

ACT Ontology Version 4.0 Installation Instructions

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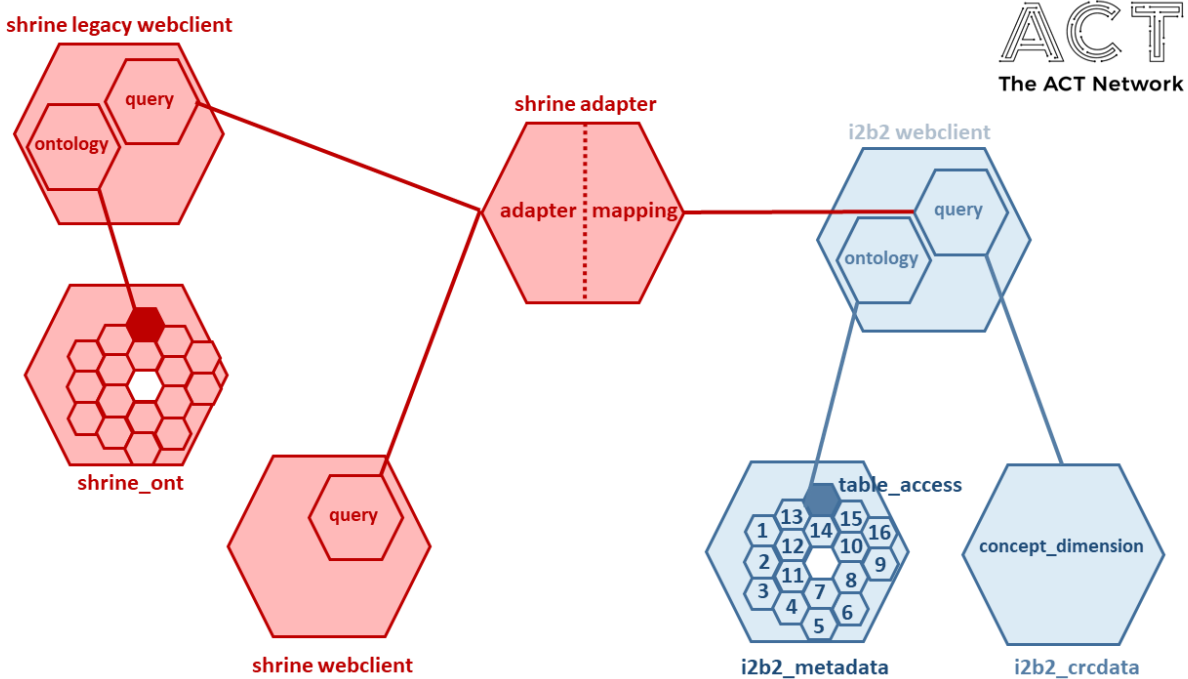
[COVID Ontology](#)

Optional Steps

Execute Totalnum Scripts after each data refresh

CLIC Metrics

ACT Ontology Overview



Ontology Contents

Ontology	Source	Status	Terminology	Backward Compatible
Demographics	ACT	Modified	ACT DEM	Yes
Visit Details	ACT	Modified		Yes
Social Determinants of Health	ACT	New	LOINC	N/A
Vital Signs	UMLS	New	LOINC	N/A
COVID	ACT	Modified	Mixed (ACT Local, ICD10CM, ICD10PCS, RxNorm, ATC, NDC, MS-DRG, CPT4, HCPCS, LOINC)	Yes
Lab (Provisional)	UMLS 2018AA	Unchanged	LOINC	Yes
Lab	ACT	Modified	LOINC	Yes
Medications grouped alphabetically	UMLS (2004AA-2020AB)	Modified	RXNORM, NDC	Yes
Medications grouped by VA Classification	UMLS (2004AA-2020AB)	Modified	VANDF, RXNORM, NDC	No
Diagnosis ICD9CM	UMLS (2004AA-2020AB)	Modified	ICD9-CM	Yes
Diagnosis ICD10CM	UMLS (2004AA-2020AB)	Modified	ICD10-CM	Yes
Diagnosis ICD10CM/9CM	Legacy UMLS 2015	Unchanged	ICD9-CM, ICD10-CM	Yes
Procedures CPT4	UMLS (2004AA-2020AB)	Modified	CPT4	Yes
Procedures HCPCS	UMLS (2004AA-2020AB)	Modified	HCPCS	Yes
Procedures ICD9PROC	UMLS (2004AA-2020AB)	Modified	ICD9-CM	Yes
Procedures ICD10PCS	UMLS (2004AA-2020AB)	Modified	ICD10-CM	Yes

Preparation

This document assumes the following:

- An operational instance of SHRINE
(<https://open.catalyst.harvard.edu/wiki/display/SHRINE/SHRINE+3.0.0+Installation+Guide>)
- An operational instance of i2b2
(<https://community.i2b2.org/wiki/display/getstarted/i2b2+Installation+Guide>)
- Write access to the SHRINE database shrine_ont schema
- Write access to the i2b2 database metadata schema
- Write access to the i2b2 database CRC schema
- Read access on the i2b2 metadata schema from the i2b2 CRC schema
- Write access to the SHRINE installation /opt/shrine/tomcat/lib directory
- Access to stop and start SHRINE
- Access to stop and start i2b2 Wildfly

