

pCLOCD and LOINC Clinical Document Ontology

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Presentation Purpose

- This session is intended to refresh and update work done on pCLOCD and LOINC Clinical Document Ontology and how it can be used with HL7 CDA.





LOINC codes and CDA

The HL7 CDA is a structured document specification

- It specifies the structure and semantics of clinical documents for the purpose of exchange.

Work on this effort began in 2000 as collaboration between the LOINC Committee and the HL7 Document Ontology Task Force (DOTF), and was supported by the US Veterans Health Administration and Columbia University

- The background and initial development of the ontology was described in 2003 and the first of attributes were agreed and published as part of the LOINC standard.

A CDA document can contain any type of clinical content

- 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) for CDA Release 2





Objective of HL7 CDA

Promotes standardization of the classification applied to medical record content, fostering a better infrastructure for interoperability across organizations

Different organizations called different clinical concepts different names.

HL7 established a common query framework using the LOINC Document Ontology axes for navigating medical record contents, fostering improved liquidity of medical record content in cross-organizational searches when compared to traditional searches for explicit document type codes

- Ability to Query for grouping of documents using Document properties
- Ability to organize into different domains
- Build data entry templates specific to a particular document

It was found that inside many EHRs and clinical data warehouses - There was a mish mash of terms





Relationship to others standards (HL7)

- HL7 will use LOINC codes for clinical document codes and will not develop an independent document code system for clinical documents. HL7 may choose to limit its domain to a subset of LOINC codes.
- The LOINC document type code domain will overlap with similar concepts found in HL7 V2.x (user defined table 0270 Document Types; user defined table 0496 Consent Types). HL7 approach to manage this overlap is:
 - Create a mapping from LOINC codes to HL7 V2.x document codes.
 - Continue to develop LOINC codes to meet the needs that are not present in the V2.x tables.

This code system <http://terminology.hl7.org/CodeSystem/v2-0270> defines the following codes:

Code	Display	Definition	Version
AR	Autopsy report		added v2.3
CD	Cardiodiagnostics		added v2.3
CN	Consultation		added v2.3
DI	Diagnostic imaging		added v2.3
DS	Discharge summary		added v2.3
ED	Emergency department report		added v2.3
HP	History and physical examination		added v2.3
OP	Operative report		added v2.3
PC	Psychiatric consultation		added v2.3
PH	Psychiatric history and physical examination		added v2.3
PN	Procedure note		added v2.3
PR	Progress note		added v2.3
SP	Surgical pathology		added v2.3
TS	Transfer summary		added v2.3





LOINC use in CDA

- LOINC is used anywhere in a CDA document when a document type needs to be identified
 - Included in the header and the body of a CDA document
- LOINC document type codes provide consistent semantics for names of documents exchanged between systems
- A document is a collection of information that contains a Title, Sections and Other content
- It's not a panel as these contain enumerated, discrete elements





Structure of LOINC Codes

Kinds of Documents:

- Clinical Note: A clinical document, produced by clinicians spontaneously or in response to a request for consultation.
- Clinical Report: A clinical document, produced in response to an order for a procedure

Formal Document Ontology exists in LOINC for Clinical Notes





Relationship to LOINC Core Fields

The relationship between the “core” LOINC fields present in the LOINC Table and the LOINC Document Ontology File is documented in the [LOINC Users’ Guide](#)

Core LOINC

LOINC Code	Component	Property	Time	System	Scale	Method	Class
22705-8	Sodium	Scnc	Pt	Ser/Plas	Qn	Test Strip	LAB

Document Ontology

LOINC Code	Component	Property	Time	System	Scale	Method	Class
	<TOS>+<Kind of document			<Setting>		<SMD>.<Role>	
54094-8	Triage Note	Find	Pt	Emergency department	Doc	{Role}	DOC. ONTOLOGY





LOINC Ontology Axis: Type of Service

Characterizes the kind of service or activity provided to/for the patient as described in the document

Examples:

- Consultations
- Summary
 - Discharge summary
 - Immunization summary
 - Transfer Summary
- Referral
- Plan of Care
- Progress





LOINC Ontology Axis: Kind of Document

Characterizes the general structure of the document at a macro level. Document types are differentiated based on the need to define distinct document headers.

