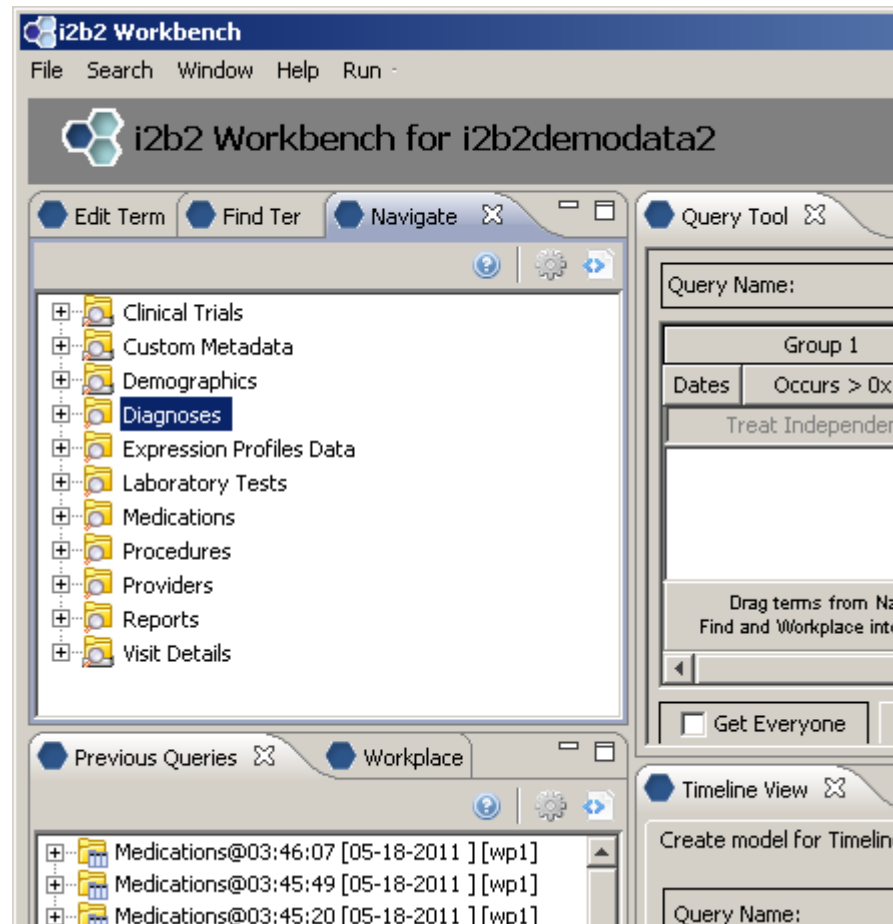


i2b2 Ontology Tutorial

Follow along for a step by step example of how metadata trees are created and configured.

i2b2 Navigate Terms View



Creating the root level nodes

There is a one-to-one mapping between the entries of the table_access table and the root level nodes for a given project.

	C_TABLE_CD	C_TABLE_NAME	C_HLEVEL	C_FULLNAME	C_NAME
1	BIRN	BIRN	0	\BIRN\	Clinical Trials
2	CUST	CUSTOM_META	0	\Custom Metadata\	Custom Metadata
3	i2b2_DEMO	I2B2	1	\i2b2\Demographics\	Demographics
4	i2b2_DIAG	I2B2	1	\i2b2\Diagnoses\	Diagnoses
5	i2b2_EXPR	I2B2	1	\i2b2\Expression Profiles Data\	Expression Profiles Data
6	i2b2_LABS	I2B2	1	\i2b2\Labtests\	Laboratory Tests
7	i2b2_MEDS	I2B2	1	\i2b2\Medications\	Medications
8	i2b2_PROC	I2B2	1	\i2b2\Procedures\	Procedures
9	i2b2_PROV	I2B2	1	\i2b2\Providers\	Providers
10	i2b2_REP	I2B2	1	\i2b2\Reports\	Reports
11	i2b2_VISIT	I2B2	1	\i2b2\Visit Details\	Visit Details

Building local metadata

```
<concept>
  <level>1</level>
  <key>\\i2b2_DIAG\i2b2\Diagnoses</key>
  <name>Diagnoses</name>
  ...
</concept>
```

	C_TABLE_CD	C_TABLE_NAME	C_HLEVEL	C_FULLNAME	C_NAME
1	BIRN	BIRN	0	\BIRN\	Clinical Trials
2	CUST	CUSTOM_META	0	\Custom Metadata\	Custom Metadata
3	i2b2_DEMO	I2B2	1	\i2b2\Demographics\	Demographics
4	i2b2_DIAG	I2B2	1	\i2b2\Diagnoses\	Diagnoses
5	i2b2_EXPR	I2B2	1	\i2b2\Expression Profiles Data\	Expression Profiles Data
6	i2b2_LABS	I2B2	1	\i2b2\Labtests\	Laboratory Tests
7	i2b2_MEDS	I2B2	1	\i2b2\Medications\	Medications

A concept's key is made up of two parts: \\c_table_cd\c_fullname

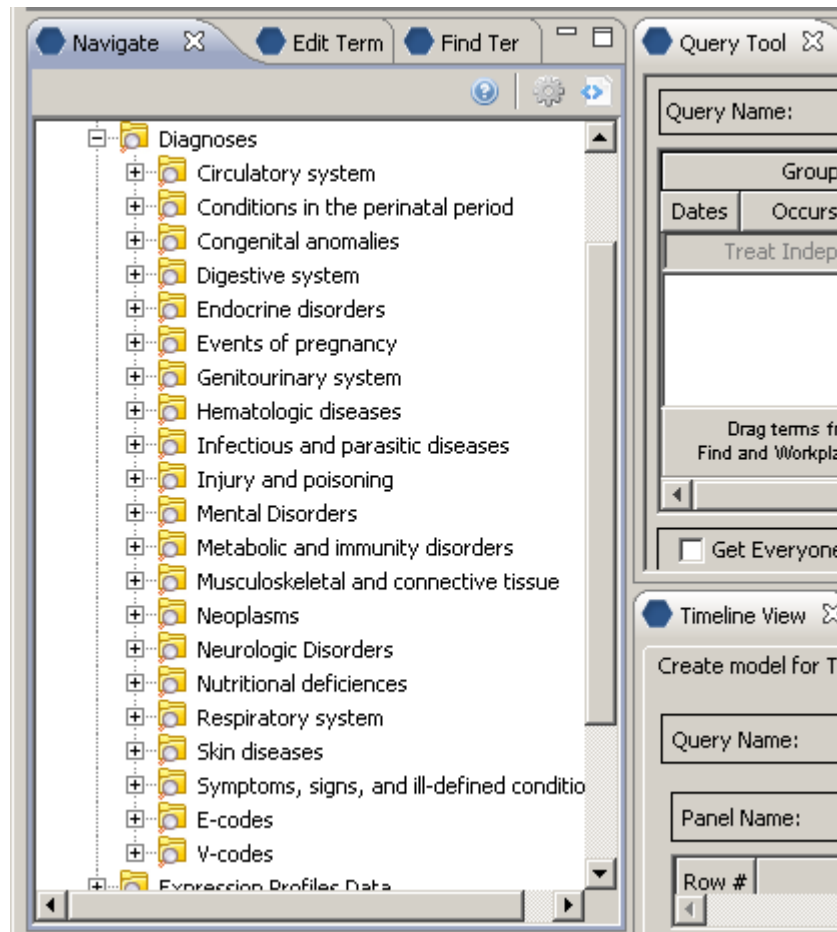
The c_table_cd tells the ONT cell which metadata table the concept resides in ('i2b2'), while c_fullname is a unique identifier for the concept itself.