Files

The files are now hosted Box

<https://pitt.app.box.com/folder/137928644213?s=kq4opwfb14nphrf2n9msjo96loap56qt>

oracle-> act_ontology_V4_1.zip, act_ontology_V4_2.zip, act_ontology_V4_3.zip

sqlserver-> act_ontology_V4_1.zip, act_ontology_V4_2.zip, act_ontology_V4_3.zip

postgres-> act_ontology_V4_1.zip, act_ontology_V4_2.zip, act_ontology_V4_3.zip

adapter_mapping_V4.zip

check_act_ont_rowcounts.sql

copy_metadata_oracle_postgres.sql

copy_metadata_sqlserver.sql

Each collection of RDB (Oracle, Postgres, SQLServer) zip file contains the following files:

create_concept_dimension_RDB.sql create_i2b2metadata_tables.sql insert_metadata_act_table_access.sql insert_metadata_act_schemes_V4.sql insert_metadata_act_covid_V4.sql insert_metadata_actcpt4_V4.sql insert_metadata_act_dem_V4.sql insert_metadata_act_hcpcs_px_V4.sql insert_metadata_act_icd10_icd9_dx_V4.sql insert_metadata_act_icd10cm_dx_V4.sql insert_metadata_act_icd10pcs_px_V4.sql insert_metadata_act_icd9cm_dx_V4.sql insert_metadata_act_icd9cm_px_V4.sql insert_metadata_act_loinc_lab_V4.sql insert_metadata_act_loinc_lab_prov_V4_00.sql insert_metadata_act_loinc_lab_prov_V4_01.sql insert_metadata_act_loinc_lab_prov_V4_02.sql insert_metadata_act_loinc_lab_prov_V4_03.sql insert_metadata_act_loinc_lab_prov_V4_04.sql	insert_metadata_act_med_alpha_V4_00.sql insert_metadata_act_med_alpha_V4_01.sql insert_metadata_act_med_alpha_V4_02.sql insert_metadata_act_med_alpha_V4_03.sql insert_metadata_act_med_alpha_V4_04.sql insert_metadata_act_med_alpha_V4_05.sql insert_metadata_act_med_alpha_V4_06.sql insert_metadata_act_med_alpha_V4_07.sql insert_metadata_act_med_alpha_V4_08.sql insert_metadata_act_med_alpha_V4_09.sql insert_metadata_act_med_va_V4_00.sql insert_metadata_act_med_va_V4_01.sql insert_metadata_act_med_va_V4_02.sql insert_metadata_act_med_va_V4_03.sql insert_metadata_act_med_va_V4_04.sql insert_metadata_act_med_va_V4_05.sql insert_metadata_act_med_va_V4_06.sql insert_metadata_act_med_va_V4_07.sql insert_metadata_act_med_va_V4_08.sql insert_metadata_act_med_va_V4_09.sql insert_metadata_act_sdoH_V4.sql insert_metadata_act_visit_details_V4.sql insert_metadata_act_vital_signs_V4.sql
--	--

act_ontology_V4_dsv.zip file contains the following files:

ACT_COVID_V4.dsv ACT_CPT4_PX_V4.dsv ACT_DEM_V4.dsv ACT_HCPCS_PX_V4.dsv ACT_ICD10CM_DX_V4.dsv ACT_ICD10PCS_PX_V4.dsv ACT_ICD10_ICD9_DX_V4.dsv ACT_ICD9CM_DX_V4.dsv ACT_ICD9CM_PX_V4.dsv ACT_LOINC_LAB_PROV_V4.dsv ACT_LOINC_LAB_V4.dsv ACT_MED_ALPHA_V4.dsv ACT_MED_VA_V4.dsv ACT_SDOH_V4.dsv ACT_VISIT_DETAILS_V4_mssql.dsv ACT_VISIT_DETAILS_V4_oracle.dsv ACT_VISIT_DETAILS_V4_postgres.dsv ACT_VITAL_SIGNS_V4.dsv SCHEMES.dsv TABLE_ACCESS.dsv	Oracle - create_concept_dimension_ORACLE.sql - create_i2b2metadata_tables.sql Postgres - create_concept_dimension_POSTGRES.sql - create_i2b2metadata_tables.sql Sqlserver - create_concept_dimension_SQLSERVER.sql - create_i2b2metadata_tables.sql
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ACT Shrine Ontology ***update for sites using SHRINE 3.1 only***

1. Create Ontology Tables **(Skip this step if your site is not using legacy shrine)**

In the SHRINE_ONT schema execute `create_i2b2metadata_tables.sql`.

The file can be found in act_ontology_V4_<RDB>.zip or in the act_ontology_V4_dsv.zip in the dsv/<RDB> directory.

Sixteen new ontology tables will be created. Previous versions of ACT ontology tables will not be overwritten.

