth date" >= 5 year(s) starts before start of "Measurement Period"
  - AND: "Patient Characteristic Birthdate: birth date" <= 17 year(s) starts before start of "Measurement Period"
  - AND: "Diagnosis, Active: Diabetes" starts before or during (MOST RECENT :"Occurrence A of Encounter, Performed: Diabetes Visit" during "Measurement Period")
  - AND: "Encounter, Performed: Diabetes Visit" >= 12 month(s) starts before start of "Occurrence A of Encounter, Performed: Diabetes Visit"
- **Denominator** =
  - AND: "Initial Patient Population"
- **Denominator Exclusions** =
  - AND NOT: "Occurrence A of Diagnosis, Active: Gestational Diabetes" ends before start of "Measurement Period"
  - AND: "Occurrence A of Diagnosis, Active: Gestational Diabetes" starts before or during "Measurement Period"
- **Numerator** =
  - AND: "Laboratory Test, Result: HbA1c Laboratory Test (result)" during "Measurement Period"
- **Denominator Exceptions** =
  - None

Data criteria (QDM Data Elements)

- "Diagnosis, Active: Diabetes" using "Diabetes Grouping Value Set (2.16.840.1.113883.3.464.1003.103.12.1001)"
- "Diagnosis, Active: Gestational Diabetes" using "Gestational Diabetes Grouping Value Set (2.16.840.1.113883.3.464.1003.103.12.1010)"
- "Encounter, Performed: Diabetes Visit" using "Diabetes Visit Grouping Value Set (2.16.840.1.113883.3.464.1003.103.12.1012)"
- "Laboratory Test, Result: HbA1c Laboratory Test" using "HbA1c Laboratory Test Grouping Value Set (2.16.840.1.113883.3.464.1003.198.12.1013)"
- "Patient Characteristic Birthdate: birth date" using "birth date LOINC Value Set (2.16.840.1.113883.3.5

Value set = List of LOINC codes for HbA1c tests

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Associated Value Set

Metadata
Measure
Grouping

Name:
HbA1c Laboratory Test

Type:
Grouping

Note:

OID:
2.16.840.1.113883.3.464.1003.198.12.1013

Developer:
National Committee for Quality Assurance

Value Set Members Expansion 20121025

Expanded Code List

View | Toggle | Clear | Page 1 of 1 | 20 | View 1 - 3 of 3

Code	Descriptor	Code System	Version
17855-8	Hemoglobin A1c/Hemoglobin.total in Blood by calculation	LOINC	2.40
17856-6	Hemoglobin A1c/Hemoglobin.total in Blood by HPLC	LOINC	2.40
4548-4	Hemoglobin A1c/Hemoglobin.total in Blood	LOINC	2.40

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Meaningful Use Criteria - 2014

93
CQMs

Developed by some 20 measure developers

3,000
value sets

1,500 unique

200,000
codes

80,000 unique

Value Set Authority Center
U.S. National Library of Medicine

Welcome back, rainerw
Sign Out | Contact Us

Welcome | Search Value Sets | Help

Apply Filters | Clear Filters

Narrow search results by selecting from pull-down menus below:

CMS eMeasure (NQF Number)
CMS102v1 (0441)

Quality Data Model Category
Select

Value Set Developer
Select

Meaningful Use Measures
Select

Search the NLM Value Set Repository

Query: Enter value set id, codes, words... Search

Search Results | Value Set Details

Export Search Results (Excel)

Matched Value Sets

Download View Page 1 of 2 20 View 1 - 20 of 21

Name	Type	Code System	Developer	OID
birth date	Extensional	LOINC	NQF	2.16.840.1.113883.3.560.100.4
Carotid Intervention	Grouping	ICD10PCS ICD9CM SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.204
Discharge To Another Hospital	Extensional	SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.87
Discharged to Health Care Facility for Hospice Care	Extensional	SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.207
Discharged to Home for Hospice Care	Extensional	SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.209
Discharged to Rehabilitation Facility	Extensional	SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.132
Emergency Department Visit	Grouping	SNOMEDCT	Lantana	2.16.840.1.113883.3.117.1.7.1.293
Ethnicity	Extensional	CDCREC	CDC NCHS	2.16.840.1.114222.4.11.837
Hemorrhagic Stroke	Grouping	ICD10CM ICD9CM SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.212
Inpatient Encounter	Extensional	SNOMEDCT	Joint Commissio	2.16.840.1.113883.3.117.1.7.1.23

https://vsac.nlm.nih.gov/

Getting involved

A few pointers

Health IT Standards Committee

Federal Advisory Committees (FACAs)

FACA Calendar

Health IT Policy Committee

Health IT Standards Committee

- HITSC Workgroups
- How To Participate
- Recommendations to the National Coordinator for Health IT

FACA Membership Application

Health IT Standards Committee

Upcoming Meetings | Past Meetings

*Past meetings are shown from January 2013. For older meetings, please visit Health IT Archives.

