LOINC Update

2017 Overview and Highlights

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Indiana University School of Medicine

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Regenstrief Center for Biomedical Informatics

@djvreeman
We want to hear your feedback
This is the LOINC Team
(they rock)
LOINC Award for Distinguished Contributions

(you rock too)

Purpose

The LOINC Award for Distinguished Contributions honors an individual who has made sustained and enduring contributions that advance health data interoperability with LOINC.

Award Criteria

This award is given for outstanding contributions, activities, and accomplishments that advance and promote LOINC and its use to improve health. A member of the LOINC community can be eligible for this award based on their thought leadership, success in implementation, promotion of awareness and adoption, education, and/or other key contributions and collaborations.

Award Presentation

The LOINC Award for Distinguished Contributions will be presented at the June Laboratory LOINC Committee meeting.

Please consider nominating a colleague

Susan Matney, PhD, RNC-OB, FAAN

2017 Honoree
Growth and Usage
Funding Acknowledgements

Lots of organizations make this data standards work possible:

U.S. National Library of Medicine
U.S. Food and Drug Administration
U.S. Centers for Medicare and Medicaid Services
National Heart, Lung, and Blood Institute / RSNA
National Center for Advancing Translational Sciences
National Institute of Diabetes and Digestive and Kidney Diseases
bioMérieux
Duke University
Regenstrief Institute and Regenstrief Foundation
LOINC Community and Premium Members
Coming Soon...

2017 ANNUAL REPORT
56,000+ registered users from 170 countries

6,000 new users per year
loinc.org registered users

6,000 new users per year

search.loinc.org login requirement

De-dupe & Purge!
This pace is more like 16,500 new users per year.
Official national standard in 30+ countries
Overall loinc.org website traffic

YTD vs Last Year

Artifact (lost data) 😞

Summary of Sessions, Users, Pageviews, Pages / Session, Avg. Session Duration, Bounce Rate:

- **Sessions**
  - **2017**: 23.72% (189,769 vs 153,382)
  - **2016**: 12.30% (106,212 vs 94,583)
  - **2018**: 34.34% (670,657 vs 499,230)

- **Pages / Session**
  - **2017**: 8.58% (3.53 vs 3.25)
  - **2016**: 19.97% (00:03:42 vs 00:03:05)
  - **2018**: -15.89% (45.87% vs 54.54%)

- **Avg. Session Duration**
  - **2017**: 00:03:42
  - **2016**: 00:03:05
  - **2018**: 45.87% vs 54.54%
Overall loinc.org website traffic (2017)
## Overall loinc.org website traffic (2017)

<table>
<thead>
<tr>
<th>Country</th>
<th>Acquisition</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sessions</td>
<td>% New Sessions</td>
</tr>
<tr>
<td></td>
<td>% of Total:</td>
<td>Avg for View:</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>(%)</td>
</tr>
<tr>
<td>United States</td>
<td>120,927</td>
<td>54.44%</td>
</tr>
<tr>
<td>India</td>
<td>8,792</td>
<td>61.14%</td>
</tr>
<tr>
<td>Canada</td>
<td>5,362</td>
<td>52.87%</td>
</tr>
<tr>
<td>Russia</td>
<td>4,469</td>
<td>53.91%</td>
</tr>
<tr>
<td>Germany</td>
<td>4,284</td>
<td>56.01%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2,675</td>
<td>61.23%</td>
</tr>
<tr>
<td>China</td>
<td>2,402</td>
<td>49.75%</td>
</tr>
<tr>
<td>France</td>
<td>2,119</td>
<td>57.64%</td>
</tr>
<tr>
<td>Australia</td>
<td>2,021</td>
<td>57.64%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2,006</td>
<td>59.72%</td>
</tr>
</tbody>
</table>

### Highlights:

- **Russia** was #10 in 2015!
- **France** was #18 in 2015!
search.loinc.org website traffic