Ontology Table Descriptions

	TABLE_NAME	ROW COUNT
1	ACT_COVID_V4	66451
2	ACT_CPT4_PX_V4	16564
3	ACT_DEM_V4	172

4	ACT_HCPCS_PX_V4	9241
5	ACT_ICD10CM_DX_V4	96366
6	ACT_ICD10PCS_PX_V4	244334
7	ACT_ICD10_ICD9_DX_V4	128152
8	ACT_ICD9CM_DX_V4	17753
9	ACT_ICD9CM_PX_V4	4676
10	ACT_LOINC_LAB_PROV_V4	142860
11	ACT_LOINC_LAB_V4	547
12	ACT_MED_ALPHA_V4	1059167
13	ACT_MED_VA_V4	1244825
14	ACT_SDOH_V4	21
15	ACT_VISIT_DETAILS_V4	164
16	ACT_VITAL_SIGNS_V4	85

2. Load Data into Ontology Tables

Using your method of choice, load data into new ontology tables. There are countless methods to load data into database tables in the three database flavors. The method you use will depend on your DB privileges and access to tools. Two options are described here.

- a. Set schema (SHRINE_ONT) (Skip this step if your site is not using legacy shrine)

Oracle

```
SET SCHEMA SHRINE_ONT
```

Postgres

```
SET search_path TO SHRINE_ONT,public;
```

SQLServer

```
USE SHRINE_ONT
```

- b. Load ontology metadata (Skip this step if your site is not using legacy shrine)

Method: load from dsv files

Each DSV is pipe delimited with each column enclosed in double quotes. The first line of each file has a header with the table column names. Loading the ontology with this method is the fastest. You should be able to complete the ontology install in under two hours. They can be ingested manually using UI tools like SQLDeveloper, or pgAdmin or Azure Data Studio or bulk loaders like Oracle's sqlldr.

Method: manually run insert scripts

Execute the 38 sql insert scripts to populate the sixteen ontology tables.

Using the appropriate relational database flavor execute the insert_metadata_act_*_V4.sql scripts. The lab and med scripts have been split into several files to accommodate resource constraints in some tools. This method may take more than eight hours to execute.

Oracle

Before executing the insert scripts set the following parameters to avoid problems inserting ampersands and i/o that could slow performance.

```
SET ECHO OFF  
SET AUTOCOMMIT ON  
SET DEFINE OFF  
SET TERMOUT OFF
```

Backup table_access and schemes (Skip this step if your site is not using legacy shrine)

Backup existing TABLE_ACCESS and SCHEMES tables using copy method to preserve and existing table indexes:

Oracle and Postgres

```
create table TABLE_ACCESS_V2 as select * from TABLE_ACCESS;  
create table SCHEMES_V2 as select * from SCHEMES;
```

SQLServer

```
select * INTO TABLE_ACCESS_V2 from TABLE_ACCESS;  
select * INTO SCHEMES_V2 from SCHEMES;
```

Load table_access and schemes (Skip this step if your site is not using legacy shrine)

Truncate table_access

```
truncate table table_access;  
truncate table schemes;
```

Load TABLE_ACCESS for V4 by executing insert_metadata_act_table_access.sql act_ontology_V4_<RDB>.zip or TABLE_ACCESS.dsv. in the act_ontology_V4_dsv.zip

Load TABLE_ACCESS for V4 by executing insert_metadata_act_schemes_V4.sql act_ontology_V4_<RDB>.zip or SCHEMES.dsv. in the act_ontology_V4_dsv.zip

Install AdapterMapping file

In SHRINE installation directory

1. Unzip AdapterMappingV4.zip to AdapterMappingV4.csv into the SHRINE /opt/shrine/tomcat/lib directory
2. Edit the shrine.conf file to make sure the filename matches the property. Look for property adapterMappingsFileName and change to:

```
adapterMappingsFileName = "AdapterMappingV4060621.csv"
```


**this is update version*
3. (Optional) Edit the SHRINE environment script /opt/shrine/tomcat/bin/setenv.sh to increase the Java memory settings; the AdapterMapping file is very large and may not successfully load otherwise. The recommended minimum memory settings are -Xms512m -Xmx1024m.

Example:

```
CATALINA_OPTS="$CATALINA_OPTS -server -Xms512m -Xmx1024m  
-Duser.timezone=America/New_York"
```

Install the new SHRINE UI lucene index

The new SHRINE user interface requires a lucene index version of the ACT ontology for display. Please follow the instructions contained in the link to download and install the ACT Ontology V4 of the index.

<https://open.catalyst.harvard.edu/wiki/display/SHRINE/Update+SHRINE+Lucene+Index+Files+-+For+ACT+Ontology+Version+4.0.0>

ACT i2b2 Ontology

The following instructions are general. They should be executed according to individual site implementation. Sites may install all, some or none of the ACT ontology in their local i2b2 instance. If not using the ACT ontology as your local i2b2 ontology please be sure to update the SHRINE AdapterMappingV4.csv file to harmonize to the ontology for network queries.

Install metadata

Install the ontology tables, table_access and schemes in the i2b2 metadata schema. This can be achieved by copying the work completed in the SHRINE ontology installation or repeating the steps above in the metadata schema. The copy method should be the most efficient method.

Method: Install ACT ontology by copying SHRINE ontology

Make sure you have read access to the SHRINE_ONT schema from the i2b2 metadata schema

- c. Set schema (i2b2_metadata)

Oracle

```
SET SCHEMA i2b2_metadata
```

Postgres

```
SET search_path TO i2b2_metadata,public;
```

SQLServer

```
USE i2b2_metadata
```

Edit script copy_metadata_oracle_postgres.sql or copy_metadata_sqlserver.sql to set local schema names. Execute a global find and replace for the variables @i2b2MetadataSchema and @shrineOntSchema. Change to your local schema/database names.