The **Health IT Standards Committee** is charged with making recommendations to the National Coordinator for Health IT on standards, implementation specifications, and certification criteria for the electronic exchange and use of health information. Initially, the Health IT Standards Committee will focus on the policies developed by the Health IT Policy Committee's initial eight areas. Within 90 days of the signing of ARRA, the Health IT Standards Committee must develop a schedule for the assessment of policy recommendations developed by the Health IT Policy Committee, to be updated annually. In developing, harmonizing, or recognizing standards and implementation specifications, the Health IT Standards Committee will also provide for the testing of the same by the National Institute for Standards and Technology (NIST).

Resources

Meeting Calendar

Meetings/Hearings Archive

Upcoming Meetings

HIT Standards Committee Virtual

Wednesday, March 26, 2014 - 10:00am to 12:45pm

Policy: Quality Measures Vendor Tiger Team

Thursday, March 27, 2014 -

Standards and Interoperability (S&I) Framework

S&I Framework Links: Home Wiki | guest | Join | Help | Sign In

S&I FRAMEWORK

http://wiki.siframework.org/

- Wiki Home
- Recent Changes
- Pages and Files
- Members

Search

- Calendar
- Contact

General Information

- Introduction & Overview
- Processes & Guidelines
- Committed Members
- Getting Started as a Participant
- Community Enabling Toolkit (CET)
- April Face-to-Face (F2F) Info
- FAQs

home

Edit | 2 | 334 | ...

Getting started is easy...

1 Join the Wiki

- Join an S&I Framework

2 Learn More

- Understand the Framework

3 Start Contributing

- Sign up to participate in an

This Week's Agenda

Today | Tuesday, March 25

Tuesday, March 25	
9:00am	EU-US Interoperability St
12:00pm	PDMP & Health IT Integr
2:00pm	Public Health Tiger Team
2:00pm	LOI-eDOS Working Grou
3:00pm	LOI Implementation Guid
Wednesday, March 26	
10:00am	AoR L2 Harmonization C
10:00am	EU-US Interoperability W
12:00pm	DAF All Hands

Events shown in time zone: Eastern Time

Google Calendar

This Week's Key Activities

View recent updates from

IHE

IHE Integrating the Healthcare Enterprise

http://www.ihe.net/

For Developers | For Users

Search

About IHE | Participate | Resources | IHE Domains | IHE Worldwide | News | Events

Integrating the Healthcare Enterprise (IHE)

IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively.

BECOME A MEMBER

Become an IHE member organization and improve the interoperability of healthcare information systems.

Semantic Web – Health Care and Live Sciences

W3C

SEMANTIC WEB HEALTH CARE AND LIFE SCIENCES (HCLS) INTEREST GROUP

HOME

http://www.w3.org/blog/hcls/

Introduction

The **mission** of the Semantic Web Health Care and Life Sciences Interest Group (HCLS IG) is to develop, advocate for, and support the use of Semantic Web technologies across health care, life sciences, clinical research and translational medicine. These domains stand to gain tremendous benefit from intra- and inter-domain application of Semantic Web technologies as they depend on the interoperability of information from many disciplines. Please see the accompanying Use Cases and Rationale document.

The group will:

- Continue to develop high level (e.g. TMO) and architectural (e.g. SWAN) vocabularies.
- Implement proof-of-concept demonstrations and industry-ready code.
- Document guidelines to accelerate the adoption of the technology.
- Disseminate information about the group's work at government, industry, academic events and by participating in community initiatives.

