RELMA®

RegenstriefLOINC® Mapping Assistant

Version 6.22
Users' Manual

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      3. Units of Measure
      4. LOINC code to which it is mapped
      5. Date of mapping
      6. Language of test names
      7. Version of LOINC used to do the mapping
      8. Contact information;
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Purpose

The stated goal of the Logical Observation Identifier Names and Codes (LOINC) is to create universal identifiers (names and codes) to be used in the context of existing HL7, ASTM E1238, and CEN TC251 observation report messages. The purpose of the Regenstrief LOINC Mapping Assistant program (RELMA) is to help the user associate, or map, their local terms to the universal LOINC codes.

Hardware/Software Requirements

Here are the hardware / software requirements that are needed to install and run RELMA:

Operating System: Windows 7 SP3 or greater

Available disk space: 2G minimum

Required memory: 1G RAM

Default location of user files: C:\Users\Public\Documents\RELMA (users must have write access to this location)

Administrative access is required to install the program.

No special privileges are required to run the program.

Installation

RELMA is available as part of the LOINC and RELMA Complete Download File or as a standalone download file, both of which are available on the LOINC website at https://www.loinc.org/downloads/. You should have at least 1.5 GB of free disk space on your system in order to install the complete package. (The large amount of disk space required is due to the size of the LOINC database.)

You must be logged into an account with Administrative privileges to successfully install RELMA. If you attempt to install the program from a limited account you may receive unexpected and intermittent errors.

WARNING : It is highly recommended that before every installation of the RELMA Program that you back-up your Local Master Observation File (LMOF) database. In a default installation, this file is typically located at: "C:\Users\Public\Documents\RELMA\LMOF3.MDB"

The RELMA distribution files are provided in a single compressed ZIP file. After you have successfully downloaded either the LOINC and RELMA package or the RELMA file, you must unzip the files and run Setup.exe to install the RELMA program.

After Installation

When SETUP completes its work, you are given a short message that the program was installed successfully. Depending on your system configuration, you may be asked to restart your computer.

You may now begin running the RELMA program by going to **Start**, **Programs**, **Regenstrief**, **RELMA**, and then **RELMA**. Once you click on **RELMA**, it should launch and the program will begin to run.

Program Overview

In this section, we present a general overview of what the RELMA program does. Specific details on how to use RELMA are presented later.

The RELMA.MDB and LMOF3.MDB Database Files

RELMA depends upon two Microsoft Access databases for its operation. The first database is named RELMA.MDB. It contains all of the data about the LOINC numbering system plus overhead information needed to run various RELMA program options. The second database is named LMOF3.MDB for the Local Master Observation File. This database is where RELMA stores information you supply about your local codes and descriptions of the tests and measurements. These two databases work together so you can relate your numbering system to the LOINC numbering system.

There are three ways to get your local codes and descriptions into your LMOF database. The first method would be to import data from an ASCII text file, which can be done through RELMA and is explained in more detail later. The second method would be to enter the data manually, which can be lengthy and time consuming if there are vast amounts of data to be entered. The third method would be to load the LMOF directly using Microsoft Access®.

After you have imported, entered, or loaded your data into RELMA, you can match your local codes and descriptions to their associated LOINC code numbers and descriptions using the RELMA map option. After you have started the mapping program, details about your local codes and descriptions are presented on the screen. You can scroll through these records one at a time. The program gives you the opportunity to search all of the words in the local description of each local test for matches on words present in the LOINC database. You can even use wildcards when searching the database. RELMA presents you with a list of LOINC records whose test/measurement name contains those words or their equivalents you selected to use in the search. You can scroll through the list of matches to find the LOINC record that corresponds to your local test description. When you find a LOINC description that matches your local description, you can store the LOINC code in the LMOF database. The process of matching a LOINC code and description to your local code and description is referred to as *mapping*. Each mapped term is immediately saved into the database table. This allows you to restart where you left off, without having to complete the mapping task at one sitting.

Details of how RELMA maps your data to the LOINC data are discussed later in this manual.

RELMA Terminology

The following words and phrases are used throughout the RELMA program and this manual.

Local Term: A concept composed of a code (or name) and a description.

Local Term File: An organized collection of local terms. (NOTE - in previous versions this was called a "working set")

Local Word: A word (e.g. "AB", "GLUCOSE", etc.) that is derived from a local term description.

LOINC Database: A Microsoft Access® database published by the Regenstrief Institute that contains LOINC codes and their definitions. This database may also contain information necessary for the operation of the RELMA program.

LOINC Hierarchy A structured arrangement of LOINC elements (a.k.a. parts) designed by the Regenstrief Institute for use in the RELMA program. Most often a hierarchy is used to restrict searches performed using RELMA.

LMOF Database: A Microsoft Access® database designed to store the user's local terms and mappings between the local terms and LOINC terms.

Mapped Term: This a local term that has previously been mapped to a LOINC term.

Mapping: The process of matching a LOINC term to a local term.

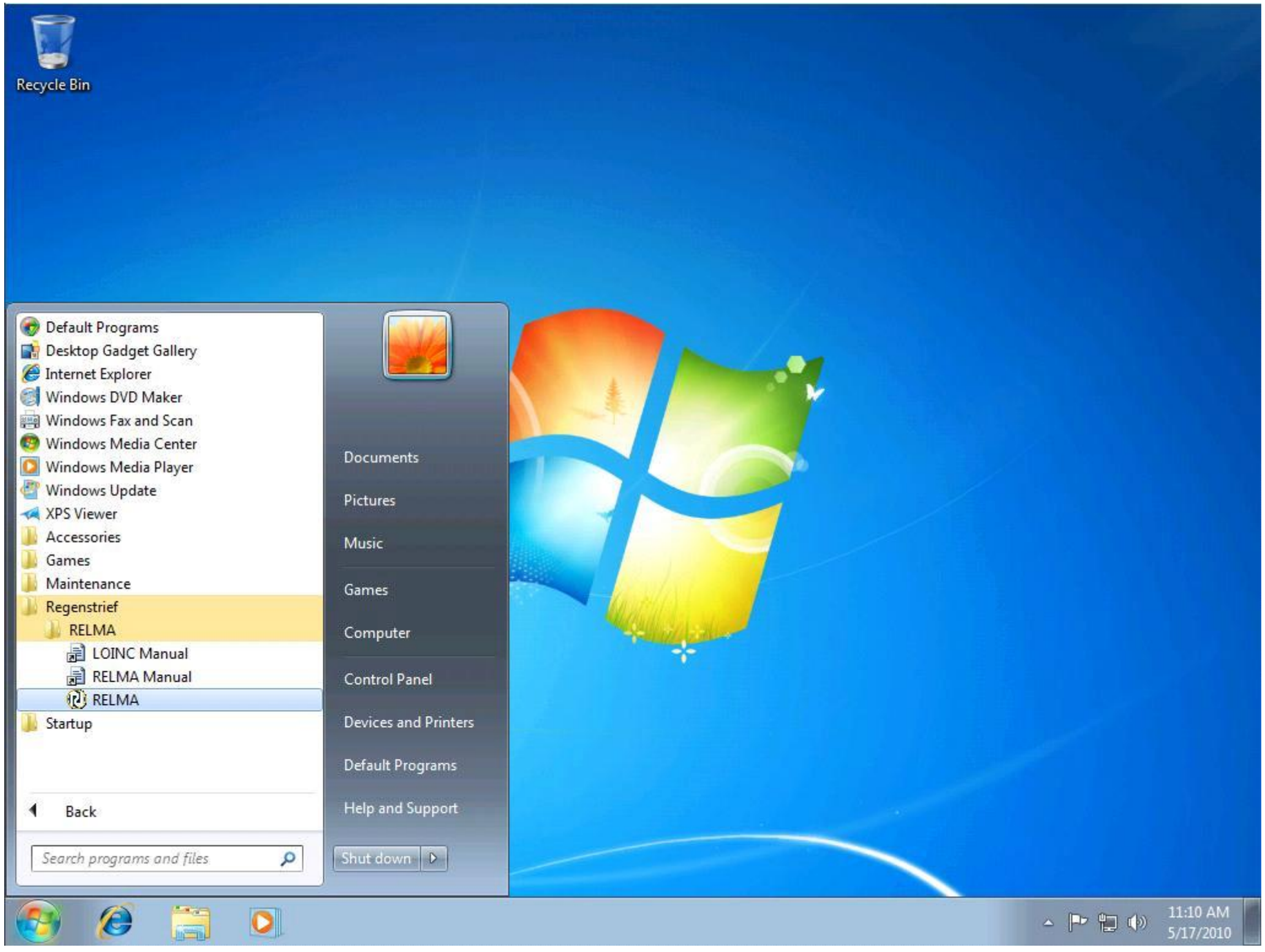
For information on the active, deprecated, discouraged, and trial LOINC status codes, please see section 11.2, "Classification of LOINC term status" in the LOINC Users' Guide.

Running the RELMA Program

Assuming you have installed the RELMA program as described in the installation section, you are now ready to run the RELMA program. As with many programs on Windows, there are numerous ways to launch RELMA.

Starting the RELMA Program

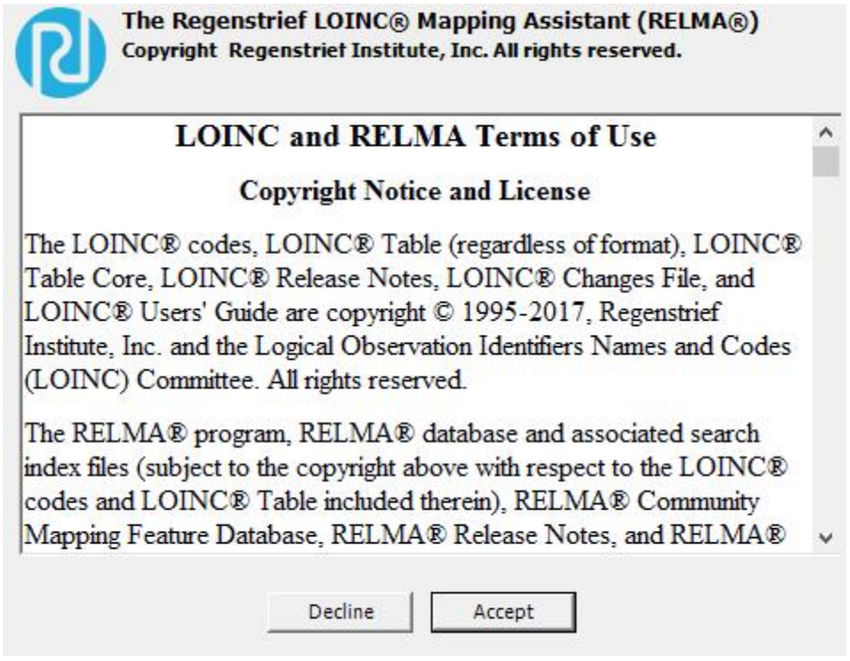
First, click the Start button on the task bar. Next, go up to All Programs. After this, go to Regenstrief, followed by RELMA, and then click on RELMA. This should launch the RELMA program. See the figure below.