Children of concept Diagnoses [\\i2b2\Diagnoses\]

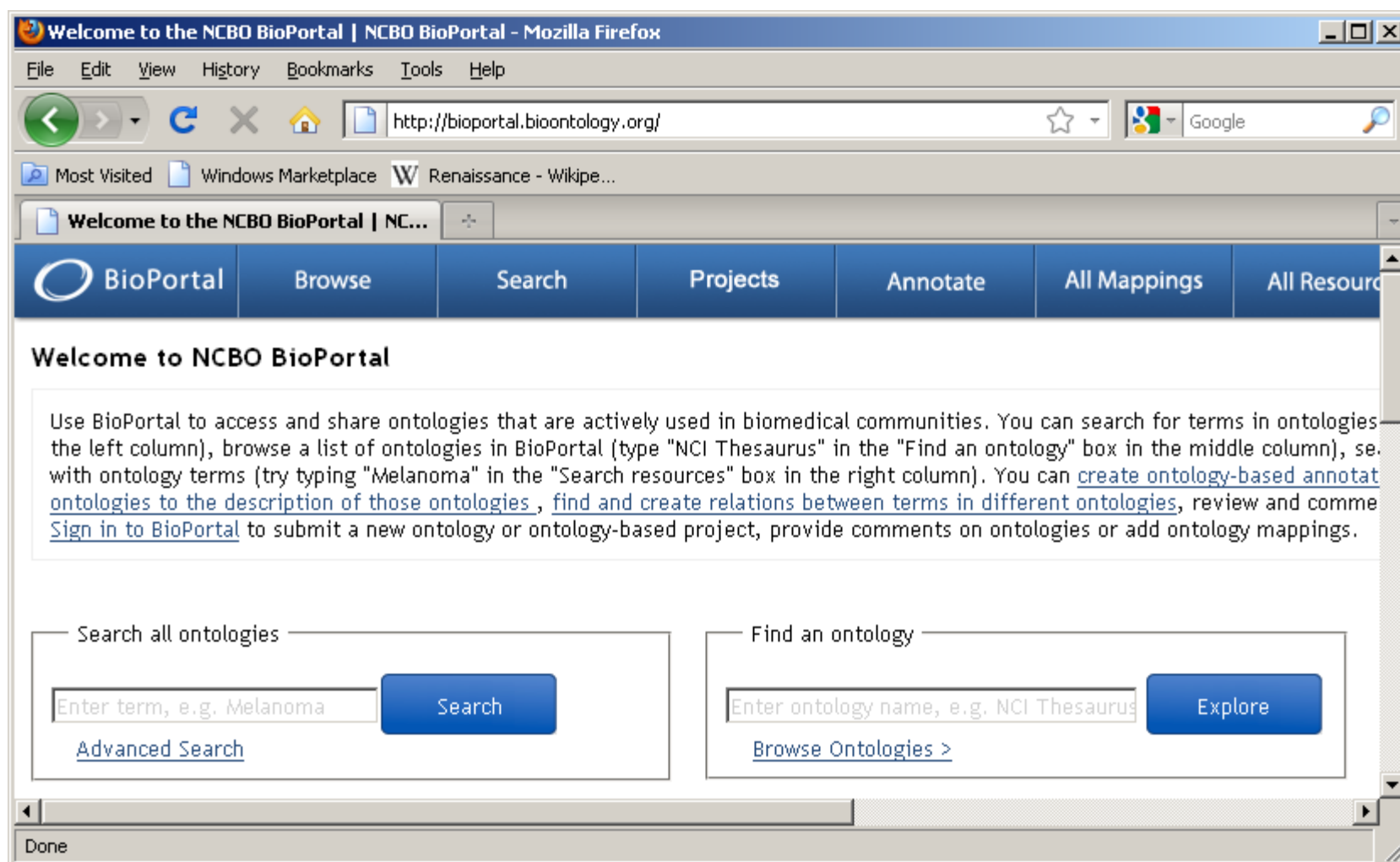
C_HLEVEL	C_FULLNAME	C_NAME
2	\\i2b2\Diagnoses\Circulatory system (390-459)\	Circulatory system
2	\\i2b2\Diagnoses\Conditions in the perinatal period (760-779)\	Conditions in the perinatal period
2	\\i2b2\Diagnoses\Congenital anomalies (740-759)\	Congenital anomalies
2	\\i2b2\Diagnoses\Digestive system (520-579)\	Digestive system
2	\\i2b2\Diagnoses\Endocrine disorders (240-259)\	Endocrine disorders
2	\\i2b2\Diagnoses\Events of pregnancy (630-677)\	Events of pregnancy
2	\\i2b2\Diagnoses\Genitourinary system (580-629)\	Genitourinary system
2	\\i2b2\Diagnoses\Hematologic diseases (280-289)\	Hematologic diseases
2	\\i2b2\Diagnoses\Infectious and parasitic diseases (001-139)\	Infectious and parasitic diseases
2	\\i2b2\Diagnoses\Injury and poisoning (800-999)\	Injury and poisoning
2	\\i2b2\Diagnoses\Mental Disorders (290-319)\	Mental Disorders
2	\\i2b2\Diagnoses\Metabolic and immunity disorders (270-279)\	Metabolic and immunity disorders
2	\\i2b2\Diagnoses\Musculoskeletal and connective tissue (710-739)\	Musculoskeletal and connective tissue
2	\\i2b2\Diagnoses\Neoplasms (140-239)\	Neoplasms
2	\\i2b2\Diagnoses\Neurologic Disorders (320-389)\	Neurologic Disorders
2	\\i2b2\Diagnoses\Nutritional deficiencies (260-269)\	Nutritional deficiencies
2	\\i2b2\Diagnoses\Respiratory system (460-519)\	Respiratory system
2	\\i2b2\Diagnoses\Skin diseases (680-709)\	Skin diseases
2	\\i2b2\Diagnoses\Symptoms, signs, and ill-defined conditions (780-799)\	Symptoms, signs, and ill-defined conditions
2	\\i2b2\Diagnoses\zz E-codes\	E-codes
2	\\i2b2\Diagnoses\zz V-codes\	V-codes

Concept Diagnoses' children all start with a c_fullname of '\\i2b2\Diagnoses\
and all reside in the same table as 'Diagnoses' (c_table_cd = 'i2b2_DIAG', c_table_name = 'i2b2')

Children of concept Diagnoses display



Creating metadata for standard ontologies using BioPortal

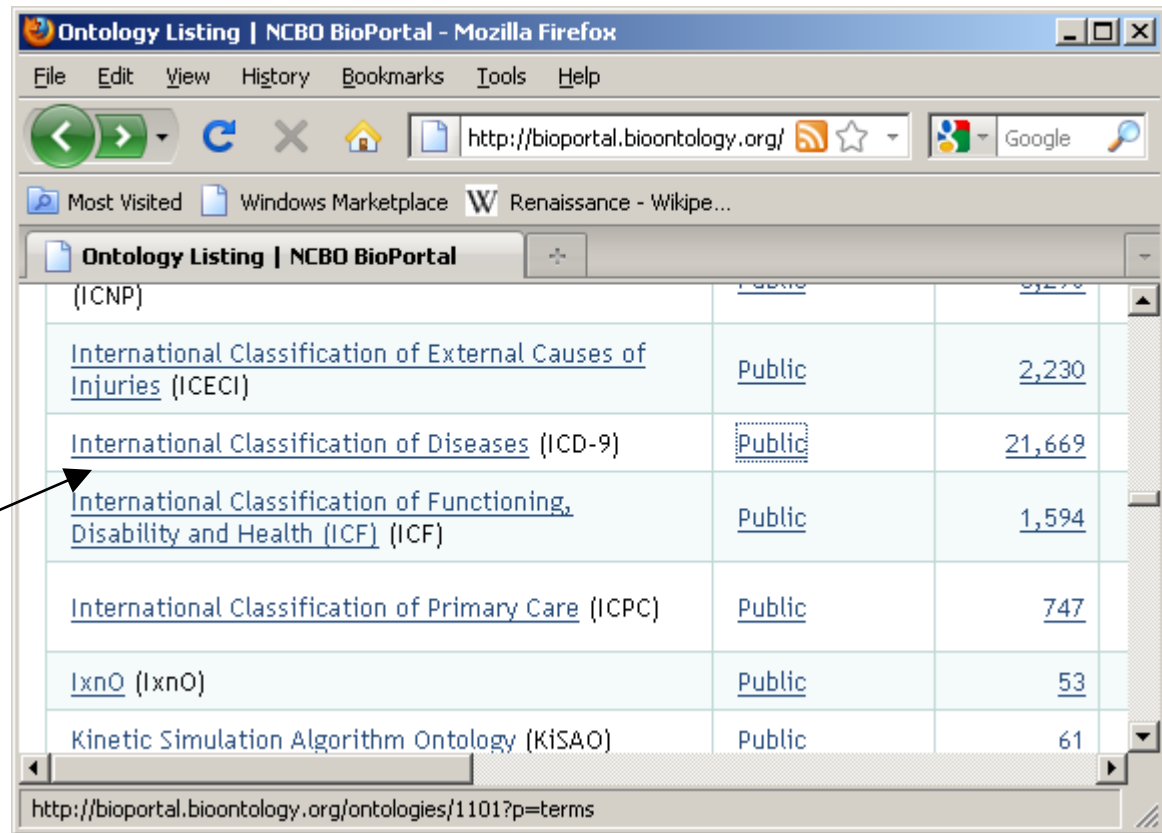


NCBO BioPortal hosts over 250 ontologies

Any of these ontologies may be extracted for use within i2b2 through use of a standalone Extraction tool.

Browse ontologies within BioPortal and locate ontology of interest: (double click on name of ontology)

ICD-9



Ontology Name	Access	Count
(ICNP)	Public	2,230
International Classification of External Causes of Injuries (ICECI)	Public	2,230
International Classification of Diseases (ICD-9)	Public	21,669
International Classification of Functioning, Disability and Health (ICF) (ICF)	Public	1,594
International Classification of Primary Care (ICPC)	Public	747
IxnO (IxnO)	Public	53
Kinetic Simulation Algorithm Ontology (KISA0)	Public	61

http://bioportal.bioontology.org/ontologies/1101?p=terms

Detail summary page:

The screenshot shows a web browser window displaying the 'International Classification of Diseases - Summary' page on the NCBO BioPortal. The browser's address bar shows the URL <http://bioportal.bioontology.org/ontologies/1101>. The BioPortal navigation bar includes links for 'Browse', 'Search', 'Projects', 'Annotate', 'All Mappings', and 'All Resources'. The main content area is titled 'International Classification of Diseases' and features a 'Summary' dropdown menu. The page is divided into two main sections: 'Details' and 'Metrics'.