Example:

```
select * into @i2b2MetadataSchema.ACT_COVID_V4 from @shrineOntSchema.ACT_COVID_V4;
```

BECOMES

```
select * into ncatstest_metadata.dbo.ACT_COVID_V4 from ncatstest_shrineont.dbo.ACT_COVID_V4;
```

Execute `copy_metadata_oracle_postgres.sql` or `copy_metadata_sqlserver.sql`

Method: Repeat steps from the SHRINE installation (above) in the i2b2 metadata schema

Update local schemes and table access. Repeat above steps taking care not to delete any local customizations you may have in your local i2b2 instance.

Update concept_dimension table in crc schema

Backup existing CONCEPT_DIMENSION table using copy method to preserve and existing table indexes:

Oracle and Postgres

```
create table CONCEPT_DIMENSION_V2 as select * from CONCEPT_DIMENSION;
```

SQLServer

```
select * INTO CONCEPT_DIMENSION_V2 from CONCEPT_DIMENSION;
```

Add ACT concepts to concept_dimension table

If ACT is your local ontology truncate the concept_dimension table.

If your local ontology has local concepts delete existing ACT concepts.

```
delete from CONCEPT_DIMENSION where concept_path like '\ACT\%'
```

Execute `create_concept_dimension_<RDB>.sql` to add ACT concepts to concept_dimension table

ACT i2b2/OMOP Ontology (In Progress)

Setup i2b2/OMOP instance

1. Follow instructions to create i2b2 instance. <https://community.i2b2.org/wiki/display/OMOP>
2. Except the create_omop_views.sql script. This should replace the default observation_view and measurement_view scripts from the i2b2 installation. This will map the value_concept_id field to observation_fact.valueflag_cd field. This will be necessary to support the COVID test mappings.

3. Create Ontology Tables

In the i2b2_metadata schema execute create_i2b2metadata_tables_omop.sql.

The file can be found in act_ontology_V4_<RDB>.zip or in the act_ontology_V4_dsv.zip in the dsv/<RDB> directory.

Sixteen new ontology tables will be created.

Ontology Table Descriptions

	TABLE_NAME	ROW COUNT
1	ACT_COVID_V4	66451
2	ACT_CPT4_PX_V4_OMOP	16564
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4	ACT_HCPCS_PX_V4_OMOP	9241
5	ACT_ICD10CM_DX_V4_OMOP	96366
6	ACT_ICD10PCS_PX_V4_OMOP	244334
7	ACT_ICD10_ICD9_DX_V4_OMOP	128152
8	ACT_ICD9CM_DX_V4_OMOP	17753
9	ACT_ICD9CM_PX_V4_OMOP	4676
10	ACT_LOINC_LAB_PROV_V4_OMOP	142860
11	ACT_LOINC_LAB_V4_OMOP	547
12	ACT_MED_ALPHA_V4_OMOP	1059167
13	ACT_MED_VA_V4_OMOP	1244825
14	ACT_SDOH_V4_OMOP	21
15	ACT_VISIT_DETAILS_V4_OMOP	164
16	ACT_VITAL_SIGNS_V4_OMOP	85

4. Load Data into Ontology Tables

Using your method of choice, load data into new ontology tables. There are countless methods to load data into database tables in the three database flavors. The method you use will depend on your DB privileges and access to tools. Two options are described here.

- d. Set schema (SHRINE_ONT)

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```
SET SCHEMA SHRINE_ONT
```

Postgres

```
SET search_path TO SHRINE_ONT,public;
```

SQLServer

```
USE SHRINE_ONT
```

- e. Load ontology metadata

Method: load from dsv files

Each DSV is pipe delimited with each column enclosed in double quotes. The first line of each file has a header with the table column names. Loading the ontology with this method is the fastest. You should be able to complete the ontology install in under two hours. They can be ingested manually using UI tools like SQLDeveloper, or pgAdmin or Azure Data Studio or bulk loaders like Oracle's sqlldr.

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Oracle

Before executing the insert scripts set the following parameters to avoid problems inserting ampersands and i/o that could slow performance.

```
SET ECHO OFF
```

```
SET AUTOCOMMIT ON
```

```
SET DEFINE OFF
```

```
SET TERMOUT OFF
```

Backup table_access and schemes

Backup existing TABLE_ACCESS and SCHEMES tables using copy method to preserve and existing table indexes:

Oracle and Postgres

```
create table TABLE_ACCESS_V2 as select * from TABLE_ACCESS;  
create table SCHEMES_V2 as select * from SCHEMES;
```

SQLServer

```
select * INTO TABLE_ACCESS_V2 from TABLE_ACCESS;  
select * INTO SCHEMES_V2 from SCHEMES;
```

Load table_access and schemes

Truncate table_access

```
truncate table table_access;  
truncate table schemes;
```

Load TABLE_ACCESS for V4 by executing insert_metadata_act_table_access.sql
act_ontology_V4_<RDB>.zip or TABLE_ACCESS.dsv. in the act_ontology_V4_dsv.zip

Load TABLE_ACCESS for V4 by executing insert_metadata_act_schemes_V4.sql
act_ontology_V4_<RDB>.zip or SCHEMES.dsv. in the act_ontology_V4_dsv.zip

Update concept_dimension table in crc schema

Backup existing CONCEPT_DIMENSION table using copy method to preserve and existing table indexes:

Oracle and Postgres