Copyright Screen

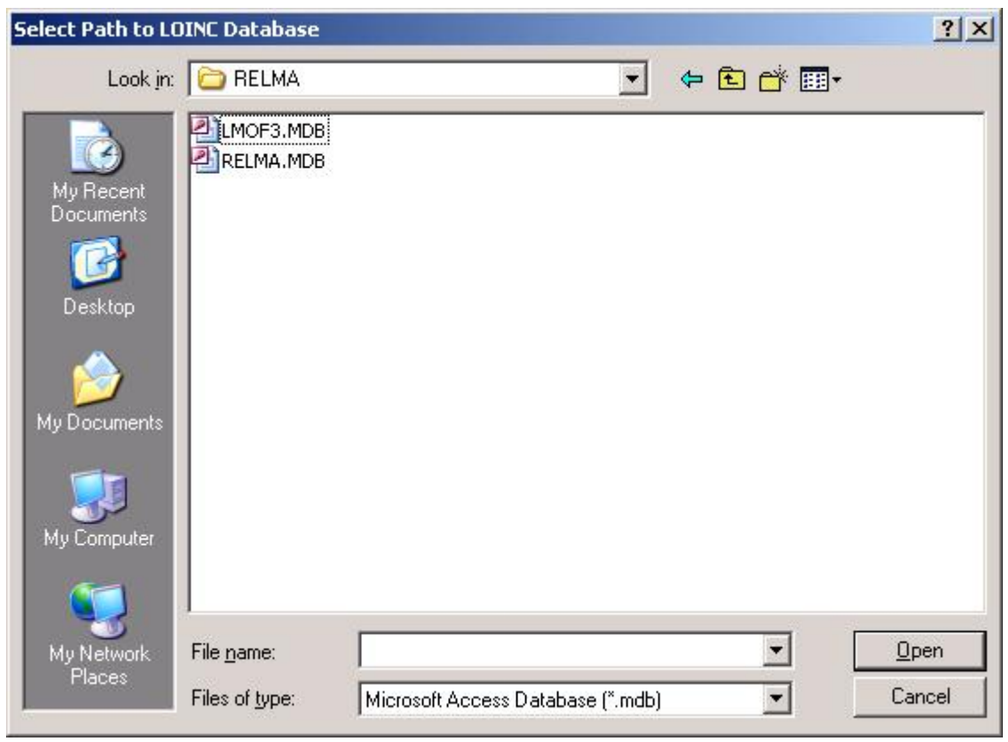
While the RELMA program loads, you will see a screen similar to that shown in the figure below. This screen provides copyright information for the use and distribution of the RELMA program and

LOINC database. The progress bar at the bottom of the screen will update you as to where the program is in the loading process.



Opening the LOINC and LMOF Databases

As described earlier, the RELMA program depends on the LOINC and LMOF Microsoft Access databases. During the loading process the program attempts to open these databases and verify their contents. If the program cannot find the LOINC database, then you will be asked to navigate to the location where it resides via a Windows Explorer window like the one shown in the figure below.

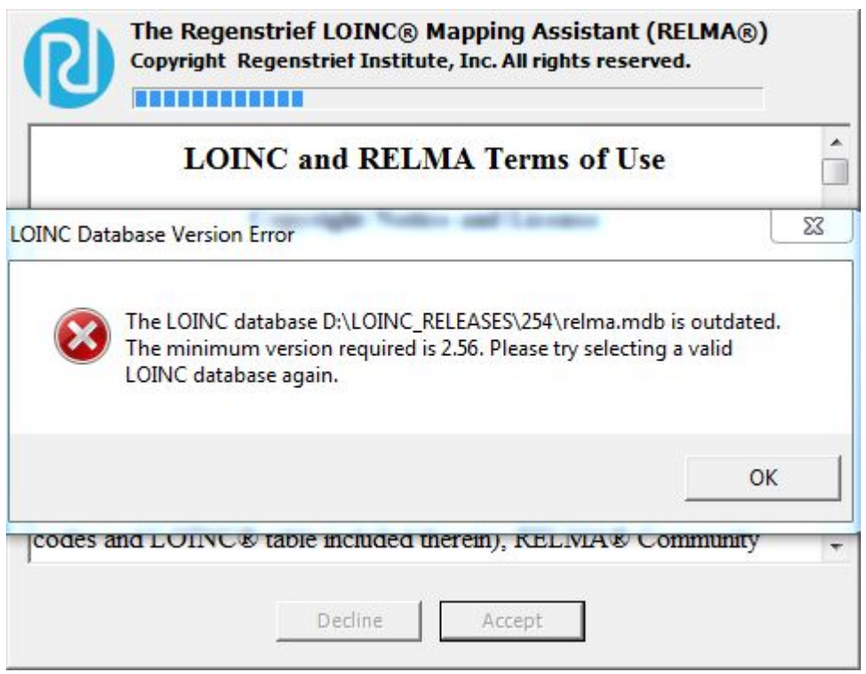


To choose a database, click on the database name and then click the [Open] button. The RELMA program will continue loading using the new directory paths. After the program has finished loading, click the [Continue] button to advance to the main menu screen.

In a default installation both the RELMA.MDB and LMOF3.MDB databases will be located in the C:\Users\Public\Documents\RELMA directory. You can, if you chose, move either of these database to a non-standard location. If you decide to relocate either of these datdabases you can use the "Set User Preferences" option to tell RELMA about their new location.

Note: *The directory paths to the LOINC and LMOF databases are stored in a hidden configuration file (user.config), which is located in a hidden directory. You can manually change the paths before running the program, but an incorrect assignment will bring up a box similar to the one in the figure below.*

LOINC Database Version



After RELMA verifies the directory paths, the program may prompt you with an out-of-date message, similar to the one shown in the figure above, regarding your RELMA.MDB database. RELMA looks at the RELMA.MDB database on your local machine and determines whether the database is a supported version. If the RELMA program determines your LOINC database to be out-of-date, you will be unable to run the RELMA program until you obtain the latest version.

You can obtain the latest version by visiting the LOINC website at http://loinc.org or downloading the database from the CD-ROM that came with this version of RELMA.

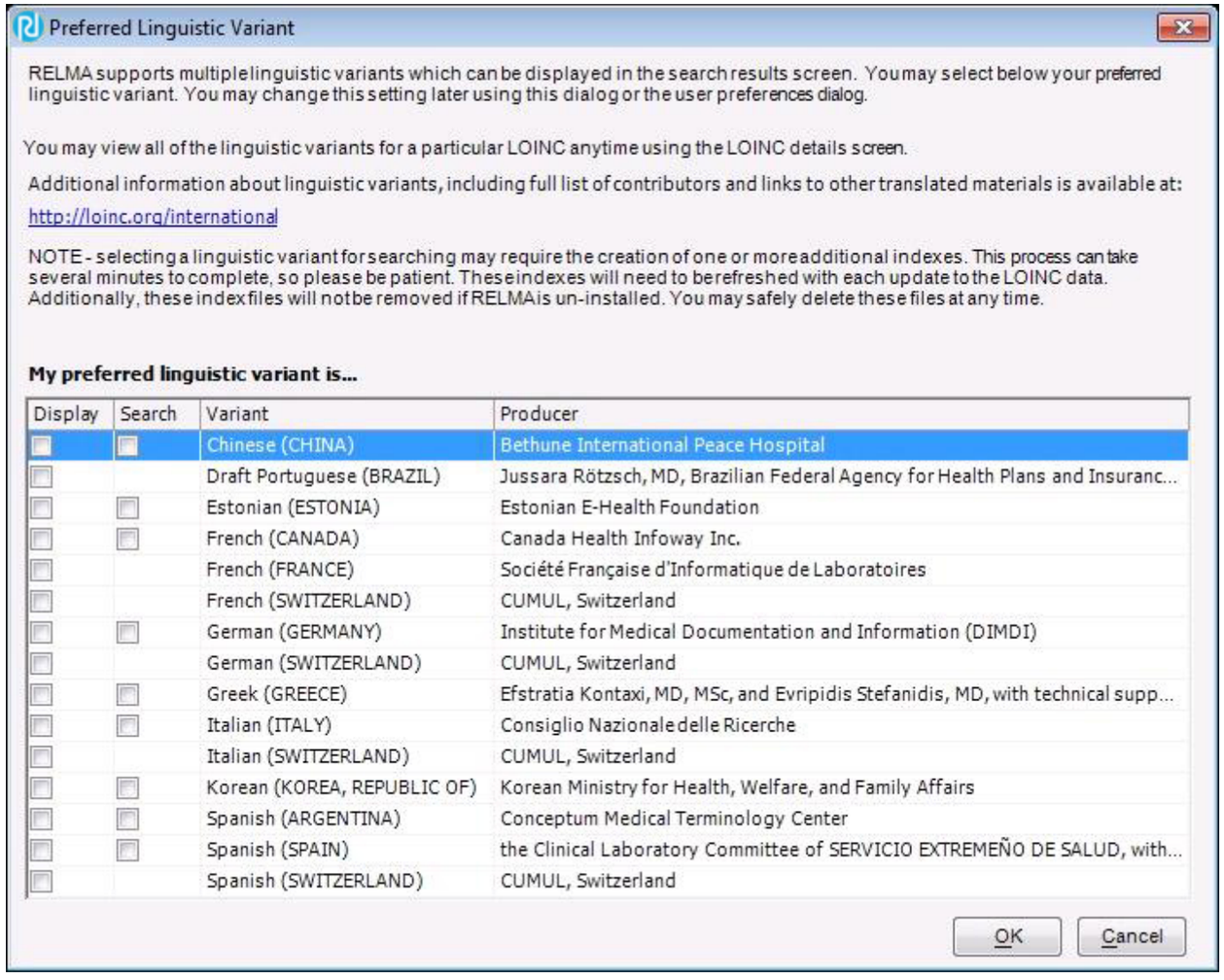
Logging in

Logging into RELMA is totally optional but something that we hope that you will do. RELMA uses the same user names and passwords as the loinc.org web site. So if you have an account on loinc.org, you are ready to go. If you don't already have an account, you can easily create one by visiting the loinc.org web site.