YTD vs Last Year

Login requirement

Artifact (lost data) 😞
# Website Uptime

**June 2017 to Feb 2018**

<table>
<thead>
<tr>
<th>Date</th>
<th>loinc.org</th>
<th>search.loinc.org</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017 06</td>
<td>99.99%</td>
<td>99.99%</td>
</tr>
<tr>
<td>2017 07</td>
<td>99.97%</td>
<td>100.00%</td>
</tr>
<tr>
<td>2017 08</td>
<td>99.99%</td>
<td>99.98%</td>
</tr>
<tr>
<td>2017 09</td>
<td>99.81%</td>
<td>99.85%</td>
</tr>
<tr>
<td>2017 10</td>
<td>99.97%</td>
<td>100.00%</td>
</tr>
<tr>
<td>2017 11</td>
<td>99.94%</td>
<td>100.00%</td>
</tr>
<tr>
<td>2017 12</td>
<td>99.90%</td>
<td>99.98%</td>
</tr>
<tr>
<td>2018 01</td>
<td>99.97%</td>
<td>99.97%</td>
</tr>
<tr>
<td>2018 02</td>
<td>99.99%</td>
<td>99.98%</td>
</tr>
<tr>
<td><strong>Ave</strong></td>
<td><strong>99.95%</strong></td>
<td><strong>99.97%</strong></td>
</tr>
</tbody>
</table>
A small taste of recent LOINC adoption around the world
Canada Health Infoway

Publish and maintain pCLOCD subset of LOINC codes (incl fr-CA translation)

Province-wide lab data repositories throughout the country

Clinical Data Repository projects using document and other LOINC terms

https://www.ehealthontario.on.ca/en/
https://infocentral.infoway-inforoute.ca/en/standards/international/loinc
Kanta

Creating My Kanta Personal Health Record (Kanta PHR), a national data repository in which citizens may enter information on their health and wellbeing.

Using FHIR as the infrastructure platform

LOINC for vital signs
International Patient Summary (IPS)

A non-exhaustive patient summary, specialty-agnostic, condition-independent, but readily usable by clinicians for the cross-border unscheduled care of a patient.

Coordinated with the IPS project mandated to CEN TC 251 by the European Commission.

Uses LOINC for:

- Document type, sections, lab results, other clinical observations, and radiology reports

http://international-patient-summary.net
United States

ONC
Meaningful Use regulations, 21st Century Cures Act, Interoperability Standards Advisory

FDA
Requiring LOINC for lab test data in studies starting after March 2020
Broad vision towards using real-world evidence in post market surveillance

CDC
Longtime users of LOINC: electronic lab reporting, case reporting, immunization messaging, National EMS Info System, National Trauma Data Standards, etc

CMS
Under Impact Act 2014, all CMS-required patient assessment instruments are standardized in LOINC
Other Notables

CMS has Attachments NPRM on Unified Agenda for Fall 2018

LOINC has central role in current HL7 specs for this

NCVHS has a current project reviewing terminology standards

FHIR ImagingStudy

The LOINC/RSNA Radiology Playbook is now the terminology binding for `ImagingStudy.procedureCode`
Large-scale observational research networks have adopted LOINC:

- FDA’s Mini-Sentinel project
- PCORnet
- Observational Health Data Sciences and Informatics (OHDSI)
LOINC Development
2017 Content, Features, Projects
New Release Artifacts
added to the portfolio this year

LOINC Table Core
LOINC Part File
LOINC Answer File
LOINC Groups File
New Term Requests:

Submissions from 160+ organizations in 15 countries in last 2 years
LOINC Queue

Requests: 128
Requested LOINCs: 3,022
Requested LOINCs Pending Copyright Approval: 84
LOINC Created Since Last Release: 285
Median Turnaround: 125 DAYS

Last updated 16 hours ago
Stay tuned for more coming submitter features!
<table>
<thead>
<tr>
<th>Collaboration</th>
<th>Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>IICC</td>
<td>NCCIH/Duke*</td>
</tr>
<tr>
<td>HL7*</td>
<td>CMS*</td>
</tr>
<tr>
<td>IEEE*</td>
<td>ICCR/CAP*</td>
</tr>
<tr>
<td>SNOMED Intl*</td>
<td>FDA</td>
</tr>
<tr>
<td>RSNA*</td>
<td>CDISC</td>
</tr>
<tr>
<td>bioMérieux*</td>
<td>HSC</td>
</tr>
<tr>
<td>NIDDK*</td>
<td>APTA*</td>
</tr>
<tr>
<td>APSE/CTSI*</td>
<td>NIEHS/RTI*</td>
</tr>
</tbody>
</table>

* indicates collaborations with specific content development
RELMA Release
Version 6.22
Focus your searches with user-defined LOINC Subsets

New in version 6.22!

loinc.org/relma
Targeted Subsets of LOINC

Many countries support a curated, nationally-approved list of LOINC codes for use in their jurisdiction. To support users in these countries, we allow a flexible import mechanism whereby users can subset their searches only to that approved list. Rather than search the whole 80,000+ LOINC database, their searches within RELMA are be limited to only what they need.