```
create table CONCEPT_DIMENSION_V2 as select * from CONCEPT_DIMENSION;
```

SQLServer

```
select * INTO CONCEPT_DIMENSION_V2 from CONCEPT_DIMENSION;
```

Add ACT concepts to concept_dimension table

If ACT is your local ontology truncate the concept_dimension table.

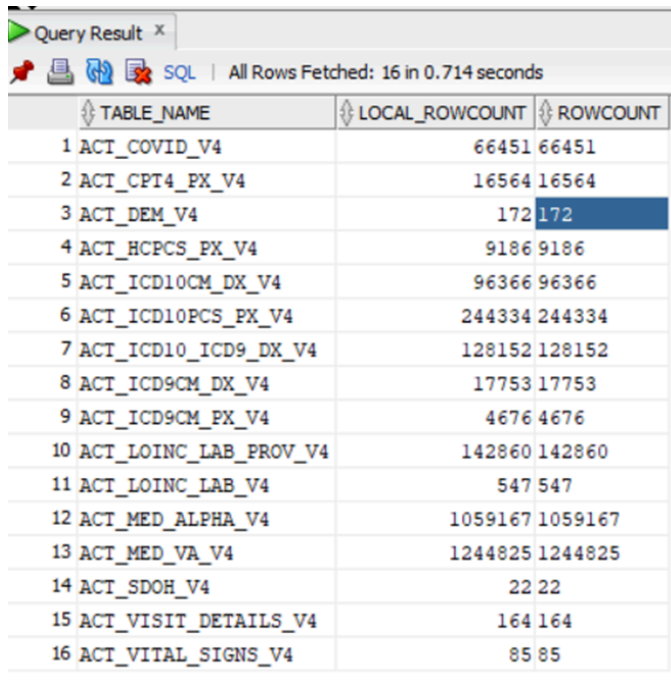
If your local ontology has local concepts delete existing ACT concepts.

```
delete from CONCEPT_DIMENSION where concept_path like '\\ACT\\%'
```

Execute create_concept_dimension_<RDB>.sql to Add ACT concepts to concept_dimension table

Test Installation

Compare row count. Run `check_act_ont_rowcounts.sql`



	TABLE_NAME	LOCAL_ROWCOUNT	ROWCOUNT
1	ACT_COVID_V4	66451	66451
2	ACT_CPT4_PX_V4	16564	16564
3	ACT_DEM_V4	172	172
4	ACT_HCPCS_PX_V4	9186	9186
5	ACT_ICD10CM_DX_V4	96366	96366
6	ACT_ICD10PCS_PX_V4	244334	244334
7	ACT_ICD10_ICD9_DX_V4	128152	128152
8	ACT_ICD9CM_DX_V4	17753	17753
9	ACT_ICD9CM_PX_V4	4676	4676
10	ACT_LOINC_LAB_PROV_V4	142860	142860
11	ACT_LOINC_LAB_V4	547	547
12	ACT_MED_ALPHA_V4	1059167	1059167
13	ACT_MED_VA_V4	1244825	1244825
14	ACT_SDOH_V4	22	22
15	ACT_VISIT_DETAILS_V4	164	164
16	ACT_VITAL_SIGNS_V4	85	85

Test ontology in the user interface by:

- Query one term from each hierarchy in SHRINE
- Find term using by name in SHRINE
- Find term by using find by code in SHRINE

Map new concepts

Although most domains were only modified to include retired and new terms from UMLS versions 2004AA - 2020AB, the following ontologies will require new ETL and mappings.

Labs (small lab)

This ontology should be reviewed carefully. It has been enhanced to contain most common labs, approximately 500 LOINC codes. Check the mappings and unit of measure of these labs as most queries and research will rely on the labs contained in this hierarchy. Sites are expected to be able to respond to queries with these labs by value where applicable.

To list the labs included in the small lab execute

In oracle:

```
select c_name, c_basecode,
substr(c_metadatxml, instr(c_metadatxml, '<NormalUnits>')+length('<NormalUnits>'),
instr(c_metadatxml, '</NormalUnits>')-instr(c_metadatxml, '<NormalUnits>')-length('<NormalUnits>'))
from act_loinc_lab_v4;
```

Use the table to compare your LOINC codes and units of measure to what is in the ontology. If no units are listed assume the units that are part of the LOINC name. For example LOINC 1960-4 Bicarbonate would be [Moles/volume]. LOINC Groups or LOINC Parts do not need to mapped to EHR data as they are hierarchical grouping concepts.

C_NAME	C_BASECODE	SUBSTR(C_METADATA)
65 Bicarbonate	LOINC:LP46...	(null)
66 Bicarbonate [Moles/volume] in Arterial blood (1960-4)	LOINC:1960-4	(null)
67 Bicarbonate [Moles/volume] in Venous blood (14627-4)	LOINC:14627-4	(null)
68 Bicarbonate in Blood (1959-6)	LOINC:1959-6	mmol/L
69 Bicarbonate in Plasma (1962-0)	LOINC:1962-0	mmol/L
70 Bicarbonate in Serum (1963-8)	LOINC:1963-8	mmol/L
71 Bilirubin	LOINC:LP43...	(null)
72 Bilirubin conjugated in Serum or Plasma (15152-2)	LOINC:15152-2	mg/dL
73 Bilirubin total (42719-5)	LOINC:42719-5	mg/dL
74 Bilirubin total in Serum or Plasma (1975-2)	LOINC:1975-2	mg/dL
75 Bilirubin total [Presence] in Urine by Test strip (5770-3)	LOINC:5770-3	(null)
76 Blasts	LOINC:LP15...	(null)
77 Blasts [# /volume] in Blood (30376-8)	LOINC:30376-8	(null)
78 Blasts/100 leukocytes in Blood by Manual count (709-6)	LOINC:709-6	(null)
79 Body temperature (8310-5)	LOINC:8310-5	(null)
80 Body temperature (8310-5)	LOINC:8310-5	(null)
81 C peptide [Mass/volume] in Serum or Plasma (1986-9)	LOINC:1986-9	(null)
82 C reactive protein	LOINC:LP41...	(null)
83 C reactive protein	LOINC:LP41...	(null)
84 C reactive protein in Blood by High sensitivity method (71426-1)	LOINC:71426-1	mg/L
85 C reactive protein in Blood by High sensitivity method (71426-1)	LOINC:71426-1	mg/L

Social Determinants of Health:

A new LOINC hierarchy has been created. Harmonize any smoking or insurance facts to these codes. When harmonizing the insurance we expect that sites record the patient's primary insurance. As a patient's insurance status can change over time, please use the fact start and end date to correspond to the patient's known coverage period.

Smoking Status

Former smoker (LOINC:LA15920-4)
 Current every day smoker (LOINC:LA18976-3)
 Current some day smoker (LOINC:LA18977-1)
 Never smoker (LOINC:LA18978-9)
 Smoker, current status unknown (LOINC:LA18979-7)
 Unknown if ever smoked (LOINC:LA18980-5)

Light tobacco smoker (LOINC:LA18982-1)

Insurance

Medicare (LOINC:LA15652-3)

Medicaid (LOINC:LA17849-3)

Private Insurance (includes 'no-fault', BCBS, United Health, etc) (LOINC:LA22073-3)

Worker's Compensation (LOINC:LA22074-1)

Veterans Administration (LOINC:LA22075-8)

Other Government (e.g. Bureau of Indian Affairs; Crippled Children's Services; Dept. of Vocational Rehab) (LOINC:LA22076-6)

No Pay (indigent, no resources) (LOINC:LA22077-4)

Private funds (e.g., self-pay; hometown fund raisers) (LOINC:LA22078-2)

Other, unclassified (e.g., SCI system patient care funds, TRICARE; Champus; Homebound, victim's assistance funds, etc.) (LOINC:LA22079-0)

Declined/Participant doesn't know (LOINC:LA22080-8)

Vital Signs

A new LOINC hierarchy of vital signs has been created. If you are not already using LOINC codes for these concepts map to the following LOINC codes. (Source: <http://hl7.org/fhir/observation-vitalsigns.html>). The unit of measures listed are the default in the metadata_xml as they exist in UMLS. If you use some other unit of measure you will need to modify the metadata_xml to do the conversion.

	CONCEPT_CD	VALTYPE_CD	MODIFIER_CD	TVAL_CHAR	NVAL_NUM	UNITS_CD
BMI https://loinc.org/39156-5/	LOINC:39156-5	N	@	E	Ex. 20	kg/m2
Temperature https://loinc.org/8310-5/	LOINC:8310-5	N	@	E	Ex. 37	deg C
Respiration Rate - https://loinc.org/9279-1/	LOINC:9279-1	N	@	E	Ex. 15	breaths/min
Heart Rate - https://loinc.org/8867-4/	LOINC:8867-4	N	@	E	Ex. 70	beats/min
Diastolic BP - https://loinc.org/8462-4/	LOINC:8462-4	N	@	E	Ex. 100	mm Hg
Systolic BP - https://loinc.org/8480-6/	LOINC:8480-6	N	@	E	Ex. 80	mm Hg
Oxygen Saturation - https://loinc.org/2708-6/	LOINC:2708-6	N	@	E	Ex. 98	%
Height - https://loinc.org/8302-2/	LOINC:8302-2	N	@	E	Ex. 66	inches
Body Weight Measured - https://loinc.org/3141-9/	LOINC:3141-9	N	@	E		gm

Visit Details