If you don't want to log in, just click the "Cancel" button and RELMA will work just as it always has. If you never want to log in to the program, you can check the "Do not show on start up" check box and RELMA will never ask you to log in again. If you change your mind, you re-enable the log in screen from the user preferences. You can also log in by clicking the link on the mapping or search screen.

Log in is required to view the mapping assistance provided by the LOINC Community Mapping project. This exciting new feature lets you see how other LOINC mappers have mapped codes in the own systems. By participating in the project you will also be able to have your own mapping included in the community repository. The Community Mapping project is one of the most innovative features that we have ever offered. Please be sure to check it out!

Preferred Linguistic Variants

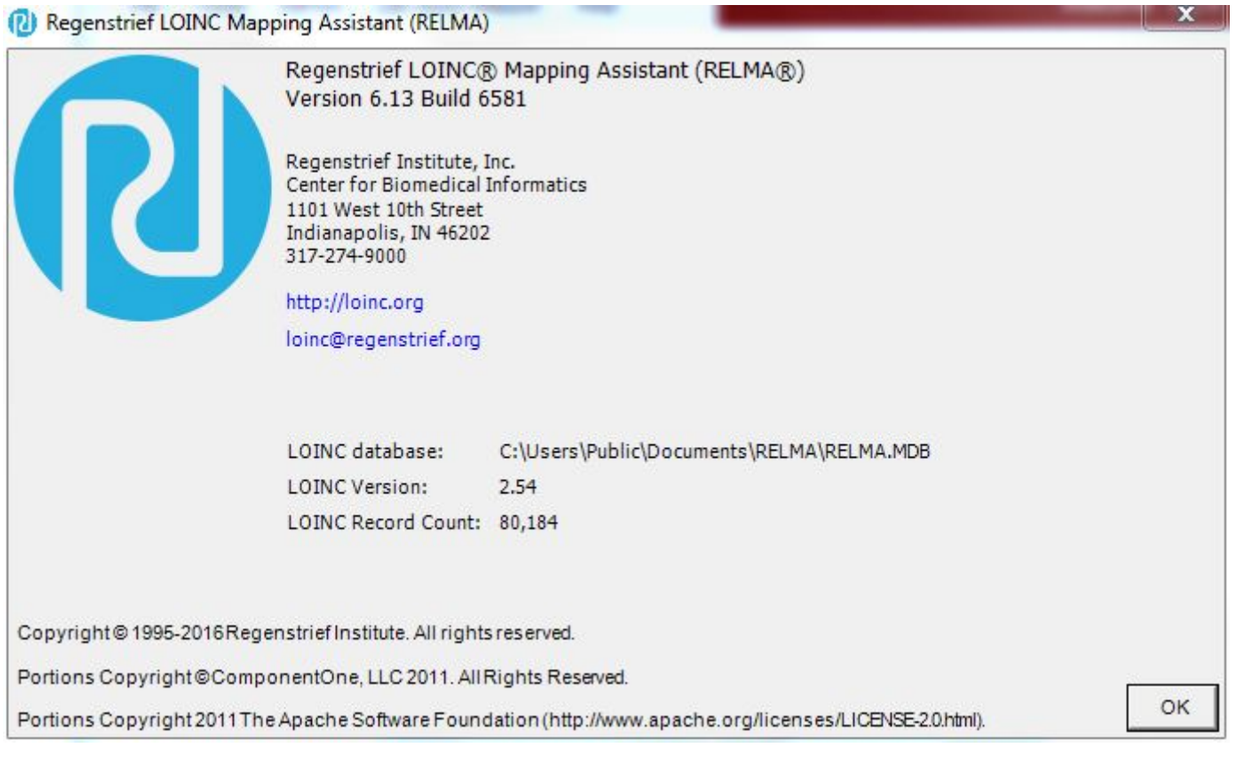


When RELMA starts, it may prompt the user with a dialog box similar to the one shown in the figure above. This dialog box allows the user to select a preferred linguistic variant. This dialog allows the user to control which variant will be displayed where appropriate.

All linguistic variants for a particular LOINC are displayed together on the LOINC details screen.

Note: *This dialog box is available to the user at any time through the User Preferences dialog box and the Preferred Linguistic Variant dialog box. See* *Mapping & Linguistic Options**.*

The About Box



The figure above displays the About RELMA Box. You can view this box by pressing the F1 key at any time or choosing Help > About RELMA from the menu. This box is useful for displaying important information such as the version number for the RELMA program and the LOINC database. If you should ever need technical support from Regenstrief Institute, this screen provides the necessary contact information. Furthermore, the staff at the Institute may ask for some of the information displayed on this screen. It is suggested that you record the RELMA version and build numbers along with the LOINC database version number and path in case you are unable to start the RELMA program and need assistance. Clicking on the LOINC website address will launch your default web browser and connect you to information about LOINC and RELMA. Clicking on the LOINC email address will open your default e-mail program and start a new message addressed to the LOINC staff.

The Welcome Screen

The figure above displays the welcome screen, or main menu, of the RELMA program.

While the large red and grey buttons allow the user to easily navigate to the major functions the program facilitates, the dropdown menu at the top of the screen allows the user access to all of the programs' functions. Each function is described in individual sections of the manual.

In the top right corner of the welcome screen, the 'log in' and 'Register' options appear. If the user logged in when starting the RELMA program, the login name will display. If the user did not log in upon initial start-up, the user can click on "log in" and another screen will display, asking for the user name and password. If a user does not have a LOINC user account, they can click on "Register", which will take them to an online form on loinc.org where they can create a LOINC user account. Additional information about created an account is discussed in the Logging in section of the RELMA manual.

The current version of the RELMA program is displayed in the bottom right corner of the screen and the current Local Term File selected by the user is shown in the bottom left corner of the screen. The program defaults to the SAMPLE Local Term File that comes with the program. Other Local Term Files may be imported from delimited files or HL7 files using the "Import Local Terms" program functions. The user may change the current Local Term File by selecting File > Change Local Term File from the dropdown menu.

Setting User Preferences

Many aspects of the RELMA program can be customized through the user preference screen, accessed by choosing the File > Set User Preferences menu option. The figure below shows the general program options available for customization.

The General Tab

This tab controls the general properties of the RELMA program. The specific options on this tab are explained below.

Path to the LOINC Database

The "Path to LOINC Database" field displays the path and name of the Microsoft Access™ database that holds information about the LOINC terms and other data used by the program. Users can point the RELMA program to a different LOINC database by clicking the "Browse..." button to the right of this field. A Windows Explorer dialog box is displayed to help you navigate to the new file. A check is then performed to ensure the file selected is a valid LOINC database that RELMA can open and use.

Path to the Local Terms

The "Path to Local Terms" field displays the path and name of the Microsoft Access™ database that holds information about your local terms. Users can point the RELMA program to a different LMOF database by clicking the "Browse..." button to the right of this field. A Windows Explorer dialog box is displayed to help you navigate to the new file. A check is then performed to ensure the file selected is a valid LMOF database that the program can open and use.

Program Loading Options

The "When RELMA starts, it should" box contains three options that let you choose the screen you see when RELMA first starts. The first option, "Take me to the Welcome Screen", is the default for new installations and brings users to the welcome screen with the large red and grey buttons. The second option, "Take me to the Mapping Screen", tells the program to bypass the welcome screen and

take users directly to the mapping screen where they can map local terms to LOINC terms and gain access to the other areas of the program. The third option, "Take me to the Simple Search Screen", tells the program to bypass the welcome screen and take users directly to the simple search screen. Any changes to this option will not take effect until you restart the RELMA program.

The Map Screen Tab

The second tab on the user preferences screen allows the user to customize options related to mapping their local terms to LOINC® terms. See the figure below for an example of one user's settings. Descriptions of each setting are below.

Pre-Search Options

Auto Select Keyword

When a user is mapping terms, individual words (keywords) are extracted from the user's local terms and used in searches against the LOINC® database. Sometimes these keywords are "known" to the RELMA program, meaning that the RELMA program knows that at least one LOINC possesses the word. When this option is checked, RELMA will automatically choose to use "known" keywords in searches conducted against the database. Otherwise the user would have to individually select each keyword for each search performed (this could get tedious). This option is enabled by default.

Auto Wildcard Keywords (*)

This option appends an asterisk to the end of every keyword after it has been extracted from a local term. Doing this tells the RELMA program to find all words that start with the keyword rather than find all words that are equal to the keywords (e.g. find everything like "BLOO*" rather than find everything equal to "BLOOD"). This option is disabled by default.

Use Local Battery Terms in Search

Many local terms possess not only a test code and test description (items found in the OBX-3 segment of an HL7 message) but also a battery code and battery description (items found in the OBR-4 segment of an HL7 message). When this option is enabled, the words from the battery description will be extracted along with the words from the test description and used in searches performed against

the LOINC® database. This option is enabled by default.

Mapping Options

Prompt for Comments When Mapping

When this option is enabled, RELMA will prompt users for comments each time they map a local term. This option is disabled by default. If you just want to leave the occasionally comment, you can use the "Comment" button on the mapping screen to add or edit the comment associated with the current local term at any time.

Post-Search Options

Display Post-Search Statistics

Some users are curious as to how many LOINCs were examined during the search or how long different parts of the search algorithm took to be performed. Enabling this option tells the RELMA program to display a popup box after every search with such information about the search performed. This option is disabled by default.

Mapping & Linguistic Options

Current Preference

The value displayed represents the user's preferred linguistic variant which, among other things, determines which variant will be displayed in the search results grid along with the other LOINC information. To change the preferred linguistic variant, simply click on the "Choose..." button.

The Details Pages Tab

Details pages can retrieved from the Internet, or they can be generated locally and then cached for that version of LOINC. Retrieving from the Internet is faster than building locally, so that is the default in RELMA. (This assumes that you have an Internet connection.) The Details Pages Tab lets you control whether RELMA should first try to get the details page from the Internet (the "Get from Internet" option), or whether RELMA should always build pages locally (the "Build Locally" option).

If you select "Build Locally", once a page has been built for the version of LOINC you installed with RELMA, that page is re-used (cached). The cache is limited to 100MB, which should be enough space to store the details pages for over 500 non-panel LOINCs. (Some panel LOINCs are much larger than the non-panel LOINCs, so they will take a greater share of this cache space.) If the cache overflows, the least-recently-used page(s) are discarded to make room for the new page.

The Subset Tab

This tab contains the targeted subsets list created by users which contains set of approved LOINC codes. The users must be logged in to access the subset list.

The users will have access to Manage subsets link on the subset screen which directs them to the webpage where they can create and maintain the subset list.

SubmissionsTab

RELMA supports two methods for sending submission files.