Or, maybe you have a different use case but still want to narrow your searches to a particular set of terms.

Now, with custom subsets, you can upload and define your own list of LOINC codes for use within RELMA. Each subset you create can be used as a custom filter to limit your search results.

_Log in_ to add a new Subset and review your existing sets
This is your name for the Subset and how it is presented within RELMA. Keep changes to a minimum so it remains recognizable.

**Name** REQUIRED

pan-Canadian LOINC Observation Code Database (pCLOCD)

53 of 120 max characters

When making changes to the Subset, please revise the version accordingly.

**Version** REQUIRED

20170731

8 of 30 max characters

This is your brief description of the Subset. Remember this information is also displayed within RELMA.

**Description/Purpose** REQUIRED

LOINC® is the largest reference terminology used for Laboratory and Clinical observations in Canada today. The pan-Canadian LOINC Observation Code Database (pCLOCD) is a Canadian constraint of the larger LOINC terminology and includes example pan-Canadian names for jurisdictional lab viewers and recommended units of measure for use in Canada.

344 of 350 max characters

Select the LOINC version used to establish this Subset. Please revise accordingly.

**LOINC Version** REQUIRED
<table>
<thead>
<tr>
<th>Select</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CI-SIS : Interopérabilité sémantique: LOINC pour résultats de biologie</td>
<td>Le jeu de valeurs LOINC pour résultats de biologie est l’un des composants sémantiques de la couche « contenu » du CI-SIS. Ce jeu de valeurs permet de coder les analyses élémentaires de biologie pour l’expression des résultats de ces analyses dans un contenu médical dématérialisé en France (par exemple un compte rendu électronique d’examen de biologie)</td>
</tr>
<tr>
<td>☑️</td>
<td>pan-Canadian LOINC Observation Code Database (pCLOCD)</td>
<td>LOINC® is the largest reference terminology used for Laboratory and Clinical observations in Canada today. The pan-Canadian LOINC Observation Code Database (pCLOCD) is a Canadian constraint of the larger LOINC terminology and includes example pan-Canadian names for jurisdictional lab viewers and recommended units of measure for use in Canada.</td>
</tr>
<tr>
<td></td>
<td>bioMérieux Etest</td>
<td>LOINC codes identified by bioMérieux for the Etest. Published in LIVD format, extracted for creating a LOINC subset.</td>
</tr>
<tr>
<td></td>
<td>ReTaM</td>
<td>The ReTaM lab code table management tool is the authentic source for laboratory codes. This authentic source is -wherever possible - based on LOINC. The ReTaM codes are used in the Kind Messages For Electronic Health Record (KMER) initiative.</td>
</tr>
<tr>
<td>Row</td>
<td>LOINC</td>
<td>Component</td>
</tr>
<tr>
<td>-----</td>
<td>---------------</td>
<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>70219-1</td>
<td>Basic metabolic 2008 panel with ionized calcium</td>
</tr>
<tr>
<td>2</td>
<td>50179-1</td>
<td>Calcitonin Calcium &amp; Pentagastrin challenge panel</td>
</tr>
<tr>
<td>3</td>
<td>17861-6</td>
<td>Calcium</td>
</tr>
<tr>
<td>4</td>
<td>2000-8</td>
<td>Calcium</td>
</tr>
<tr>
<td>5</td>
<td>86915-6</td>
<td>Calcium goal</td>
</tr>
<tr>
<td>6</td>
<td>1993-5</td>
<td>Calcium renal clearance</td>
</tr>
<tr>
<td>7</td>
<td>17863-2</td>
<td>Calcium/ionized</td>
</tr>
<tr>
<td>8</td>
<td>17864-0</td>
<td>Calcium/ionized</td>
</tr>
<tr>
<td>9</td>
<td>1995-0</td>
<td>Calcium/ionized</td>
</tr>
<tr>
<td>10</td>
<td>13959-2</td>
<td>Calcium/ionized</td>
</tr>
<tr>
<td>11</td>
<td>12180-6</td>
<td>Calcium/ionized</td>
</tr>
<tr>
<td>12</td>