New visit types to represent Telehealth(T) and Long-Term Care(LTC) visits were added. Use these new codes in the inout_cd field in the visit_dimension table.

COVID Ontology

Vaccines - The ontology contains multiple ways to map to the COVID vaccines.
CVX, RXNORM, NDC and CPT codes are provided.

COVID-19 Vaccines

Janssen Vector-nrVector RXNORM:2479831

COVID-19 vaccine, vector-nr, rS-Ad26, PF, 0.5 mL CPT4:91303

Janssen Covid-19 Vaccine Administration ADM SARSCOV2 VAC AD26 .5ML CPT4:0031A

COVID-19 vaccine, vector-nr, rS-Ad26, PF, 0.5 mL CVX:212

Janss

en COVID-19 Vaccine RXNORM:2479835

Janssen COVID-19 Vaccine NDC:59676058005

Janssen COVID-19 Vaccine NDC:59676058015

AstraZeneca Vector-nr ACT|LOCAL|VAX:ASTRAZENECA_VAX_VECTOR_NR_IN

COVID-19 vaccine, vector-nr, rS-ChAdOx1, PF, 0.5 mL CPT4:91302

AstraZeneca Covid-19 Vaccine Administration First Dose ADM SARSCOV2 5X10^10VP/.5ML 1 CPT4:0021A

AstraZeneca Covid-19 Vaccine Administration Second Dose ADM SARSCOV2 5X10^10VP/.5ML 2 CPT4:0022A

COVID-19 vaccine, vector-nr, rS-ChAdOx1, PF, 0.5 mL CVX:210

AstraZeneca NDC:0310122210 NDC:0310122210

AstraZeneca NDC:0310122215 NDC:0310122215

6 Introduction of COVID-19 vaccine dose 1 into subcutaneous tissue, percutaneous approach, new technology group
ICD10PCS:XW013S6

6 Introduction of COVID-19 vaccine dose 2 into subcutaneous tissue, percutaneous approach, new technology group
ICD10PCS:XW013T6

Introduction of COVID-19 vaccine into subcutaneous tissue, percutaneous approach, new technology group 6
ICD10PCS:XW013U6

ICD10PCS:XW023S6 Introduction of COVID-19 vaccine dose 1 into muscle, percutaneous approach, new technology group 6

ICD10PCS:XW023T6 Introduction of COVID-19 vaccine dose 2 into muscle, percutaneous approach, new technology group 6

ICD10PCS:XW023U6 Introduction of COVID-19 vaccine into muscle, percutaneous approach, new technology group 6

SARS-CoV-2 (COVID-19) vaccine, mRNA spike protein ingredient (Moderna & Pfizer) RXNORM:2468231

Pfizer mRNA (Precise Ingredient) RXNORM:2468230

Pfizer-Biontech Covid-19 Vaccine Administration SARSCOV2 VAC 30MCG/0.3ML IM CPT4:91300

Pfizer-Biontech Covid-19 Vaccine Administration First Dose ADM SARSCOV2 30MCG/0.3ML 1ST CPT4:0001A

Pfizer-Biontech Covid-19 Vaccine Administration Second Dose ADM SARSCOV2 30MCG/0.3ML 2ND

CPT4:0002A

COVID-19, mRNA, LNP-S, PF, 30 mcg/0.3 mL dose (CVX:208) CVX:208

SARS-CoV-2 (COVID-19) vaccine, mRNA-BNT162b2 0.1 MG/ML Injectable Suspension RXNORM:2468235

Pfizer-BioNTech Covid-19 Vaccine NDC:59267100001

COVID-19 Vaccines NDC:59267100002

Pfizer-BioNTech Covid-19 Vaccine NDC:59267100003

SARS-CoV-2 (COVID-19) vaccine, mRNA spike protein Injectable Suspension (Clinical Dose Form)

RXNORM:2468234

Modern mRNA (Precise Ingredient) RXNORM:2470232

COVID-19, mRNA, LNP-S, PF, 100 mcg/0.5 mL dose CPT4:91301

Moderna Covid-19 Vaccine Administration First Dose ADM SARSCOV2 100MCG/0.5ML1ST CPT4:0011A

Moderna Covid-19 Vaccine Administration Second Dose ADM SARSCOV2 100MCG/0.5ML2ND CPT4:0012A

COVID-19, mRNA, LNP-S, PF, 100 mcg/0.5 mL dose CVX:207
SARS-CoV-2 (COVID-19) vaccine, mRNA-1273 0.2 MG/ML Injectable Suspension RXNORM: 2470234
Moderna NDC:80777027310
Moderna NDC:80777027398
Moderna NDC:80777027399

COVID Treatments and Medications

Other Monoclonal Antibody Treatment ACT_LOCAL_MONOCLONAL:OTHER
Introduction of other new technology monoclonal antibody into subcutaneous tissue, percutaneous approach, new technology group 6 ICD10PCS:XW013H6
Introduction of other new technology monoclonal antibody into peripheral vein, percutaneous approach, new technology group 6 ICD10PCS:XW033H6
Introduction of other new technology monoclonal antibody into central vein, percutaneous approach, new technology group 6 ICD10PCS:XW043H6
Leronlimab KEGG:D11399
Introduction of leronlimab monoclonal antibody into subcutaneous tissue, percutaneous approach, new technology group 6 ICD10PCS:XW013K6
Baricitinib RXNORM:2047232
Introduction of baricitinib into mouth and pharynx, external approach, new technology group 6 ICD10PCS:XW0DXM6
Introduction of baricitinib into upper GI, via natural or artificial opening, new technology group 6 ICD10PCS:XW0G7M6
Introduction of baricitinib into lower GI, via natural or artificial opening, new technology group 6 ICD10PCS:XW0H7M6
baricitinib 2 MG Oral Tablet RXNORM:2047241
baricitinib 2 MG Oral Tablet [Olumiant] RXNORM:2047247
baricitinib 1 MG Oral Tablet RXNORM:2205472
baricitinib 1 MG Oral Tablet [Olumiant] RXNORM:2205474