- WEB (FTP) *default*
  - In this process, the generated submission file is sent directly to Regenstrief Institute.
  - The default "Timeout in Minutes" is 180. While not typical, it is advisable to increase this setting, should RELMA present timeout type errors or fails to respond within the alloted timeout setting.
- EMAIL
  - This process will generate the submission file and open your default email client for further processing.

See section Submitting a Submission File Using RELMA for more details

Local Terms Backup Tab

RELMA provides backup capability for your local terms database. The figure above shows the default settings.

- Automatic Backup Frequency
  - Never make a backup. I'd rather do it manually. This turns off the automation of backups; however the application will still allow you to create backups from the Local Term Backup form.
  - Make a backup every time I exit the program. This will make a copy each time the application exits.
  - Make a backup every [integer] days. This will make a backup once the pre-defined time period has passed. Note that the backup is created on application exit and will not be created unless the application is opened.
- Backup Retention Policy
  - Keep the last [integer] backups on disk. This allows the user to control how many backups are saved on disk.
  - Never delete backup files. I'll clean them myself. This setting is not recommended with automatic backups since this has a potential of consuming a large portion of your hard drive space. If,

however, you choose to perform backups manually, this setting would give the user more control.

Basic Search Syntax

The search syntax is similar to that of Google. Basic searches will follow the rules outlined below.

- Searches are case-insensitive so an upper case search term will return the same results as a lower case search term.
- Search terms will be separated by the AND operator when no operator is specified.

The following special characters can also be used in a basic search.

Special Characters	Example	Definition
" "	`influenza "virus A"`	The phrase in quotations is considered as a single search term rather than two independent terms.
AND	`morphine AND cutoff`	Both terms must exist somewhere in each search result. As stated above, AND is implied when no operator is specified between search terms. In addition, the "+" operator has the same function as AND (see the Advanced Search Syntax section). So searching for **morphine AND cutoff** will produce the same search result as **morphine cutoff** or **morphine +cutoff**.
OR	`influenza OR parainfluenza`	Either of the terms exist somewhere in each search result.
NOT	`influenza NOT equine`	Excludes records that contain the term after NOT. The NOT operator cannot be used with only a single search term. In addition, the - operator has the same function as NOT (see the Advanced Search Syntax section). So searching for **influenza NOT equine** will produce the same search result as **influenza -equine**.
?	`allergy artemi?`	Single character wildcard search. Cannot be used in phrases. The ? operator is particularly useful when searching for a LOINC code when you do not remember the check digit. For example, **80619-?** is a valid search that will return the row for LOINC 80619-0.
*	`allergy artemi*`	Multiple character wildcard search. Cannot be used in phrases.
FieldName:	`Component:opiates System:hair`	When performing a search you can either search across all indexed fields, which is the default, or you can search for a value in a specific field using the syntax "FieldName:". See the Basic LOINC Field Names section and the Basic Part Field Names section for a list of the basic field names for LOINC term and part searches, respectively. See the Advanced LOINC Field Names section and the Advanced Part Field Names section for a list of the advanced field names for each type of search. Remember that the "FieldName:" operator is only valid for the search term that it directly precedes. So the query `Component:opiates confirm` will look for **opiates** in the Component field and **confirm** in all of the indexed fields.

Searching for existence or non-existence of a value

Users have the ability to search for the existence or non-existence of a value in many of the common LOINC fields.

The search syntax for this feature is FieldName:null or FieldName:notnull. For example, to search for **glucose** terms that do not have a Method specified, you can use the query **glucose method:null** Likewise, the query **glucose method:notnull** will return all glucose terms that do have a method.

In addition to the "notnull" and "null" keywords, you can also use "true" and "false" to achieve the same results, for example, **glucose method:true** .

For more advanced search syntax see the Advanced Search Syntax section.

Basic LOINC Field Names

The LOINC search supports the use of the following field names in a basic search:

Field Name	Example
LOINC	`LOINC:12628-4`
Component	`Component:chemotherapy`
Property	`glucose Property:CCnc`
Timing	`glucose Timing:24H`
System	`glucose System:CSF`
Scale	`glucose Scale:Nar`
Method	`mycobacterium Method:IA`
Class	`glucose Class:UA`

For more advanced field names see the Advanced LOINC Field Names section.

Basic Part Field Names

The RELMA Part Search tab supports the use of the following field names in a basic search:

Field Name	Example
Part	`Part:LP16708-7`
Name	`Name:giemsa`

For more advanced field names see the Advanced Part Field Names section.

Basic Answer List Field Names

The RELMA Answer List Search tab supports the use of the following field names in a basic answer list search:

Field Name	Example
AnswerLi	`AnswerList:LL512`

st	`-5`
Name	`Name:care*`
Description	`Description:sock`

For more advanced field names see the Advanced Answer List Field Names section.

Advanced Search Syntax

Advanced users can use the following special characters in the search string.

Special Characters	Definition
+	The "+" or required operator requires that the term after the "+" symbol exists somewhere in each search result. As described in the Basic Search Syntax section, the "+" and the AND operators are interchangable, and when no operator is specified, "+" is implied. To search for records that must contain **anthracis** and may contain **bacillus** use the query: `bacillus +anthracis`
-	The "-" or prohibit operator excludes records that contain the term after the "-" symbol. To search for records that contain **bacillus** but not **anthracis** use the query: `bacillus -anthracis`

( )	Parentheses can be used to group clauses to form sub queries. This can be very useful if you want to control the boolean logic for a query. To search for records that contain either **influenza** or **rhinovirus** and not **haemophilus** use the query:
	
	`(influenza OR rhinovirus) -haemophilus`
	
	Parentheses can also be used to search for multiple search terms in a single field. To search for terms that contain the words **opiates** and **confirm** in the Component use the query:
	
	`Component:(opiates confirm)`
	
	To search for terms that contain the word **opiates** or the word **confirm** in the Component use the query:
	
	`Component:(opiates OR confirm)`

~	To do a fuzzy search use the tilde symbol ("~") at the end of a single search term. Fuzzy searches can be used when you are not sure about the spelling of a word. For example, to search for a term similar in spelling to "haemofhilus" use the fuzzy search:
	
	`haemofhilus~`
	
	An additional (optional) parameter between 0 and 1 can specify the degree of similarity required. With a value closer to 1, only terms with a higher similarity will be matched. For example:
	
	`haemofhilus~0.8`
	
	returns a large number of terms, but
	
	`haemofhilus~0.95`
	
	does not return any.
	The default that is used if the optional parameter is not given is 0.5.

" "~	The proximity search allows you to find records containing words within a specific distance of each other. To do a proximity search use the tilde symbol ("~") at the end of a phrase in quotes. For example to search for **function** and **panel** within 1 word of each other use the search: `"function panel"~1`

[ ]
{ }
	Range searches allow you to find records whose field values are between the specified lower bound and upper bound.
	To perform an inclusive range search use square brackets. This type of query will return records where the specified field contains the lower bound, the upper bound, or any value between the lower bound and upper bound. For example, to search for Parts created between 20170101 and 20170601, inclusive, use the following query in the Part Search tab:
	
	`createdon:[20170101 TO 20170601]`
	
	To perform an exclusive range search use curly brackets. This type of query will only return records where the specified field contains a value between the lower bound and the upper bound without containing either the upper or lower bound values themselves. For example, to search for records created between 20170101 and 20170601, exclusive (i.e., not created on either January 1, 2017 or June 1, 2017), use the query:
	
	`createdon:{20170101 TO 20170601}`

\	Special characters that are part of the query syntax can be escaped and treated as data. The current list of special characters is
	
	`+ - && || ! ( ) { } [ ] ^ " ~ * ? : \`
	
	To escape these characters use the \ before the character. For example to search for **O157:H7** use the query
	
	`O157\:H7`

For basic search syntax see the Basic Search Syntax section.

Advanced LOINC Field Names

Advanced users can use the following field names in the search string.
Note that **True** and **NotNull** can be used interchangeably, as can **False** and **Null**.

Field Name	Definition

AllowMethodSpecific	Allowed values:
	
	`True`
	
	`False`
	
	This field is used to find LOINC codes with a Method, where either equivalent methodless LOINC codes exist (**AllowMethodSpecific:False**) or do not exist (**AllowMethodSpecific:True**). For example, to find codes containing **cytomegalovirus** that have a Method and for which there are no equivalent methodless LOINC codes use the query:
	
	`cytomegalovirus AllowMethodSpecific:True`
	
	And to find codes containing **cytomegalovirus** that have a Method and for which there are equivalent methodless LOINC codes use the query:
	
	`cytomegalovirus AllowMethodSpecific:False`

AnswerList	Allowed values:
	
	`True`
	
	`False`

	Whether or not a LOINC code has an associated answer list. To search for all the LOINC codes containing **glucose** that also have an answer list use the query: `glucose AnswerList:true`
AnswerListId	This field allows you to find all LOINC codes with a specific answer list. For example, to find all LOINC codes with which Answer list LL956-4 is associated, use: `AnswerListId:LL956-4`
AnswerListName	This field allows you to find LOINC codes whose answer list name contains specific keywords. The following example will return all of the LOINC codes whose assigned answer list has the word "medication" in its name. `AnswerListName:medication`

AnswerListType	Allowed values:
	
	`Example`
	
	`Preferred`
	
	`Normative`
	
	This field allows you to find LOINC codes by the type of associated answer list. The following example will return all of the LOINC glucose codes that have an associated NORMATIVE answer list.
	
	`glucose answerlisttype:normative`
	
	See the LOINC Users' guide for the complete list of answer types and their definitions.

AOEObservation	Allowed values:
	
	`True`
	
	`False`
	
	Ask at order entry observation terms represent additional questions that may be included with an instance of an order. This includes things like fasting status or travel history. You can see a complete list of the AOE questions with the following query:
	
	`AOEObservation:True`
	
	*Although a value of **False** is allowed, a search for terms that are not AOE observations would not be particularly useful because only a handful of terms are designated as AOE observations (i.e., almost all LOINC terms are not AOE observations).