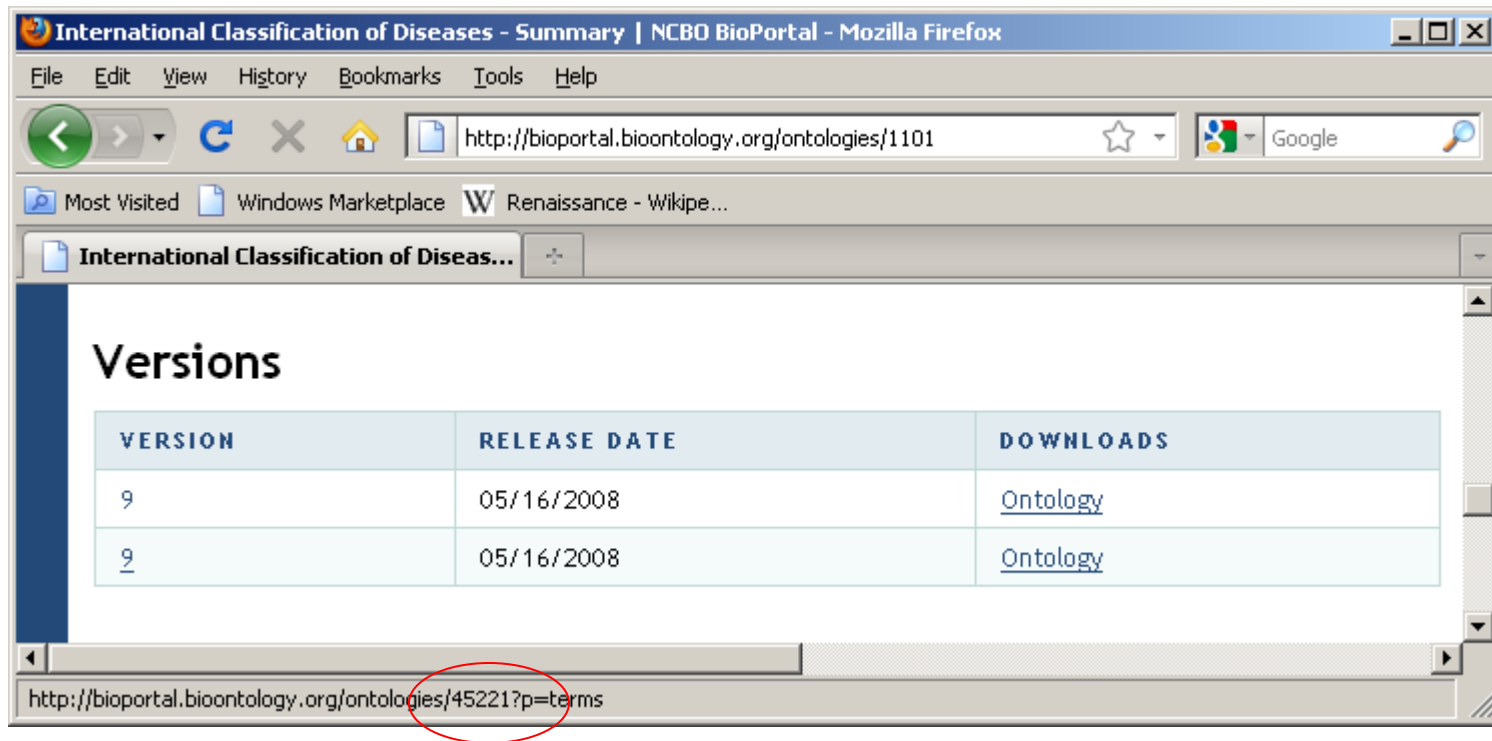
Details

ONTOLOGY ID:	1101
BIOPORTAL PURL:	http://purl.bioontology.org/ontology/ICD-9
STATUS:	
FORMAT:	RRF
CATEGORIES:	
GROUPS:	Unified Medical Language System WHO Family of International Classifications
CONTACT:	The World Health Organization, info@who.int
HOME PAGE:	http://www.who.int/classifications/icd/en/
PUBLICATIONS PAGE:	
DOCUMENTATION PAGE:	
DESCRIPTION:	The ICD is the international standard diagnostic classification for all general epidemiological, many health management purposes and clinical use.

Metrics

NUMBER OF CLASSES:	21669
NUMBER OF INDIVIDUALS:	0
NUMBER OF PROPERTIES:	10
MAXIMUM DEPTH:	6
MAXIMUM NUMBER OF SIBLINGS:	25
AVERAGE NUMBER OF SIBLINGS:	1
CLASSES WITH A SINGLE SUBCLASS:	23
CLASSES WITH MORE THAN 25 SUBCLASSES:	0
CLASSES WITH NO AUTHOR:	0
CLASSES WITH NO DEFINITION:	0

Locate ontology id for version of interest [45221]



International Classification of Diseases - Summary | NCBO BioPortal - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bioportal.bioontology.org/ontologies/1101

Most Visited Windows Marketplace W Renaissance - Wikip...

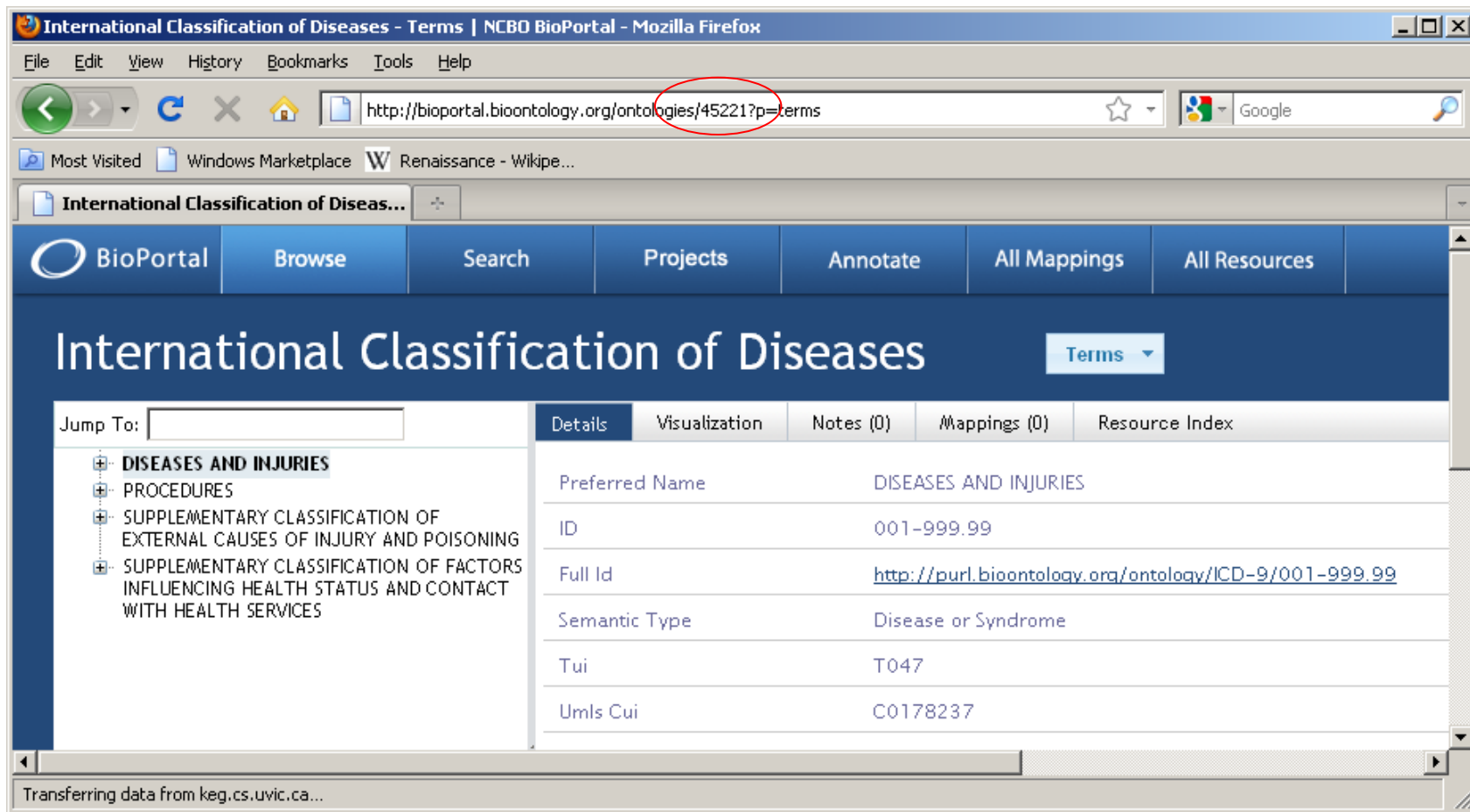
International Classification of Diseas...