Examples:

- Form
- Instructions
- Report
- Letter
- Note
- Legal
 - Legal Letter
 - Power of Attorney





LOINC Ontology Axis: Setting

Setting is a modest extension of CMS's coarse definition of settings, which have well-defined meanings. Setting is not equivalent to location, which typically has more locally defined meanings and is reported in other parts of the message. For example, The Admission H&P is usually taken to be the Hospital Admission H&P, but it could be confused with the nursing home H&P if not distinguished by the setting. It is not an important part of the name

Examples

- Ambulance
- Hospital
- Outpatient
- Patients home
- Pharmacy
- Telehealth





LOINC Ontology Axis: Subject Matter Domain (SMD)

Characterizes the subject matter domain of the document. It typically an abstract of the American Board of Specialties or The Royal College of Physician & Surgeons of Canada

Examples

- Addiction medicine
- Audiology
- Dentistry
- Emergency medicine
- Mental Health
- Obstetrics and gynecology
- Orthopaedic surgery





LOINC Ontology Axis: Role

Characterizes the training or professional level of the author or the party responsible for the content in the document. The role category is a high-level classification that does not get as detailed as specialty or subspecialty so as to avoid potential overlap with the subject matter domain axis

Examples

Clerk

Counsellor

Intern

Midwife

Nurse

Physician

- Attending
- Resident
- Consultant





What is not part of the LOINC Document Code

Author

Date of service

Status (signed, unsigned)

Updates or amendments to the document





Constructing a Document Code

Document names are constructed from the agreed set of values from each axis, but additions are added to the list if new candidates for the axis are identified e.g. Healthcare Navigator

A complete list can be found at :

- <https://loinc.org/document-ontology/current-version/>

Detail information about creating document codes can be found in the LOINC Users manual in Section 6 :

- <https://loinc.org/kb/users-guide/document-ontology>





Basic Construction a Document Code

Names for clinical notes will be constructed by picking entries from the Kind of Document axis and at least one of the other four axes.

Component		Property	Time	System	Scale	Method	
<Type of Service>	<Kind of Document>	Find	Pt	<Setting>	Doc	<Subject Matter Domain>	<Role>

The LOINC committee will create LOINC codes for all required combinations (not all possible combinations)





Examples

Example LOINC codes in the Document Ontology include:

<i>Component</i>	<i>Property</i>	<i>Time</i>	<i>System</i>	<i>Scale</i>	<i>Method</i>	<i>Class</i>
Group counseling note	Find	Pt	Hospital	Doc	{Role}	DOC.ONTOLOGY
Note	Find	Pt	Outpatient	Doc	{Role}	DOC.ONTOLOGY
Admission evaluation note	Find	Pt	{Setting}	Doc	General medicine	DOC.ONTOLOGY
History and physical note	Find	Pt	{Setting}	Doc	{Role}	DOC.ONTOLOGY

{Curly Brackets} notation: means that the information is provided elsewhere



pCLOCD Addition of LOINC Document Ontology Codes



Engagement with Jurisdictions

- In 2023, all jurisdictions were approached to assess potential impacts of adding these codes to pCLOCD.
- Ensured the addition would not disrupt existing laboratory update processes.
- Allowed jurisdictions to provide feedback on integration and adoption.
- Ontario Digital Health Information Exchange Standard (DHIEX) request additions to pCLOCD and Telus EMR

Expansion of pCLOCD:

- Built using **Request for Change (RFCs)** submitted by **Ontario Health** and published **British Columbia's Document Ontology** LOINC codes.
- 1,173 new additional LOINC Document Ontology codes added to pCLOCD.

French translations

- French translation of these LOINC Document Ontology codes were not included in this release.
- We encourage submitting requests for translation or submitting contributions of translation to support the bilingual pCLOCD.





Supporting Interoperability

Supporting Interoperability

- Enhances standardization of clinical documents across Canadian jurisdictions.
- Facilitates consistent identification and exchange of clinical documents between systems.
- Aligns with international LOINC and SNOMED CT interoperability efforts. Document Ontology is not part of the LOINC-SNOMED Extension at present, but tabled for discussion

LOINC & SNOMED International Collaboration – February 2025 Update

- Focuses on **laboratory observables** covering **80% of test volumes** based on LOINC's Top 20,000 rankings.
- Integrates **SNOMED CT's computable framework** with **LOINC's laboratory and pathology content** to meet clinical and regulatory needs.
- Continued focus on **high-volume laboratory terms**, with **potential expansion** into other domains based on community input.





LOINC Ontology

A LOINC and SNOMED CT Interoperability Solution aka LOINC & SNOMED International Collaboration or extension (loincsnomed.org)

The March 2025 release of LOINC will include more concepts, including quantitative lab tests and the top 200 most used labs. Domains of information (lab, clinical, documents, radiology, survey instruments) will be added incrementally.

Existing SNOMED CT observables will be aligned to LOINC codes and new LOINC codes will be created as needed. LOINC Parts will be mapped to SNOMED concepts, and new SNOMED CT concepts will be created as needed.

- **Special webinar** to discuss the first production release of the LOINC Ontology
- Tuesday, March 25, 2025 (9:30 a.m. to approx. 11:00 a.m. EDT)
- Register : <https://loinc.org/ontology/>
- The webinar will be recorded and all registrants will be sent a link to the recording after the event





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