<td>49935-0</td>
<td>Calcium/ionized/Calcium.total^^correction for...</td>
</tr>
<tr>
<td>13</td>
<td>57333-7</td>
<td>Calcium/ionized^^adjusted to pH 7.4</td>
</tr>
<tr>
<td>14</td>
<td>19072-8</td>
<td>Calcium/ionized^^adjusted to pH 7.4</td>
</tr>
<tr>
<td>15</td>
<td>13444-5</td>
<td>Calcium/Albumin</td>
</tr>
<tr>
<td>16</td>
<td>13448-6</td>
<td>Calcium/Osmolality</td>
</tr>
<tr>
<td>17</td>
<td>16525-8</td>
<td>Calcium/Phosphate</td>
</tr>
<tr>
<td>18</td>
<td>16526-6</td>
<td>Calcium/Protein</td>
</tr>
</tbody>
</table>
| Row | LOINC   | Component                                      | Property | Timing | System       | Scale | Method        | ExUCUMunits | Ex | Ra | SIR | LFo | C...
|-----|---------|-----------------------------------------------|----------|--------|--------------|-------|---------------|-------------|----|----|-----|-----|------
| 1   | 50179-1 | Calcitonin Calcium & Pentagastrin challenge panel | -        | Pt     | Ser/Pl... Qn | Qn    | Calculated    | mmol/L      | m  |    |     |     |      
| 2   | 13959-2 | Calcium.ionized                               | SCnc     | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol/L      | m  |    |     |     |      
| 3   | 12180-6 | Calcium.ionized                               | SCnc     | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol/L      | m  | 10 | 15  | 6   |      
| 4   | 19072-8 | Calcium.ionized \^adjusted to pH 7.4          | SCnc     | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol/L      | m  |    |     |     |      
| 5   | 29265-6 | Calcium\^\^corrected for albumin             | SCnc     | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol/L      | m  | 237| 23  | 56  |      
| 6   | 18281-6 | Calcium\^\^corrected for total protein       | SCnc     | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol/L      | m  |    |     |     |      
| 7   | 59148-7 | Calcium\^post dialysis                        | SCnc     | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol/L      | m  |    |     |     |      
| 8   | 13454-4 | Calcium-phosphorus product                    | SCncSq   | Pt     | Ser/Pl... Qn | Qn    | ISE           | mmol2/L2    | m  |    |     |     |      |
Coming Attractions
Funded Project with the PhenX team at RTI

Linking Complex Disease and Exposure Data to Established Data Standards

Goal is to represent exposure indicator data elements from relevant PhenX protocols and the Gulf Resilience on Women’s Health (GROWH) study and other related environmental epidemiology studies in LOINC.

Grant 1R24ES028479-01 from National Institute of Environmental Health Sciences (NIEHS)
Funded Project with the ADAPTABLE team at Duke

Use of the ADAPTABLE Trial to Strengthen Methods to Collect, Validate, and Integrate Patient-reported Information with Electronic Health Record Data

Our (sub) goal is to represent key patient-reported outcomes variables in LOINC (and also into some sites with new PCORnet Common Data Model v4.0)

Grant 3U54AT007748-05S1 from Duke University / National Center for Complementary & Integrative Health
Active work in Social Determinants of Health

Revised R21 Proposal with NYU Submitted

Participated in excellent stakeholder meeting following organized by SIREN network

Paper in preparation

Active area interest with ONC, others
Ongoing FDA-funded Pilot project and final publication of Guide for Using LOINC Microbiology Terms

Our first (but hopefully not last) “Implementation Guide”

Contract HHSF223201710178P from U.S. Food and Drug Administration
LOINC Versioning Policy

Approved by both LOINC Committees

Lab Committee recommended implementation in June 2018 release

See loinc.org/versioning