Versions

VERSION	RELEASE DATE	DOWNLOADS
9	05/16/2008	Ontology
<u>9</u>	05/16/2008	Ontology

http://bioportal.bioontology.org/ontologies/45221?p=terms

45221 is the ontology id which uniquely identifies this version of this ontology. It is generally a 5-digit number.



The screenshot shows the NCBO BioPortal interface for the International Classification of Diseases (ICD-9) ontology. The browser address bar shows the URL <http://bioportal.bioontology.org/ontologies/45221?p=terms>, with the ontology ID '45221' circled in red. The page features a navigation menu with options like 'Browse', 'Search', 'Projects', 'Annotate', 'All Mappings', and 'All Resources'. The main content area displays the 'International Classification of Diseases' title and a 'Terms' dropdown menu. Below this, there is a 'Jump To:' search box and a list of ontology terms. The 'DISEASES AND INJURIES' term is selected, and its details are shown in a table.

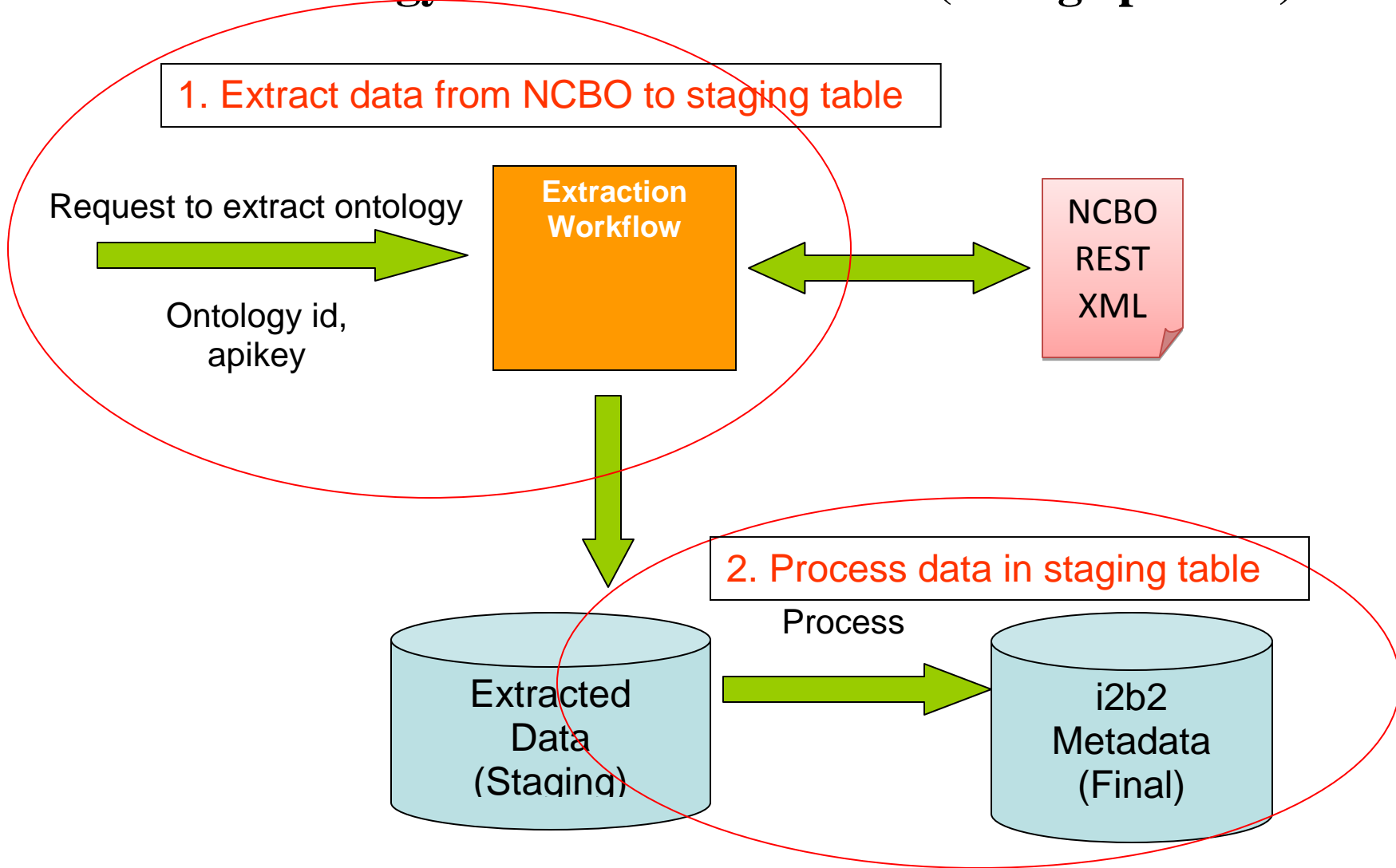
Details	Visualization	Notes (0)	Mappings (0)	Resource Index
Preferred Name	DISEASES AND INJURIES			
ID	001-999.99			
Full Id	http://purl.bioontology.org/ontology/ICD-9/001-999.99			
Semantic Type	Disease or Syndrome			
Tui	T047			
Umls Cui	C0178237			

NCBO-specific Ontology Extraction tool inputs:

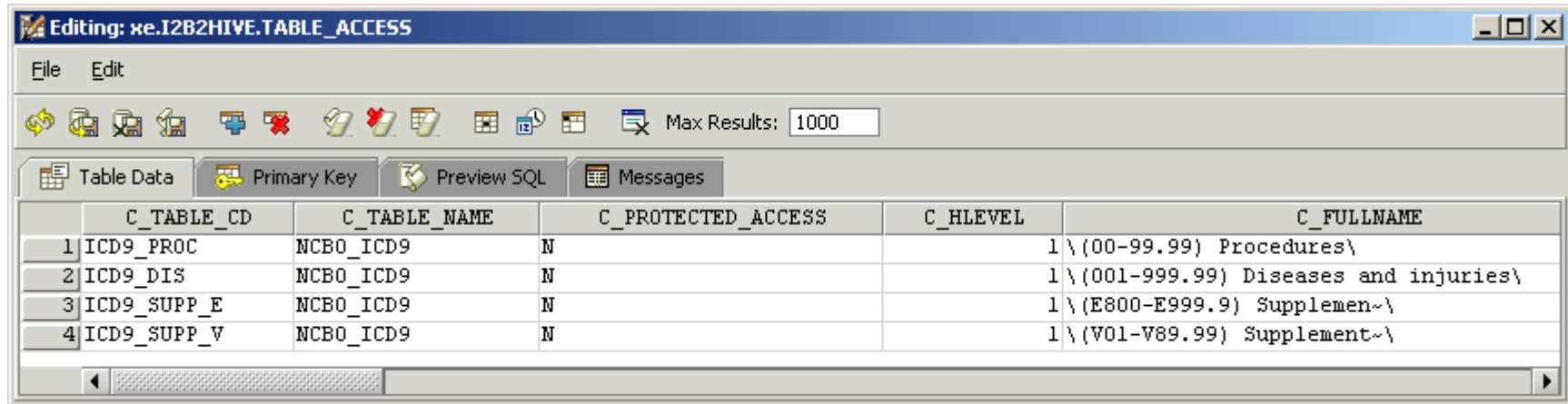
Ontology id: 5-digit id assigned to ontology version of interest

apikey: An API key assigned to you by NCBO. Log onto BioPortal (or get an account); your apikey is located on your Account page.

NCBO Ontology Extraction Workflow (2-stage process)



Point table_access to root nodes of your new extracted metadata.