AskAtOrderEntry	Allowed values:
	
	`True`
	
	`{LOINC #}`
	
	Ask at order entry terms are additional observation terms that may be included with an instance of an order. A LOINC order term may be associated with one or more ask at order entry sets.
	The example query shown here will return all of the LOINC terms with which the ask at order entry panel 80399-9 are associated:

	`AskAtOrderEntry:80399-9`
	
	To see the complete list of LOINC codes that are linked to an Ask at Order Entry set of any type, use this query:
	
	`AskAtOrderEntry:True`

AssociatedObservations	Allowed values:
	
	`True`
	
	`{LOINC #}`
	
	Associated observations are additional results that may be reported with a primary result. For example, the laboratory may report the volume of a urine specimen along with the primary urine analyte results. We also use the associated observations mechanism in LOINC to specify the sections and entries from HL7 Clinical Document Architecture (CDA) implementation guides that can be reported with certain LOINC document codes. This field can be used to find all of the LOINC terms have associated observation term(s) assigned to them, or to find terms that are linked to a specific associated observation term.
	The example query shown here will return all of the LOINC terms that are associated with the term 72225-6, which contains all of the recommended C-CDA R1.1 sections for a Progress Note:
	
	`AssociatedObservations:72225-6`
	
	To see the complete list of LOINC codes to which associated observations are linked, use this query:
	
	`AssociatedObservations:True`

AttachmentUnitsRequired	Allowed values:
	
	`Y`
	
	`N`
	
	Y/N field indicating whether or not a LOINC code is an attachment that requires units. To find all the LOINC codes containing **chicken** that are attachments that require units use the query:
	
	`chicken AttachmentUnitsRequired:y`

ChangeReasonPublic	This field provides detailed explanation about changes made to the term over time, including those made to the primary Parts, Answer list, etc. To search for all LOINC codes containing the word **Mucus** and the phrase "specimen changed" in this field, use the query: `mucus ChangeReasonPublic:"specimen changed"`
ChngType	This field is used to limit a search using the value of the LOINC CHNG_TYPE field. The values in this field are fully documented in the LOINC Users' Guide and are reproduced here for you convenience. • DEL = delete (deprecate) • ADD = add • NAM = change to Component • MAJ = change to one of the six major parts other than the Component (i.e., Property, Time, System, Scale, or Method) • MIN = change to field other than name

	• UND = undelete To search for all the LOINC codes containing the word **Glucose** that have not been modified since they were first released, and therefore will still have a CHNG_TYPE of ADD, use the query: `glucose chngtype:ADD`
ClassHierarchy ComponentHierarchy MethodHierarchy MultiAxialHierarchy SystemHierarchy	Hierarchy. This field contains the path enumeration to a category or name in the hierarchy. Restricting on the hierarchy by manually typing in a value requires extensive knowledge of the database and is therefore not recommended. See the "LOINC Hierarchies" section of the "Mapping" chapter in the RELMA Users' Manual for information on how to enforce a hierarchy restriction from the user-friendly hierarchy restriction screen.

CommonOrder	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a LOINC code is one of the S&I Framework's LOINC order set. To search for all the LOINC codes containing **acetone** that are a common test use the query:
	
	`acetone CommonOrder:true`

CommonLabResult	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a LOINC code is one of the "LOINC Top 2,000+" result codes. To search for all the LOINC codes containing **acetone** that are in the Top 2000+ use the query:
	
	`acetone CommonLabResult:true`

ComponentWordCount	Number of words in the Component field. To search for all the LOINC codes containing **cancer** with 3 words in the Component field use the query: `cancer ComponentWordCount:3`
CoreComponent	This field is used to search for the "core component" of the LOINC term. The Core Component is the portion of the Component that remains after all other parts, including the suffix, challenge, and divisor, are parsed. For example, the core component for **Chlamydia trachomatis Ab.IgA** is **Chlamydia trachomatis** . To search for all LOINC codes with core compnent of **acyclovir** , use the query: `CoreComponent:acyclovir`
CorePlaybook	Limits searches to LOINC terms that are part of the RadLex core playbook. To see all of the terms in the RadLex core playbook, use the query: `CorePlaybook:true`
Description	Description. Use this field to search the LOINC description and other reference information fields. Example query: `Description:"isoleucine catabolism"`

DocSection	Allowed values:
	
	`Both`
	
	`Document`
	
	`Section`
	
	Document section type. To search for all the LOINC codes containing **medication** that are used for full documents use the query:
	
	`medication DocSection:document`
	
	To search for all the LOINC codes containing **medication** that are used for document sections use the query:
	
	`medication DocSection:section`

ExUCUMunits	Example UCUM units. To search for all the LOINC codes containing **glucose** that have **ug/dl** in the example UCUM units field use the query: `glucose ExUCUMunits:ug/dl`
ExUnits	Example units. To search for all the LOINC codes containing **streptococcus** that also contain **titer** anywhere in the example units field use the query: `streptococcus ExUnits:titer`
Formula	Contains the formula in human readable form, for calculating the value of any measure that is based on an algebraic or other formula, except those for which the component expresses the formula. So **Sodium/Creatinine** does not need a formula, but **Free T3 index** does. To find all LOINC codes that contain the word "hours" in their formula field, use the query: `Formula:hours`

HL7AttachmentStructure	Allowed values:
	
	`IGexists`
	
	`NoIGexists`
	
	This field can be used to restrict search results to find LOINC codes that have clinically-relevant HL7 implementation guides that use the U.S. Realm Header (using **IGexists**) or those that are approved by the HL7 Attachments WG for transmission using the C-CDA Unstructured Document template. Example query:
	
	`cancer HL7AttachmentStructure:IGexists`

HL7FieldSubId	The field is valued with the pre-defined HL7 v2.x field that should be used to represent the result associated with this LOINC term if the data is being transmitted using HL7 v2.x messages. For most terms, this field will be null, meaning that the result should be sent in an OBX segment with the LOINC code in OBX-3 and result in OBX-5. To find LOINC codes whose values would be transmitted in the PID-8 field use the query: `HL7FieldSubId:PID-8`

Honorary	Allowed values:
	
	`True`
	
	`False`

	Honorary LOINC terms have been created to celebrate the contributions of an individual. To search for honorary LOINC terms use the query: `Honorary:true` *Although a value of **False** is allowed, a search for terms that are not honorary terms would not be particularly useful because only a few LOINC terms are designated as honorary (i.e., almost all LOINC terms are not honorary terms).

Internal lab use terms	Allowed values:
	
	`True`
	
	`False`
	
	These are LOINC terms that are primarily used for internal lab reporting. To search for internal lab use terms use the query:
	
	`InternalLabUse:True`
	
	To exclude internal lab use terms from your search results use the query:
	
	`InternalLabUse:False`

LabTest	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a LOINC code is a lab test (i.e., Class type 1). To search for all the LOINC codes containing **aortic** that are a lab test use the query:
	
	`aortic LabTest:true`
	
	The above query will return the same result as:
	
	`aortic Type:1`

LForms	Allowed values:
	
	`True`
	
	`False`
	
	This field indicates whether or not the LOINC term is available for viewing in the LForms data widget tool. To search for these terms use the query:
	
	`LForms:True`

Limited use lab orders	These are LOINC terms that were created ONLY for indistinct lab ordering (in response to Canada Health Infoway). To search for these terms use the query: `LimitedUseLabOrders:true` To exclude limited use lab orders terms from your search results use the query:

	`LimitedUseLabOrders:False`
LongName	To search for all the LOINC codes containing **glucose** that also contain **[presence]** anywhere in the long common name field use the following query. Note that **[** and **]** are special characters that are part of the query syntax and must be escaped with the \ character so they are treated as data in the search. `glucose LongName:\[presence\]`
MapToLOINC	The LOINC code to be used as a replacement for deprecated or discouraged LOINC codes. To search for all the LOINC codes containing "protein" that are mapped to LOINC code "2885-2" use the query: `protein MapToLOINC:2885-2`

MassProperty	Allowed values:
	
	`True`
	
	`False`
	
	This field will contain true if the property of the LOINC code is a mass concentration or if it is unknown whether the property of the LOINC code is a mass concentration or a substance concentration. To search for all the LOINC codes containing **calcium** whose LOINC property is not defined as a substance concentration use the query:
	
	`calcium MassProperty:true`

Methodless	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a LOINC code contains a value in the Method field. To search for all the LOINC codes containing **amikacin** that do not contain a Method use the query:
	
	`amikacin Methodless:true`

NonroutineChallenge	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a LOINC code is considered a non-routine challenge test. To search for all glucose terms with non-routine challenges use the query:
	
	`glucose nonroutinechallenge:true`
	
	More practically, you probably want to hide the non-routine terms. This query will return the glucose terms that are not tagged as being non-routine:
	
	`glucose nonroutinechallenge:false`

OrderObs	Allowed values: `Both`

	`Observation`
	
	`Order`
	
	`Subset`
	
	To search for all the LOINC codes containing **glucose** that can be used an an order or an observation use the query:
	
	`glucose OrderObs:both`

OrderRank	This field has been deprecated. Please see the UniversalLabOrders field.
OtherCopyright	External copyright. To search for all the LOINC codes containing **feeling** with material that is copyrighted by Pfizer use the query: `feeling OtherCopyright:Pfizer`

PanelType	Allowed values:
	
	`Panel`
	
	`Convenience`
	
	`Organizer`
	
	LOINC panel classification as a Panel, a Convenience Group, or an Organizer. To search for all the LOINC panel codes classified as a "Convenience Group" use the query:
	
	`paneltype:Convenience`
	
	See the LOINC Users' Guide for the complete list of panel types and their definitions.