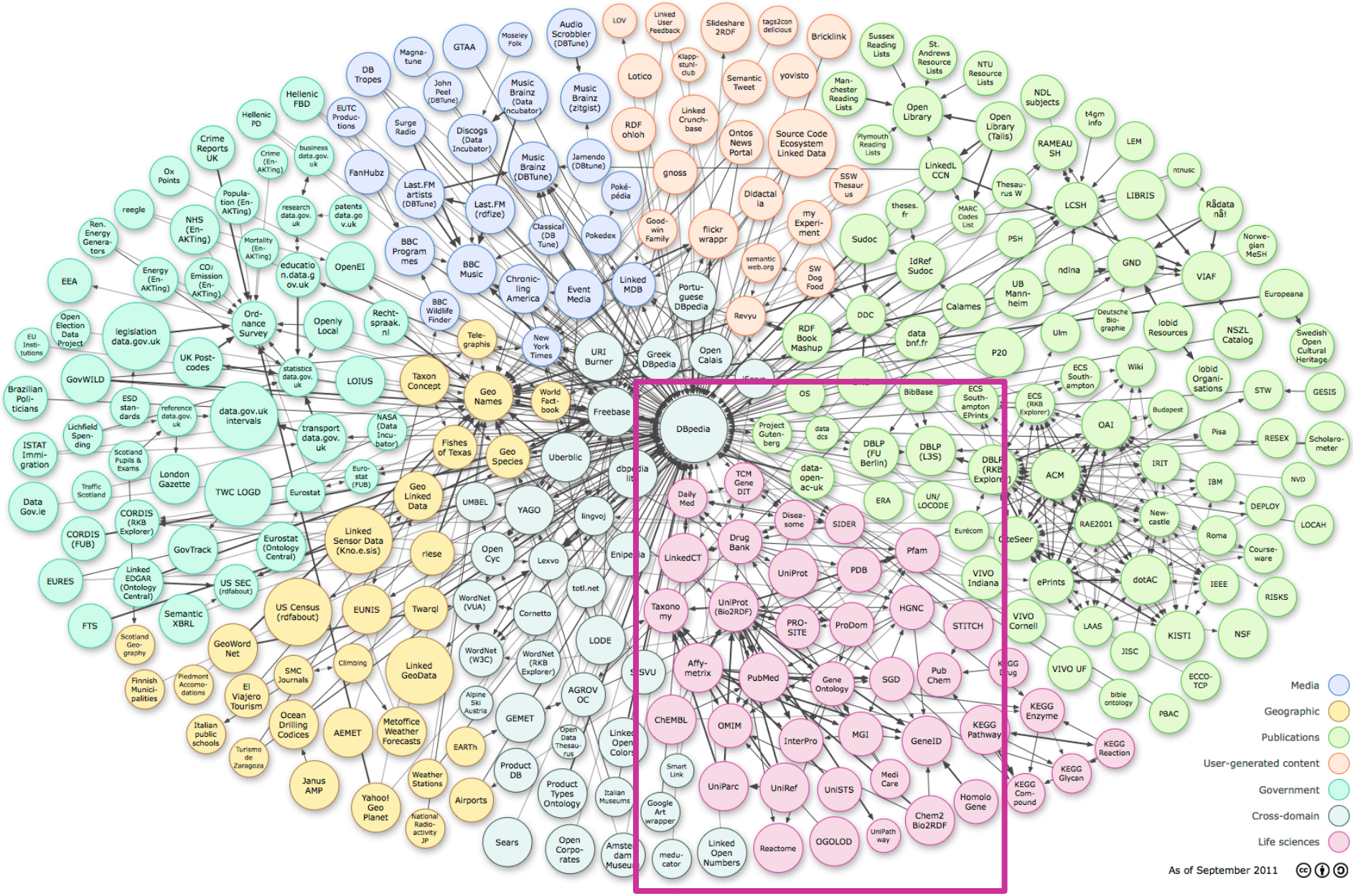
LINKS

Interest Group links:

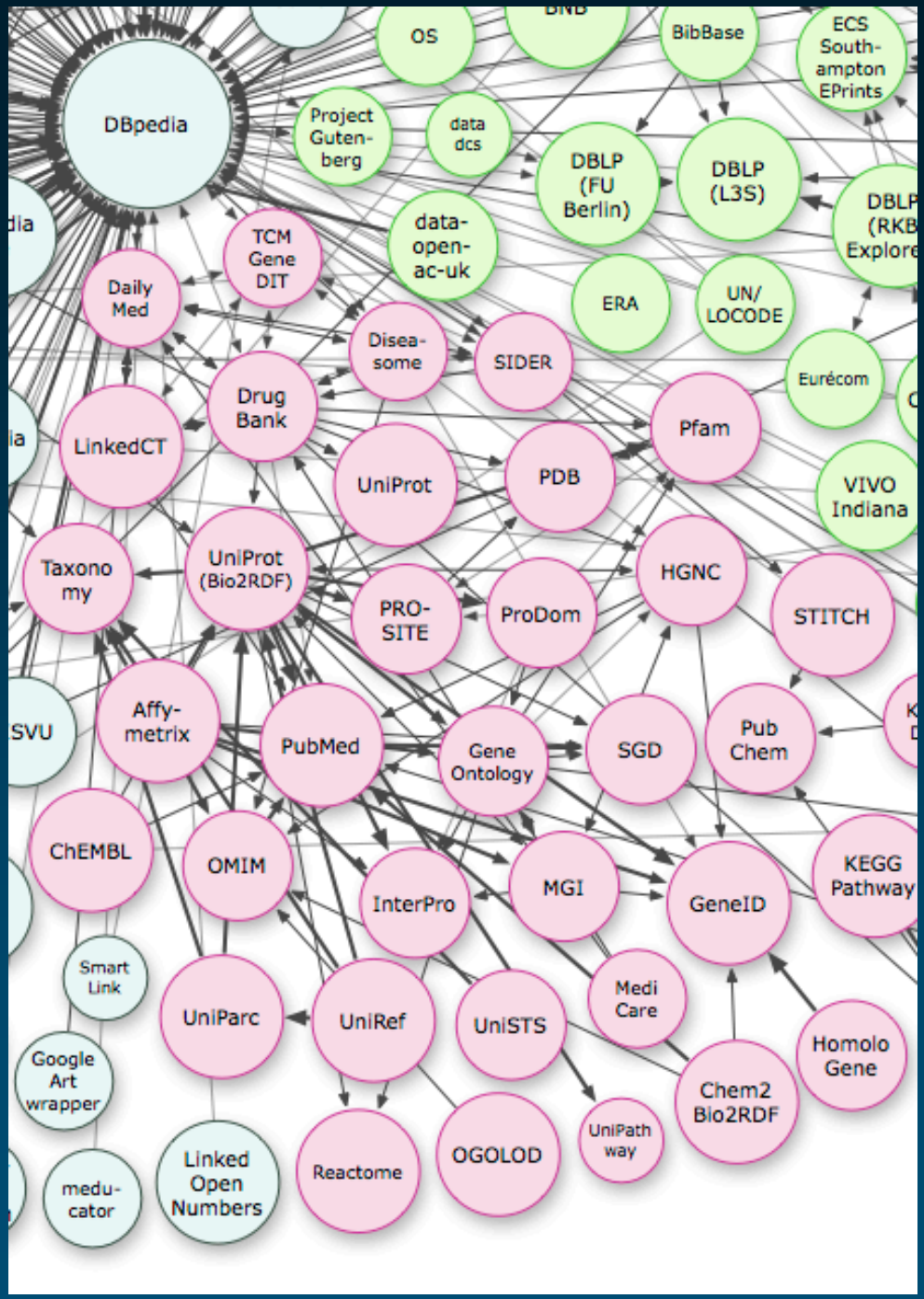
- Group Charter
- Public Wiki page
- Instructions on joining the IG
- Participants:
  - organizations
  - persons (member only link)

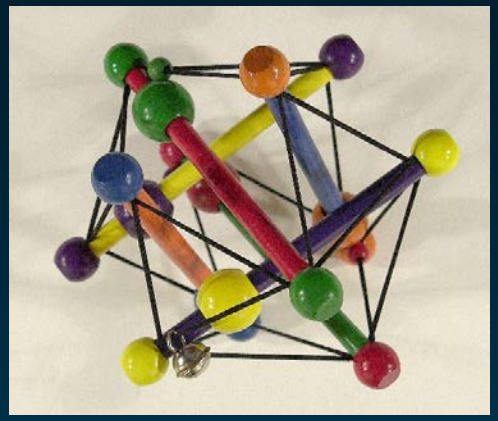
Mailing list archives

Linked Open Data Cloud



Linked Open Data Cloud – Biomedical resources





Medical Ontology Research

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