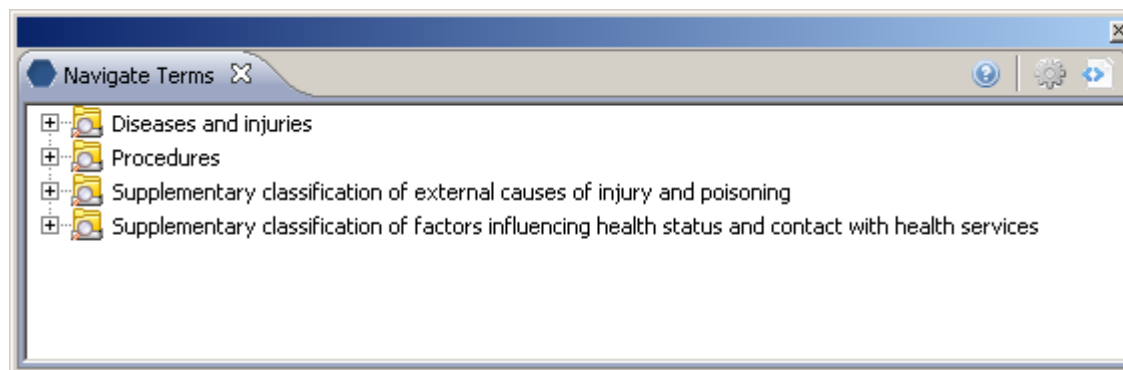
Editing: xe.I2B2HIVE.TABLE_ACCESS

File Edit

Max Results: 1000

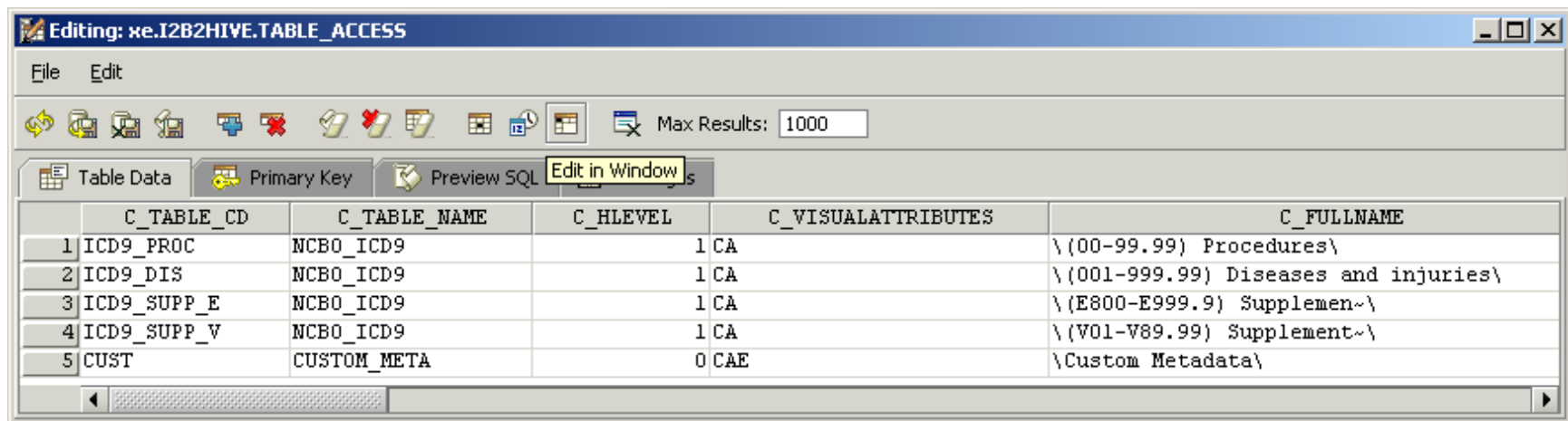
Table Data Primary Key Preview SQL Messages

	C_TABLE_CD	C_TABLE_NAME	C_PROTECTED_ACCESS	C_HLEVEL	C_FULLNAME
1	ICD9_PROC	NCBO_ICD9	N	1	\{(00-99.99) Procedures\}
2	ICD9_DIS	NCBO_ICD9	N	1	\{(001-999.99) Diseases and injuries\}
3	ICD9_SUPP_E	NCBO_ICD9	N	1	\{(E800-E999.9) Supplemen~\}
4	ICD9_SUPP_V	NCBO_ICD9	N	1	\{(V01-V89.99) Supplement~\}



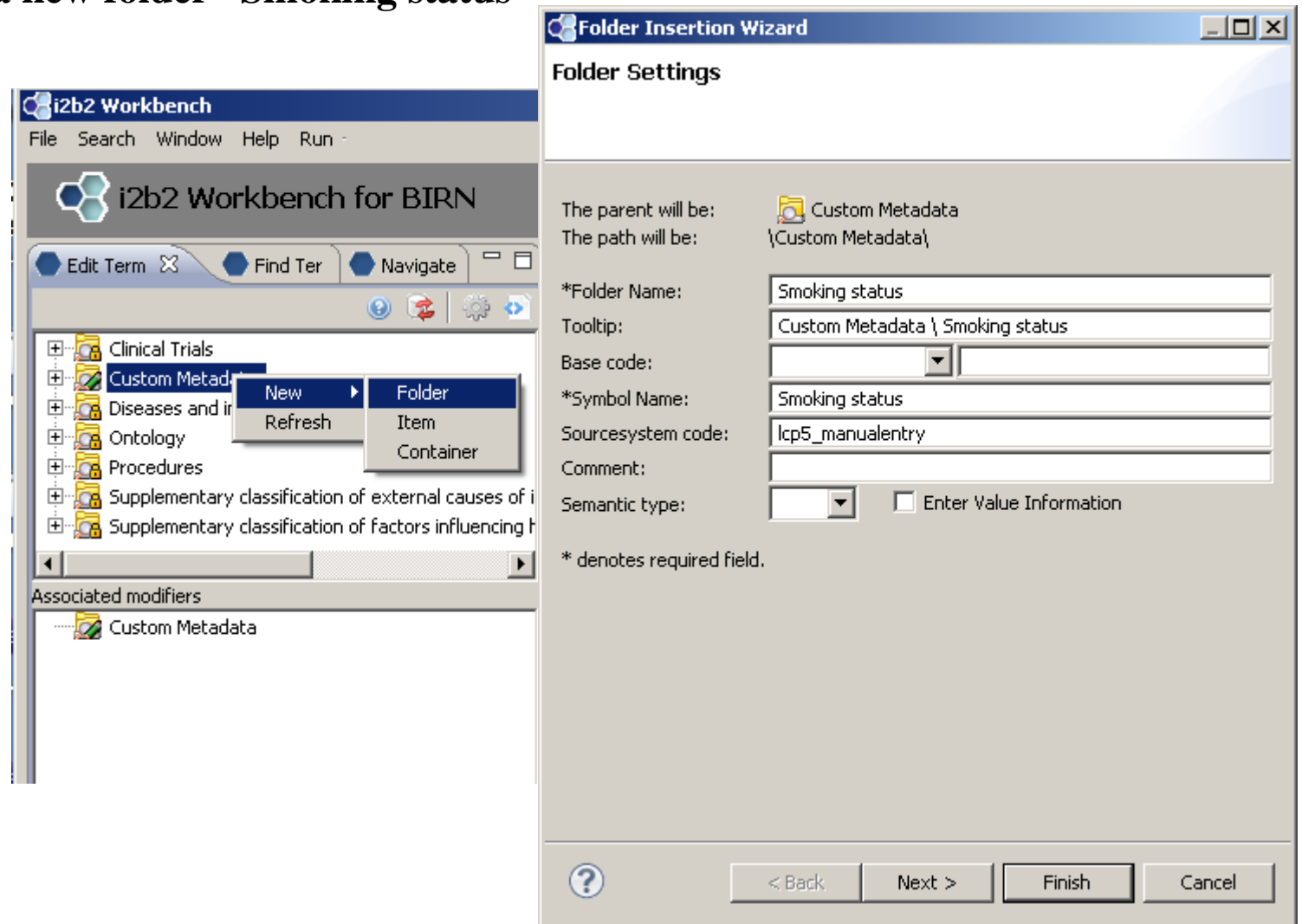
Creating project-specific (localized) metadata

In some cases you may need to create a small, non-standard ontology for a local project. Consider the case for classifying patients as smokers, non-smokers or smoking status unknown. To support this effort, we create a new table 'Custom_Meta' whose root level entry 'Custom Metadata' has visual attribute 'CAE'. The 'E' stands for 'editable' and makes the entry available for editing within the Edit Terms tool.