Pharma	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not the codes were created for a special Pharma use case and have a property that covers both mass and substance. To search for all the LOINC codes containing **calcium** whose property covers both mass and substance use the query:
	
	`calcium Pharma:True`

Punctuation	This field contains a text version of the non-alphanumeric characters that exist in the 6 core fields of the LOINC name. For example, if you want to only see LOINC terms that contain a "+" character, you would use the following query: `Punctuation:plus` Supported values: • ampersand

<table>
<tr><td></td><td>

asterisk
brace
caret
colon
equal
greaterthan
hyphen
lessthan
parenthesis
period
percent
plus
semicolon
slash

</td></tr>
<tr><td>Public health</td><td>Allowed values:

<code>True</code>

<code>False</code>

These are LOINC terms that are designated primarily for use in the world of public health. To search for public health LOINC terms use the query:

<code>publichealth:true</code></td></tr>
<tr><td>Rank</td><td>The position of the LOINC code in the list of the "LOINC Top 2,000+" result codes. This field originally contained values of 1 through approximately 2,000 where 1 represents the most common test. In 2016 we added some LOINC terms to the top 2,000 and assigned them a rank of 3,000 in order to distinguish them from the original set. To search for the LOINC code that is ranked as the 5th most common test use the query:

<code>Rank:5</code>

To search for the LOINC codes that were added to the list in 2016 use the query:

<code>Rank:3000</code></td></tr>
<tr><td>RelatedCodes</td><td>This field contains Core Concepts and Synonyms. The table below lists code systems and their descriptions as of RELMA version 6.14 along with search examples for each code system. This search looks for related codes and their concept names and returns LOINC codes that are linked to those related codes.
For example, to find LOINC codes containing congenital that are linked to a related code containing the text heart, use this query:

<code>congenital relatedcodes:heart</code>

<table>
<tr><th>Code System</th><th>Description</th><th>Example Search</th></tr>
<tr><td>IEEE_CFCODE10_NUM</td><td>ISO/IEEE 11073 MDC numeric code</td><td>relatedcodes:131844</td></tr>
<tr><td>IEEE_REFID_TXT</td><td>ISO/IEEE 11073 Medical Device Communications (MDC)</td><td>relatedcodes:MDC_BLD_PULS_RATE_INV</td></tr>
<tr><td>NAACCR_ID</td><td>NAACCR item #</td><td>relatedcodes:2880</td></tr>
</table>
</td></tr>
</table>

NINDS	NINDS Common data elements (CDEs)	relatedcodes:C13072
RadLex	Radlex radiology codes	relatedcodes:rpid455

SIRank	The position of the LOINC code in the list of the common 2,000+ tests performed by hospitals that are reported using SI units of measure. This field originally contained values of 1 through approximately 2,000 where 1 represents the most common test. In 2016 we added some LOINC terms to the top 2,000 and assigned them a rank of 3,000 in order to distinguish them from the original set. To search for the LOINC code that is ranked as the 5th most common test use the query:
	
	`SIRank:5`
	
	To search for the LOINC codes that were added to the list in 2016 use the query:
	
	`SIRank:3000`

ShortName	To search for all the LOINC codes containing **chemotherapy** that also contain **Rx** anywhere in the short name field use the query: `chemotherapy ShortName:Rx`
Species	To search for all the LOINC codes containing **parainfluenza** that also contain a species of **k9 use the query:** `parainfluenza Species:k9`

Status	Allowed values:
	
	`Active`
	
	`Trial`
	
	`Discouraged`
	
	`Deprecated`
	
	To search for all the LOINC codes containing **bacteria** that are deprecated use the query:
	
	`bacteria Status:deprecated`

StatusReason	Allowed values:
	
	`Duplicate`
	
	`Erroneous`
	
	`Ambiguous`
	
	Gives the reason a term was deprecated, if known. Otherwise, it contains NULL. To search for all the LOINC codes containing **bacteria** that are deprecated because a duplicate term exists, use the query:
	
	`bacteria Status:deprecated StatusReason:duplicate`

StatusText	This field contains the free text reason for the current STATUS. This field is optional, therefore it may or may not contain text, and because it is free text, it may not contain the exact text you are searching for. To search for all the LOINC codes that are deprecated because they were created in error and use the phrase "created in error" in the Status text field, use the query:

	`statustext:"created in error"`
SubmittedUnits	To search for all the LOINC codes containing the phrase **carbon dioxide** that also contain **mm** in the submitted units field use the query: `"carbon dioxide" SubmittedUnits:mm`

SubstanceProperty	Allowed values:
	`True`
	`False`
	This field will contain true if the property of the LOINC code is a substance concentration or if it is unknown whether the property of the LOINC code is a mass concentration or a substance concentration. To search for all the LOINC codes containing **calcium** whose LOINC property is not defined as a mass concentration use the query:
	`calcium SubstanceProperty:true`

SuperSystem	The super system is the text to the right of the "^" in the system field. To search for all the LOINC codes with a supersystem of **fetus** use the query:
	`supersystem:fetus`
	This query will return all terms that have a super system
	`supersystem:true`

SurveyQuestionSource	To search for all the LOINC codes containing **bowel** that also contain **Omaha** anywhere in the survey question source use the query: `bowel SurveyQuestionSource:omaha`
SurveyQuestionText	To search for all the LOINC codes containing **pain** that also contain **HIV** anywhere in the survey question text use the query: `pain SurveyQuestionText:HIV`

TimeModifier	The time modifier is the text to the right of the "^" in the TIME_ASPCT field. The following query will return all terms with time modifier of **mean**:
	`TimeModifier:mean`
	This query will return all terms that have a time modifier
	`TimeModifier:true`

Type	Allowed values:
	`1`
	`2`
	`3`
	`4`
	Numeric representation of the class type. To search for all the LOINC codes containing **glucose** with a class type of **2** use the query:

	`glucose Type:2` See the LOINC Users' Guide for definitions of each class type.

TypeName	Allowed values:
	
	`Lab`
	
	`Clinical`
	
	`Attachment`
	
	`Survey`
	
	String representation of the class type. To search for all the LOINC codes containing **glucose** with a class type of **clinical** use the query:
	
	`glucose TypeName:clinical`

UnitsAndRange	To search for all the LOINC codes containing **oxygen** that also contain **mm** anywhere in the units and range field use the query: `oxygen UnitsAndRange:mm`
UniversalLabOrders	The Universal Lab Order Codes Value Set from LOINC is a collection of the most frequent lab orders. `universallaborders:true`

ValidHL7AttachmentRequest	Allowed values:
	
	`Y`
	
	`N`
	
	A value of **Y** in this field indicates that this LOINC code can be sent by a payer as part of an HL7 attachment request for additional information. To find all LOINC codes that can be sent by a payer as part of an HL7 attachment request, type:
	
	`ValidHL7AttachmentRequest:Y`

VersionLastChanged	The LOINC version number in which this LOINC code was modified. To search for all the LOINC codes containing **adenovirus** that were last updated in version 2.56 use the query: `adenovirus VersionLastChanged:2.56`

Veterinary	These are LOINC Terms that are primarily used in the field of veterinary medicine. To search for veterinary terms use the query:
	
	`Veterinary:true`
	
	To exclude veterinary terms from your search results use the query:
	
	`-Veterinary:true`

For basic field names see the Basic LOINC Field Names section.

Advanced Part Field Names

Advanced users can use the following field names in the search string when using the RELMA Part Search tab.

Field Name	Definition
Abbreviation	The preferred abbreviation for this part. To find all the parts containing **Gie** anywhere in the preferred abbreviation use the query: `Abbreviation:Gie`

Article	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a part is linked to an article. To find all the parts containing **choriogonadotropin** that are linked to an article use the query:
	
	`choriogonadotropin Article:true`

Book	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a part is linked to a book. To find all the parts that are linked to a book use the query:
	
	`Book:true`

Citation	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a part is linked to a citation. To find all the parts that are linked to a citation use the query:
	
	`Citation:true`

ClassList	Contains a delimited list of LOINC classes that are associated with the LOINC terms that use a part. To find the parts that are used in LOINC coagulation terms use the query:
	
	`classlist:coag`
	
	HINT - To get the complete list of LOINC classes use the query
	
	`type:class`

CreatedOn	The date that the PART was originally created. The value is stored in "YYYYMMDD" format. To search for all PARTs that were created in August of 2013 use the query: `createdon:201308*`

Description	Allowed values:
	`True`
	`False`
	Indicates whether or not a part is linked to a description. To find all the parts containing **ampicillin** that are linked to a description use the query:
	`ampicillin Description:true`

DisplayName	The name of the part as displayed in the hierarchy. To find all the parts containing **oxalate** anywhere in the display name use the query: `DisplayName:oxalate`

FDA510k	Allowed values:
	`True`
	`False`
	Indicates whether or not a part is linked to an FDA 510(k) document. To find all the parts that are linked to an FDA 510(k) document use the query:
	`FDA510k:true`

Image	Allowed values:
	`True`
	`False`
	Indicates whether or not a part is linked to an image. To find all the parts containing **mandibular** that are linked to an image use the query:
	`mandibular Image:true`

MolecularWeight	Allowed values:
	`True`
	`False`
	`75.07`
	`94.97`
	Use True to find all PARTs that have an associated molecular weight. You can also search for a specific molecular weight. Examples:
	`MolecularWeight:true`
	`MolecularWeight:75.07`

OriginalForm	Allowed values: `True`

	`False`
	
	Indicates whether or not a part is linked to an original form. To find all the parts that are linked to an original form use the query:
	
	`OriginalForm:true`

PackageInsert	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a part is linked to a package insert. To find all the parts containing **mellifera** that are linked to a package insert use the query:
	
	`mellifera PackageInsert:true`

Synonyms	To search for all the parts containing **Dengue** that also contain **fever** anywhere in the synonyms field use the query: `Dengue Synonyms:fever`

TechnicalBrief	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether or not a part is linked to a technical brief. To find all the parts containing **calciferol** that are linked to a technical brief use the query:
	
	`calciferol TechnicalBrief:true`

Type	The type of part. This field can contain the following values. • Adjustment • Challenge • Class • Component • Divisors • Fragment • Method • Modifier • Property • Scale • Suffix • Super • SuperClass • System • Time To find all the parts with a type of Component use the query:

	`Type:Component`

WebContent	Allowed values:
	`True`
	`False`
	Indicates whether or not a part is linked to web content. To find all the parts containing **allergy** that are linked to web content use the query:
	`allergy WebContent:true`

For basic field names see the Basic Part Field Names section.

Advanced Answer List Field Names

Advanced users can use the following field names in the search string when using the RELMA Answer List Search tab.