Bamlanivimab RXNORM:2463114
Intravenous infusion, bamlanivimab-xxxx, includes infusion and post administration monitoring HCPCS:M0239
Injection, bamlanivimab, 700 mg HCPCS:Q0239
Introduction of bamlanivimab monoclonal antibody into peripheral vein, percutaneous approach, new technology group 6 ICD10PCS:XW033F6
Introduction of bamlanivimab monoclonal antibody into central vein, percutaneous approach, new technology group 6 ICD10PCS:XW043F6
20 ML bamlanivimab 35 MG/ML Injection RXNORM:2463118
Bamlanivimab and etesevimab RXNORM:2463114_2477854
intravenous infusion, bamlanivimab and etesevimab, includes infusion and post administration monitoring HCPCS:M0245
Injection, bamlanivimab and etesevimab, 2100 mg HCPCS:Q0245
Casirivimab RXNORM:2465242
11.1 ML casirivimab 120 MG/ML Injection RXNORM:2465246
2.5 ML casirivimab 120 MG/ML Injection RXNORM:2465248
Casirivimab and Imdevimab RXNORM:2465242_2465249
Casirivimab and Imdevimab (HCPCS:M0239) HCPCS:M0239
Casirivimab and Imdevimab (HCPCS:Q0243) HCPCS:Q0243
Casirivimab and Imdevimab (ICD10PCS:XW043G6_B2) ICD10PCS:XW043G6_B2
{1 (11.1 ML casirivimab 120 MG/ML Injection) / 1 (11.1 ML imdevimab 120 MG/ML Injection) } Pack RXNORM:2479149
{1 (11.1 ML casirivimab 120 MG/ML Injection) / 1 (11.1 ML imdevimab 120 MG/ML Injection) } Pack [REGEN-COV 1/1] RXNORM:2479150
{4 (2.5 ML casirivimab 120 MG/ML Injection) / 4 (2.5 ML imdevimab 120 MG/ML Injection) } Pack RXNORM:2479153
{4 (2.5 ML casirivimab 120 MG/ML Injection) / 4 (2.5 ML imdevimab 120 MG/ML Injection) } Pack [REGEN-COV 4/4] RXNORM:2479154
{1 (11.1 ML imdevimab 120 MG/ML Injection) / 4 (2.5 ML casirivimab 120 MG/ML Injection) } Pack RXNORM:2479155
{1 (11.1 ML imdevimab 120 MG/ML Injection) / 4 (2.5 ML casirivimab 120 MG/ML Injection) } Pack [REGEN-COV 4/1] RXNORM:2479156
{1 (11.1 ML casirivimab 120 MG/ML Injection) / 4 (2.5 ML imdevimab 120 MG/ML Injection) } Pack RXNORM:2479158

{1 (11.1 ML casirivimab 120 MG/ML Injection) / 4 (2.5 ML imdevimab 120 MG/ML Injection) } Pack [REGEN-COV 1/4]
RXNORM:2479159
Imdevimab RXNORM:2465249
11.1 ML imdevimab 120 MG/ML Injection RXNORM:2465253
2.5 ML imdevimab 120 MG/ML Injection RXNORM:2465255
Etesevimab RXNORM:2477854
Introduction of etesevimab monoclonal antibody into peripheral vein, percutaneous approach, new technology group 6
ICD10PCS:XW033E6
Introduction of etesevimab monoclonal antibody into central vein, percutaneous approach, new technology group 6
ICD10PCS:XW043E6
20 ML etesevimab 35 MG/ML Injection RXNORM:2477902
Itolizumab UMLS:C2987424
CD24Fc UNII:FN12T66RMN
Introduction of CD24Fc immunomodulator into central vein, percutaneous approach, new technology group 6
ICD10PCS:XW043L6

Optional Steps

Below are optional steps you may take to satisfy CTSA CLIC metric reporting and/or assess the quality of your new ontology installation and your mapping to the concepts.

Execute Totalnum Scripts after each data refresh

It is recommended that sites execute the latest version of the totalnum scripts to review and assess local data quality over time. These updated scripts will compute and store patient counts each time it is executed. We hope to use these counts in the future to automate network data characterization, improve data quality and inform future ontology development.

To install the i2b2 scripts:

- Load the [stored procedures](#)
- Add the [totalnum and totalnum_report tables to i2b2](#)

The method to run the script is at the top of the run_all_counts.sql file for your db platform

https://github.com/i2b2/i2b2-data/tree/master/edu.harvard.i2b2.data/Release_1-7/NewInstall/Metadata/scripts/procedures
https://github.com/i2b2/i2b2-data/tree/master/edu.harvard.i2b2.data/Release_1-7/Upgrade/Metadata/scripts

CLIC Metrics

Annually, hubs are required to report their Informatics data. These metrics are required to be reported in the fall of 2021, but CLIC will accept submissions now. Scripts are available at <https://github.com/ncats/CTSA-Metrics>. Hubs should run the script appropriate for their

institution's data model and data system. The output file from the script will need to be uploaded to CLIC's CM-PRISM software application. The PRISM user's guide https://clic-ctsa.org/sites/default/files/2021-05/CM-PRISM%20Users%20Guide%205.24.2021_0.pdf includes all of the steps required to upload the file. If you have questions, please contact common_metrics@clic-ctsa.org."