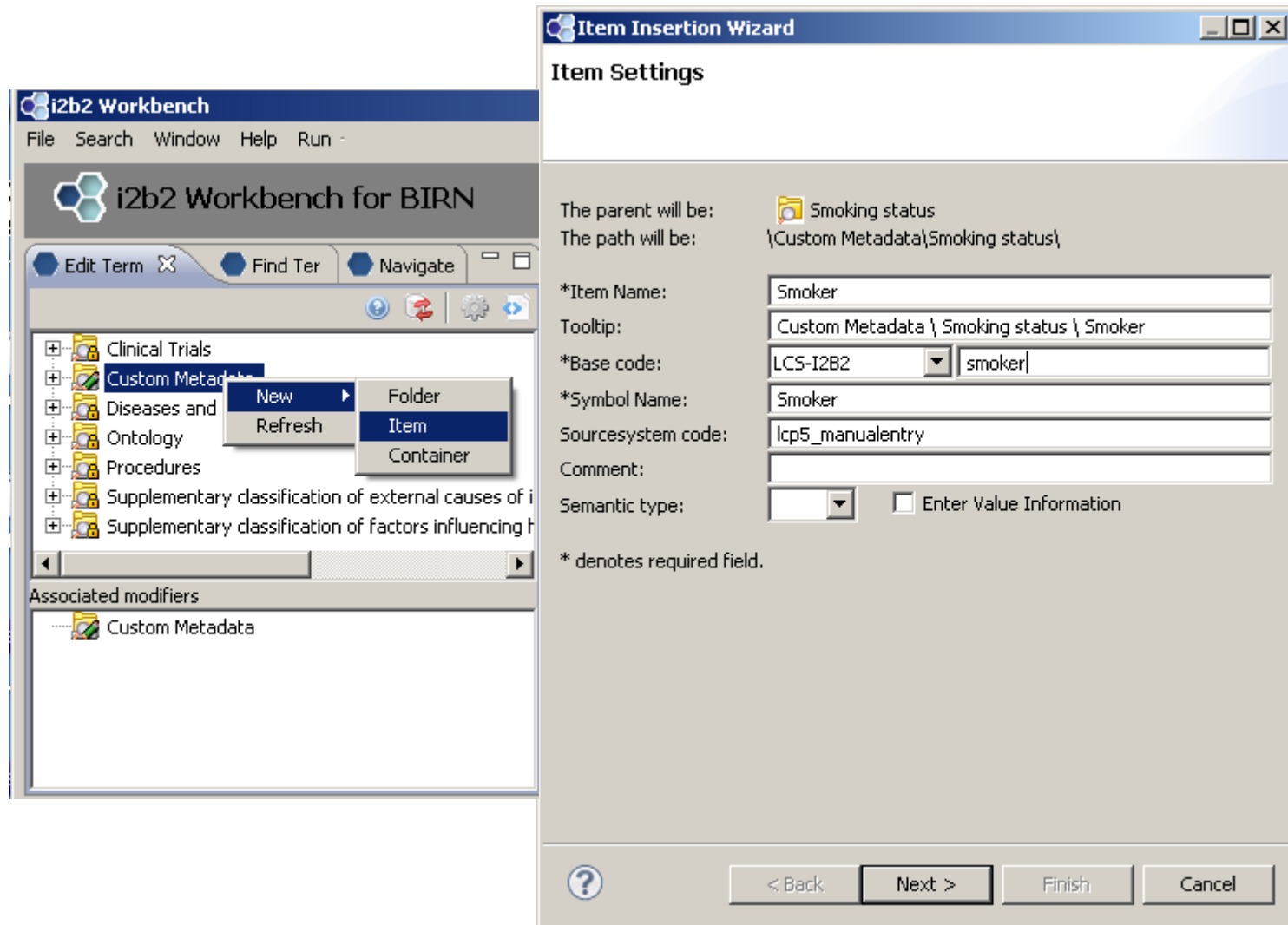


	C_TABLE_CD	C_TABLE_NAME	C_HLEVEL	C_VISUALATTRIBUTES	C_FULLNAME
1	ICD9_PROC	NCBO_ICD9	1	CA	\(00-99.99) Procedures\
2	ICD9_DIS	NCBO_ICD9	1	CA	\(001-999.99) Diseases and injuries\
3	ICD9_SUPP_E	NCBO_ICD9	1	CA	\(E800-E999.9) Supplemen~\
4	ICD9_SUPP_V	NCBO_ICD9	1	CA	\(V01-V89.99) Supplement~\
5	CUST	CUSTOM_META	0	CAE	\Custom Metadata\

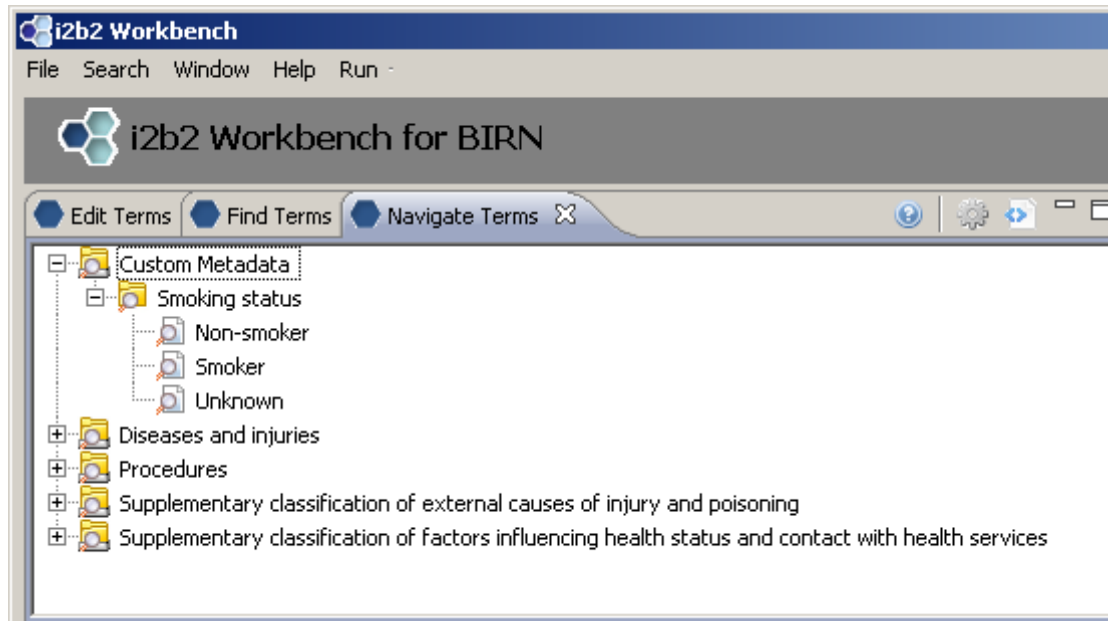
First we create a new folder “Smoking status”



Add three concepts: “Smoker”, “Non-smoker”, “Unknown”

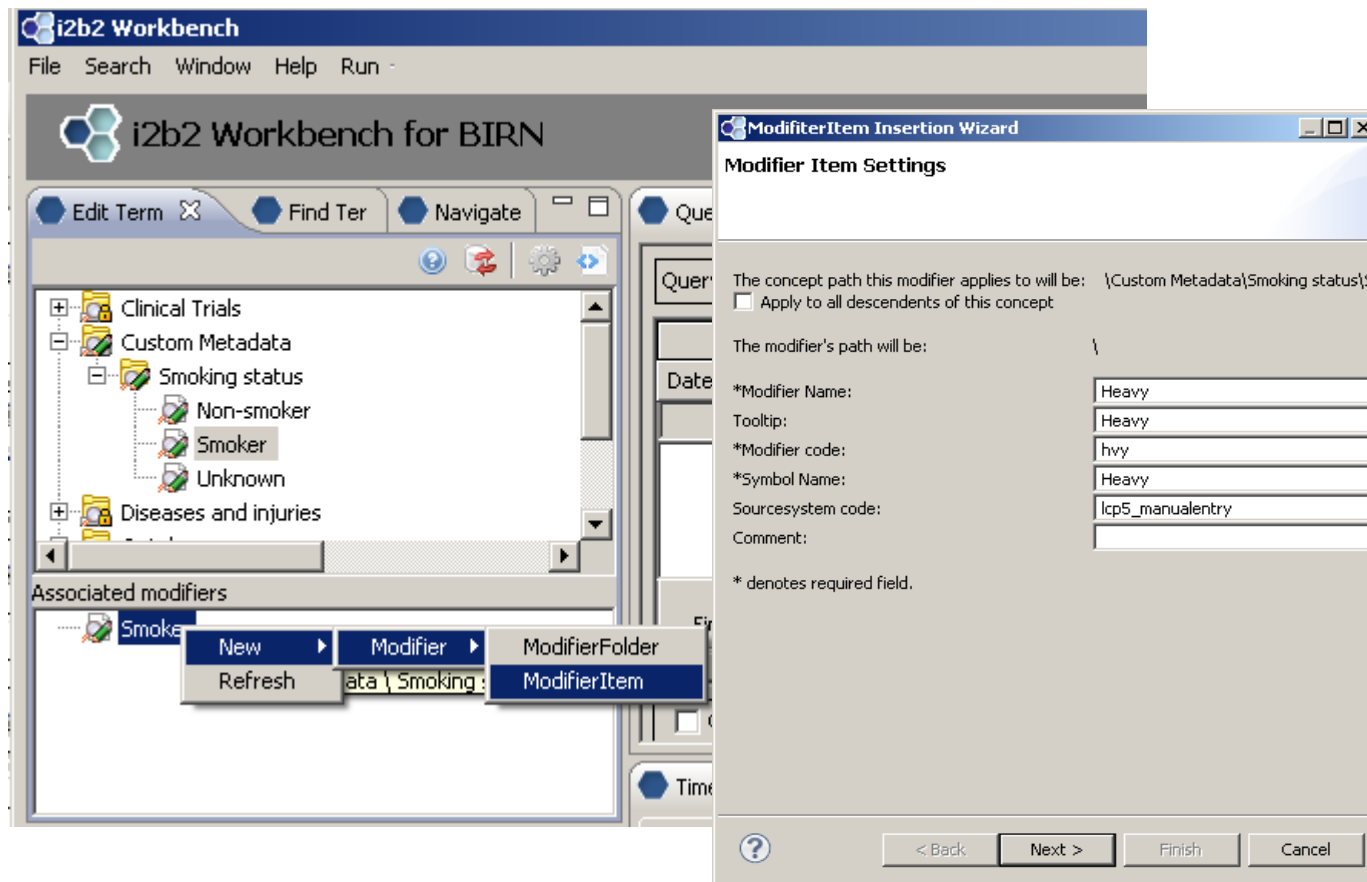


New folder with three new concepts:

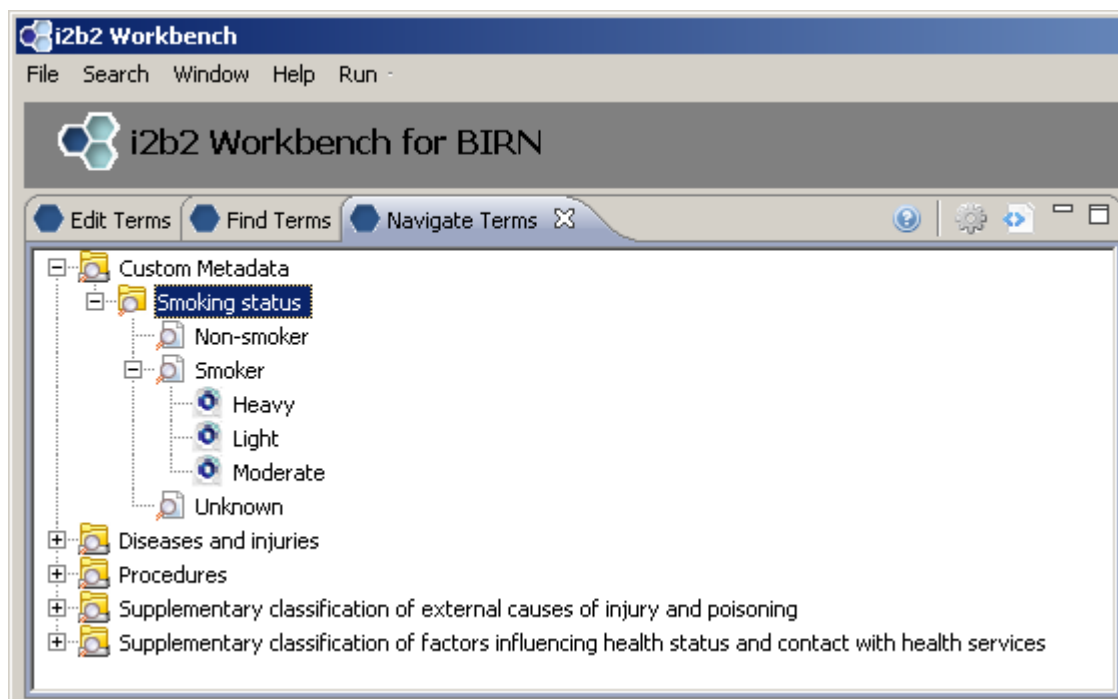


Creating modifiers for existing metadata

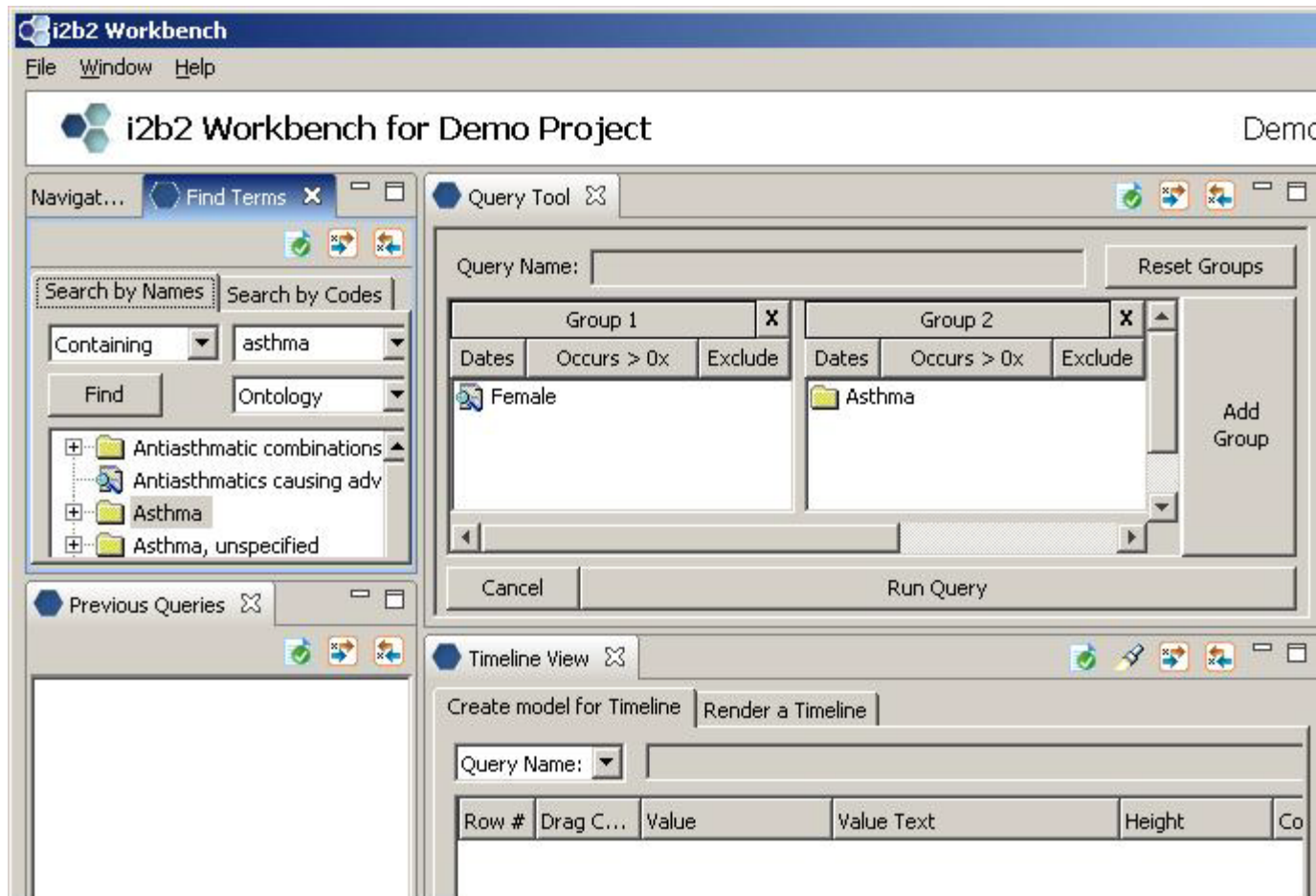
Now we would like to further specify our smokers as “Heavy”, “Moderate” or “Light” smokers. We could create three new terms, or, we can create modifiers for our ‘Smoker’ concept.