Field Name	Definition
AnswerCode	The code for this answer. To find all the answers with a code of **1** use the query: `AnswerCode:1`
AnswerCodeSystem	The code system for this answer. To find all the Answer Lists with a code system of **NNDSS** use the query: `AnswerCodeSystem:NNDSS`
LOINCAnswerListOID	The LOINC OID for this answer list. To find all the Answer Lists that contain "1" in the OID use the query: `LOINCAnswerListOID:*1*`

AnswerCount	The count of answers contained in this answer list. For example, to find all the Answer Lists that have 6 answers use the query:
	`AnswerCount:6`
	Or, to find all of the lists that include 100 or more answers use the query:
	`AnswerCount:???*`

AnswerDisplayText	The text displayed for the answer. To find all the Answer Lists containing **cup** use the query: `AnswerDisplayText:cup`
AnswerScore	The score for the answer. To find all the answer lists where an answer has a score of 6 use the query: `AnswerScore:6`
AnswerSequenceNum	Sequence number for the answers in the answer list. To find all the Answer lists whose sequence includes "9" use the query: `AnswerSequenceNum:9`

AnswerString	The LOINC answer (LA) code. To find all the Answer Lists that contain the LA code "LA22482-6" use the query: `AnswerString:LA22482-6`
AnswerStringDescription	Answer string detailed description. To find all the Answer Lists whose answers contain **infant** use the query: `AnswerStringDescription:infant`
CodeSystem	Answer List code system. To find all the Answer Lists with a code system containing "I9" use the query: `CodeSystem:I9`
ExternalAnswerListOID	External Answer List OID. To find all the Answer Lists whose code system OID starts with "2.16.840.1" use the query: `ExternalAnswerListOID:2.16.840.1*`
ExternalListURL	Externally-defined answer list URL. To find all the Answer Lists whose URL is from the CDC use the query: `ExternalListURL:*.cdc.gov*`

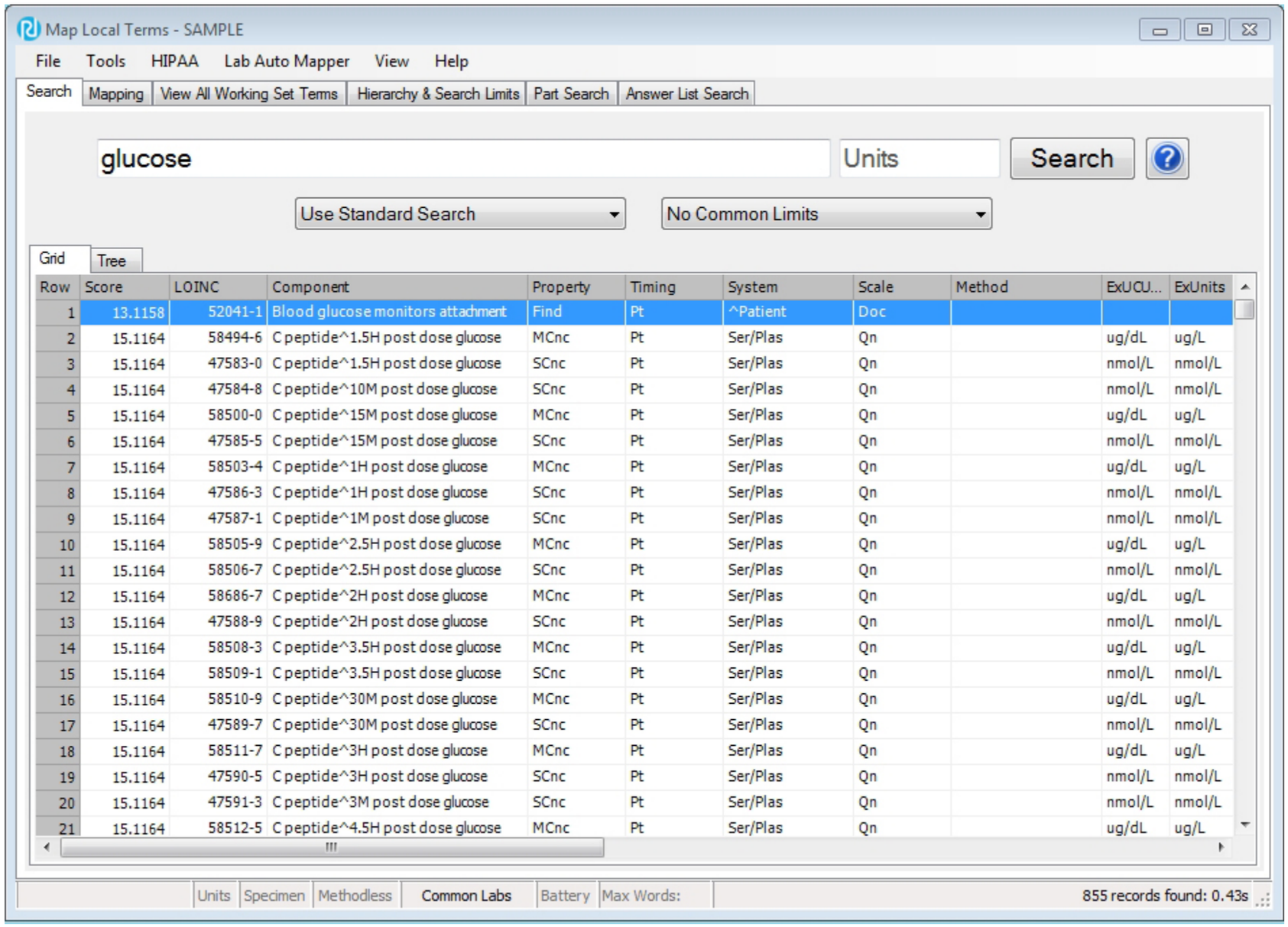
ExternallyDefined	Allowed values:
	
	`True`
	
	`False`
	
	Indicates whether the Answer List is externally-defined. To find all the externally-defined Answer Lists use the query:
	
	`ExternallyDefined:true`

LoincCount	The count of LOINCs that use this answer list. To find all the Answer Lists used by 100 or more LOINCs use the query: `LoincCount:???*`
SourceName	Answer List source name. To search for all the Answer Lists whose source name contains "national" use the query: `SourceName:national`

For basic field names see the Basic Answer List Field Names section.

'Search LOINC' Provides Streamlined LOINC Searching

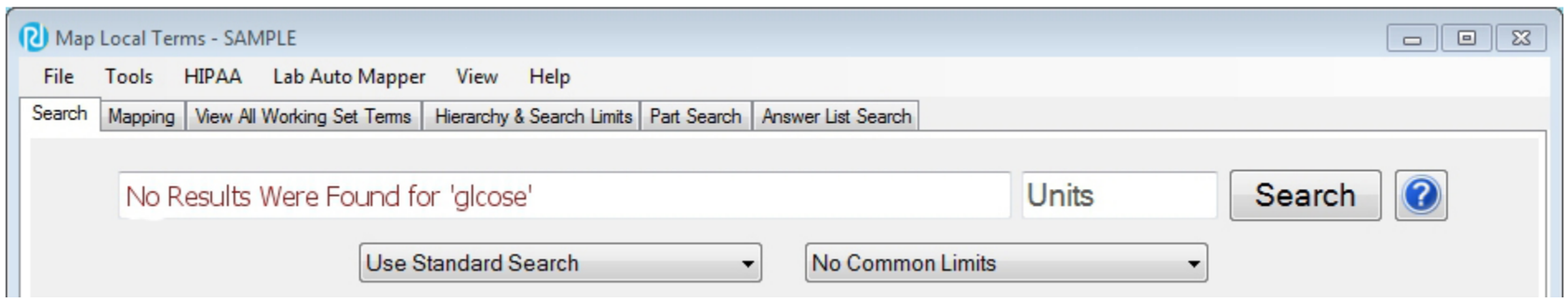
When you need to query the LOINC database for details on a particular LOINC, available panels, etc, this simplified screen provides access to all of the LOINC searching functionality within RELMA.



Search Parameters

Search string	Enter one or more keywords for your search. The search string must follow the syntax described in the Syntax section of this document. The field names listed in the LOINC Field Names section of this document can also be used in the search string.

<table>
<tr><td>Units</td><td>Applying this filter limits the results to LOINCs with properties and units that are compatible with the units specified. For example, specifying "mg/dL" could return LOINCs with the units (and compatible properties) "mg/dL", "g/L", "MCnc", etc. but would not return LOINCs with incompatible properties or units ("SCnc", "g", "Find", "%", etc.)</td></tr>
<tr><td>Filters</td><td>The "Filter" drop down list allows you to easily limit your search space to one of three pre-defined sets of common LOINC codes.
<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>No Limits</td><td>Use this option to search the full LOINC space. No additional filtering of results will be performed.</td></tr>
<tr><td>Lab Terms Only</td><td>When this option is selected, only lab specific terms will be returned from a search. This option is equvilant to adding +labtest:true to your search string</td></tr>
<tr><td>Common Labs US</td><td>When this option is selected, only terms that are part of the LOINC Top 2000+ US Observations will be returned from a search. This option is equivilant to adding +commonlabresult:true to your search string.</td></tr>
<tr><td>Common Labs SI</td><td>When this option is selected, only terms that are part of the LOINC Top 2000+ SI Observations will be returned from a search. This option is equivilant to adding +commonsilabresult:true to your search string.</td></tr>
</table></td></tr>
<tr><td>Search Type</td><td>The "Search Type" drop down list allows you choose a specific search strategy.
<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>Standard</td><td>With this option RELMA uses a straight keyword based search. With type of search you have the full power of the Lucene search engine available.</td></tr>
<tr><td>Lab Automapper</td><td>With this option RELMA will use the same search algorithm as the RELMA Lab Auto Mapper. The Auto Mapper search performs additional processing to identify matching LOINC Parts in your search string so it can narrow down the list of matching LOINCs.</td></tr>
<tr><td>Clinical Automapper</td><td>This option is similar to the Lab Automapper options but the search strategy has been optimized for clinical terms.</td></tr>
</table></td></tr>
</table>