Updated 'Smoker' concept with modifiers displayed

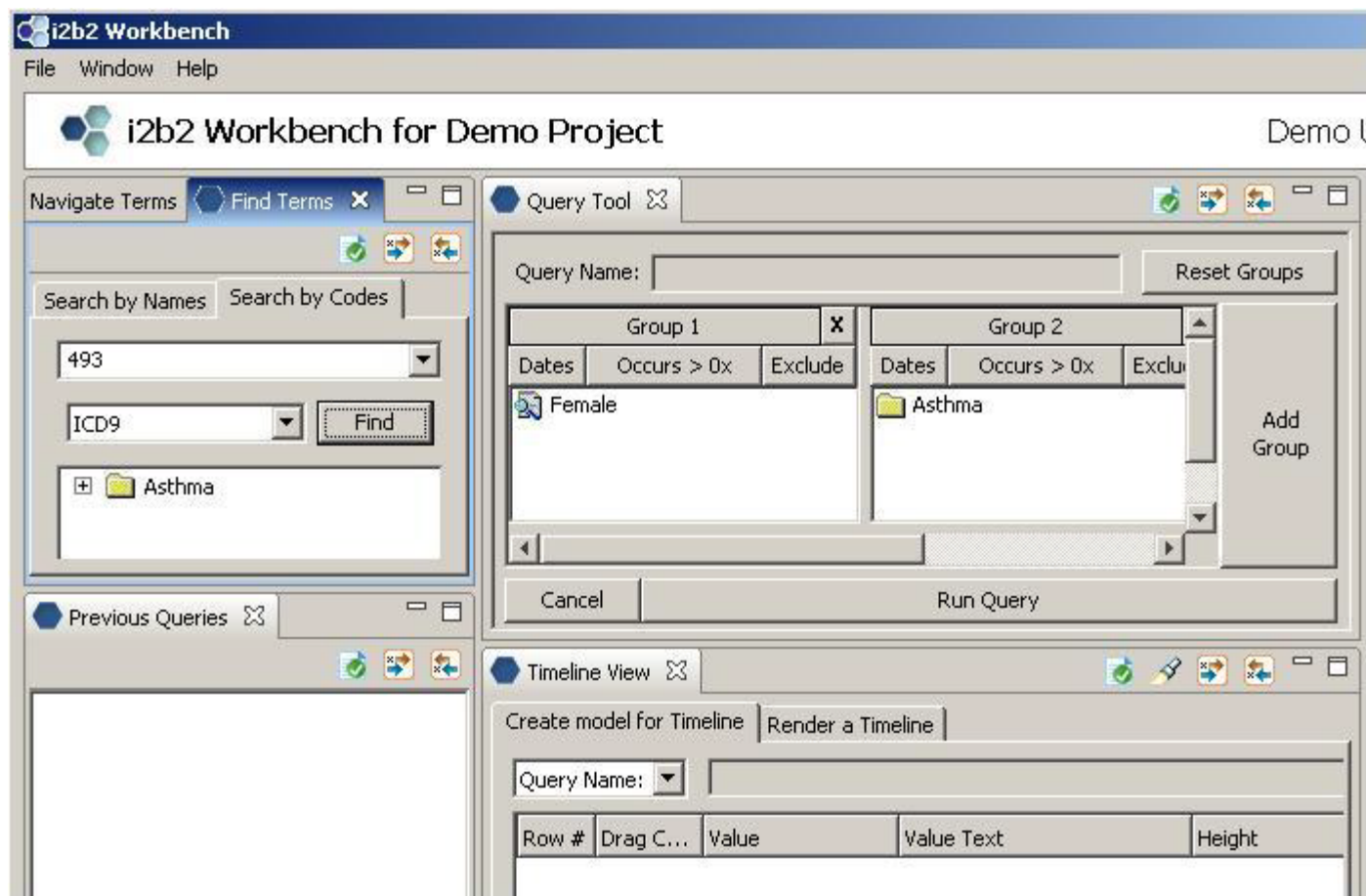


Using Find Terms Search by Names Tab to Locate Diagnoses



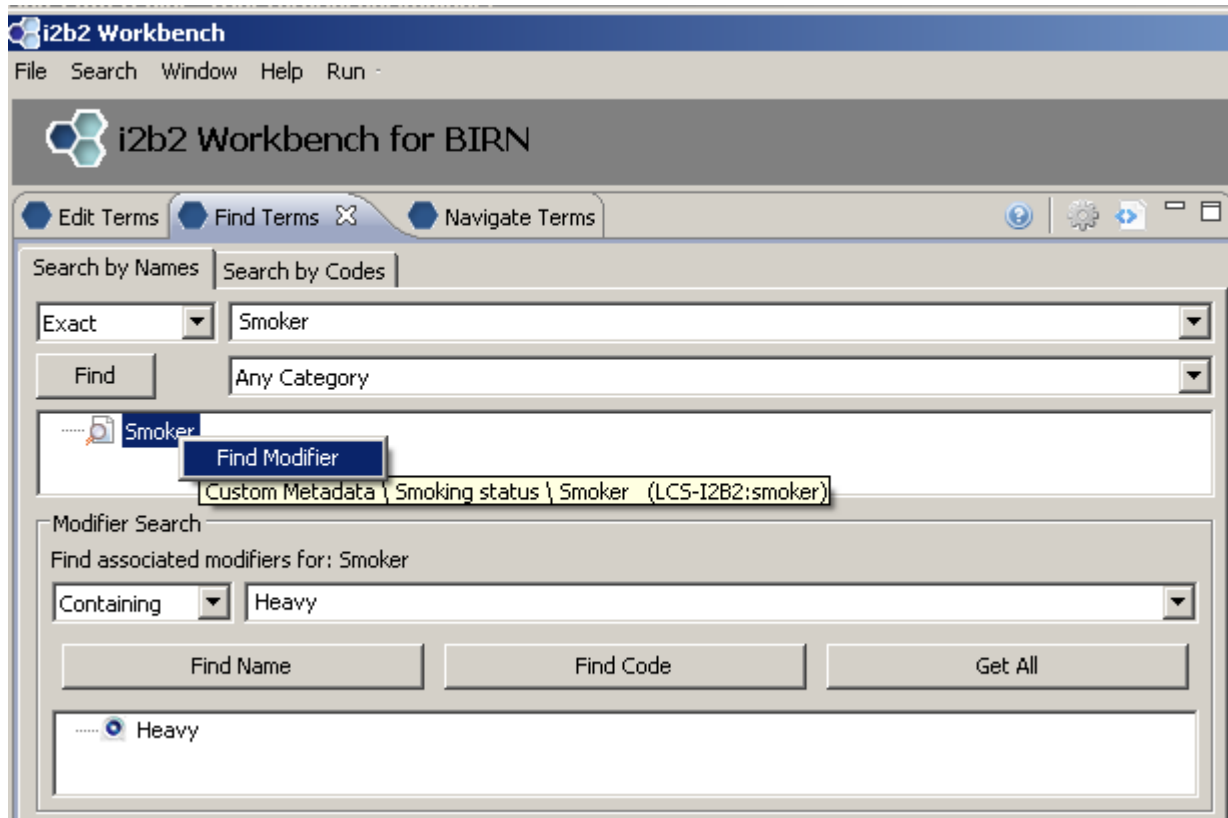
Choose 'Ontology' from the drop-down box, type in a text string ('asthma' in our example), and click on 'Find'.

Using Find Terms Search by Codes Tab to Locate Diagnoses



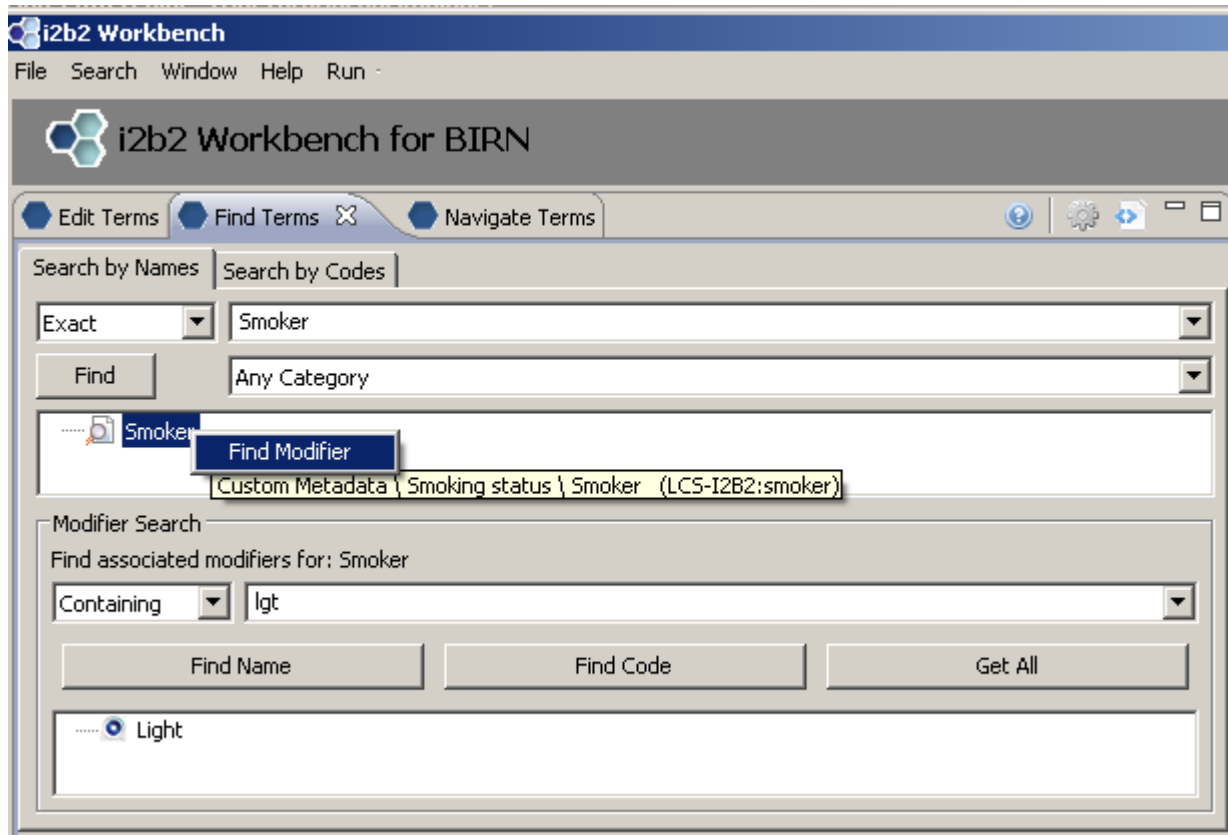
Enter 'ICD-9' from the drop-down box, type in a text string ('493' in our example), and click on 'Find'.

Using Find Terms to Locate Modifier by Name



Right click on concept we wish to find modifiers for; Choose 'Find Modifier'. Enter the name of the modifier we are searching for in text box ('Heavy'). Select 'Find Name'

Using Find Terms to Locate Modifier by Code



Right click on concept we wish to find modifiers for; Choose 'Find Modifier'. Enter the code for the modifier we are searching for in text box ('lgt'). Select 'Find Code'