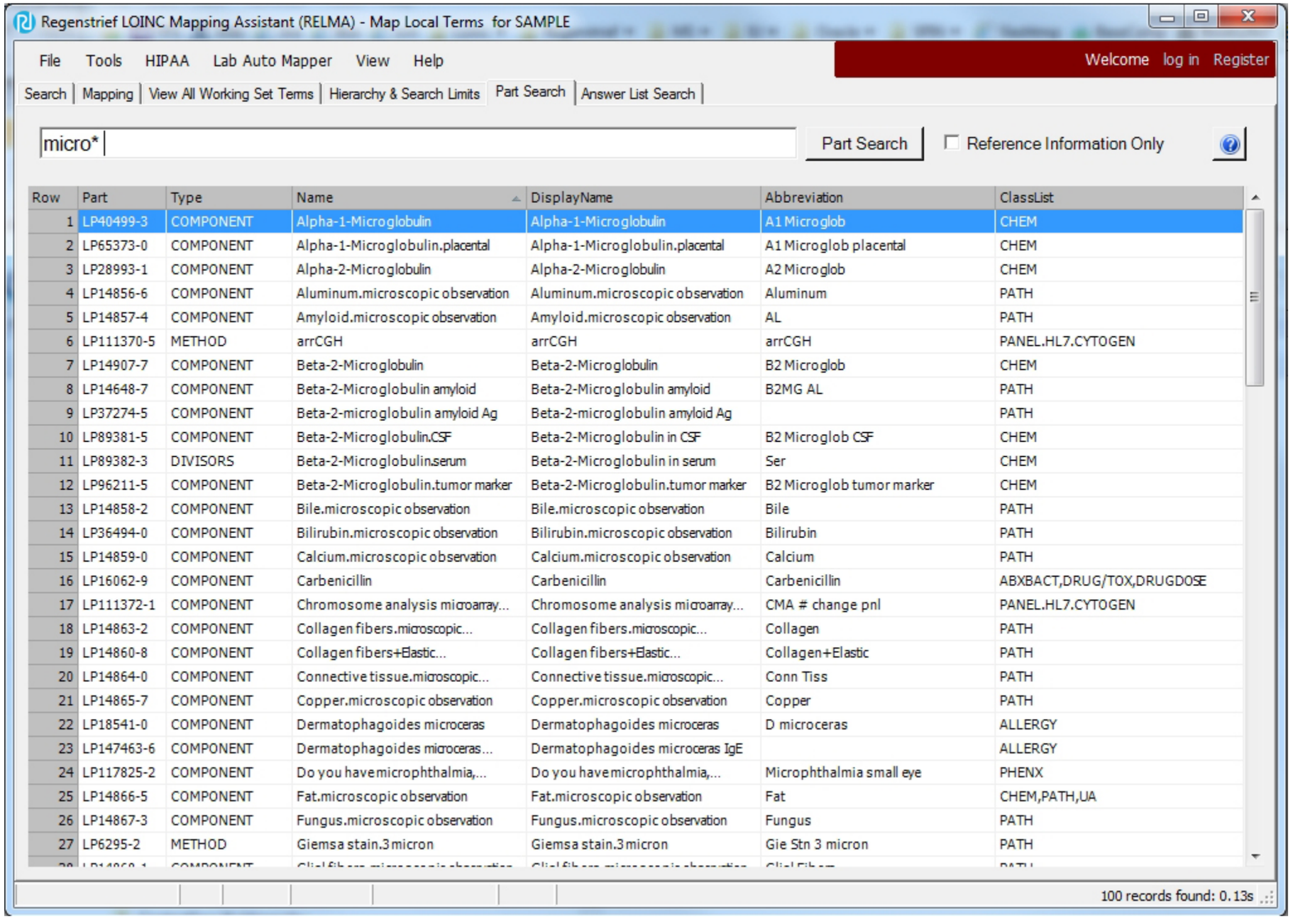


Search Without Results

In a case where your search text does not provide any results, a message notifying you that no results were found, will be provided temporarily in the search text box. The message will be in the form of "No Results Found For [your text]".

'Part Search' provides searches for LOINC Parts

The fully-specified name of LOINC is divided into six main Parts, as described in the LOINC User's Guide. The 'Part Search' screen lets you search for matching LOINC Parts.



Row	Part	Type	Name	DisplayName	Abbreviation	ClassList
1	LP40499-3	COMPONENT	Alpha-1-Microglobulin	Alpha-1-Microglobulin	A1 Microglob	CHEM
2	LP65373-0	COMPONENT	Alpha-1-Microglobulin.placental	Alpha-1-Microglobulin.placental	A1 Microglob placental	CHEM
3	LP28993-1	COMPONENT	Alpha-2-Microglobulin	Alpha-2-Microglobulin	A2 Microglob	CHEM
4	LP14856-6	COMPONENT	Aluminum.microscopic observation	Aluminum.microscopic observation	Aluminum	PATH
5	LP14857-4	COMPONENT	Amyloid.microscopic observation	Amyloid.microscopic observation	AL	PATH
6	LP111370-5	METHOD	arrCGH	arrCGH	arrCGH	PANEL.HL7.CYTOGEN
7	LP14907-7	COMPONENT	Beta-2-Microglobulin	Beta-2-Microglobulin	B2 Microglob	CHEM
8	LP14648-7	COMPONENT	Beta-2-Microglobulin amyloid	Beta-2-Microglobulin amyloid	B2MG AL	PATH
9	LP37274-5	COMPONENT	Beta-2-microglobulin amyloid Ag	Beta-2-microglobulin amyloid Ag		PATH
10	LP89381-5	COMPONENT	Beta-2-Microglobulin.CSF	Beta-2-Microglobulin in CSF	B2 Microglob CSF	CHEM
11	LP89382-3	DIVISORS	Beta-2-Microglobulin.serum	Beta-2-Microglobulin in serum	Ser	CHEM
12	LP96211-5	COMPONENT	Beta-2-Microglobulin.tumor marker	Beta-2-Microglobulin.tumor marker	B2 Microglob tumor marker	CHEM
13	LP14858-2	COMPONENT	Bile.microscopic observation	Bile.microscopic observation	Bile	PATH
14	LP36494-0	COMPONENT	Bilirubin.microscopic observation	Bilirubin.microscopic observation	Bilirubin	PATH
15	LP14859-0	COMPONENT	Calcium.microscopic observation	Calcium.microscopic observation	Calcium	PATH
16	LP16062-9	COMPONENT	Carbenicillin	Carbenicillin	Carbenicillin	ABXBACT,DRUG/TOX,DRUGDOSE
17	LP111372-1	COMPONENT	Chromosome analysis microarray...	Chromosome analysis microarray...	CMA # change pnl	PANEL.HL7.CYTOGEN
18	LP14863-2	COMPONENT	Collagen fibers.microscopic...	Collagen fibers.microscopic...	Collagen	PATH
19	LP14860-8	COMPONENT	Collagen fibers+Elastic...	Collagen fibers+Elastic...	Collagen+Elastic	PATH
20	LP14864-0	COMPONENT	Connective tissue.microscopic...	Connective tissue.microscopic...	Conn Tiss	PATH
21	LP14865-7	COMPONENT	Copper.microscopic observation	Copper.microscopic observation	Copper	PATH
22	LP18541-0	COMPONENT	Dermatophagoides microceras	Dermatophagoides microceras	D microceras	ALLERGY
23	LP147463-6	COMPONENT	Dermatophagoides microceras...	Dermatophagoides microceras IgE		ALLERGY
24	LP117825-2	COMPONENT	Do you have microphthalmia,...	Do you have microphthalmia,...	Microphthalmia small eye	PHENX
25	LP14866-5	COMPONENT	Fat.microscopic observation	Fat.microscopic observation	Fat	CHEM,PATH,UA
26	LP14867-3	COMPONENT	Fungus.microscopic observation	Fungus.microscopic observation	Fungus	PATH
27	LP6295-2	METHOD	Giemsa stain.3 micron	Giemsa stain.3 micron	Gie Stn 3 micron	PATH

Part Search results include the Part number, the Part type (Component, Method, etc.), the Part name/concept, the Part display name (an expanded version of the name/concept), and the preferred abbreviation for that Part.

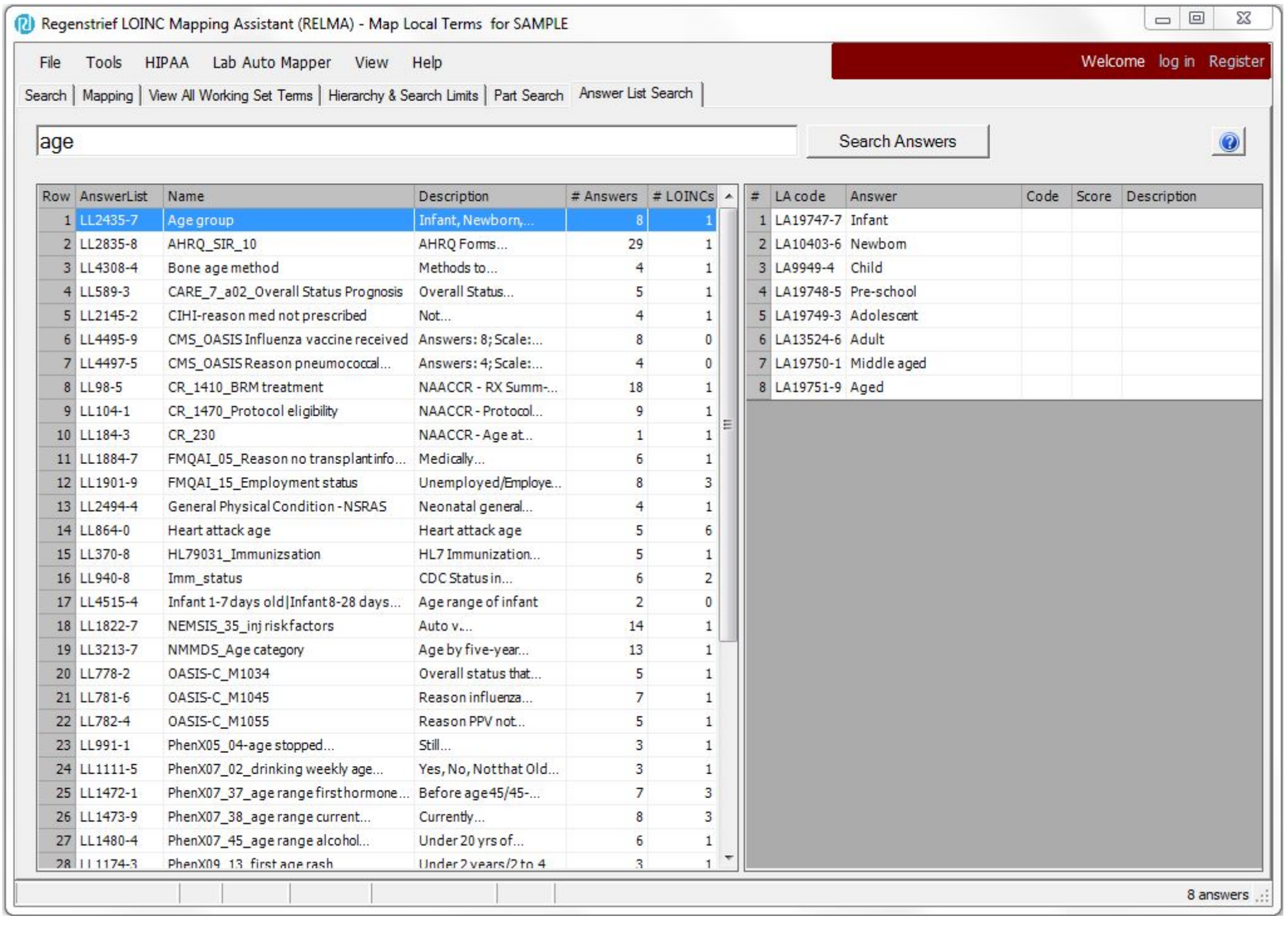
The search string must follow the syntax described in the Syntax section of this document. The field names listed in the Part Field Names section of this document can also be used in the search string.

The Reference Information button, when checked, enforces that search results must contain a reference information Description.

Additional description and discussion of LOINC Parts is provided in the LOINC Users' Guide.

'Answer List Search' provides searches for LOINC Answer Lists

The 'Answer List Search' screen lets you search for matching LOINC Answer Lists.



Answer List Search results on the left pane include the Answer List number, the Answer List name, the Answer List description, the number of answers displayed for the list, and the number of LOINCs that use this Answer List. If one and only one Answer List is selected in the left pane, then the right pane displays the text of each answer and the code for that answer.

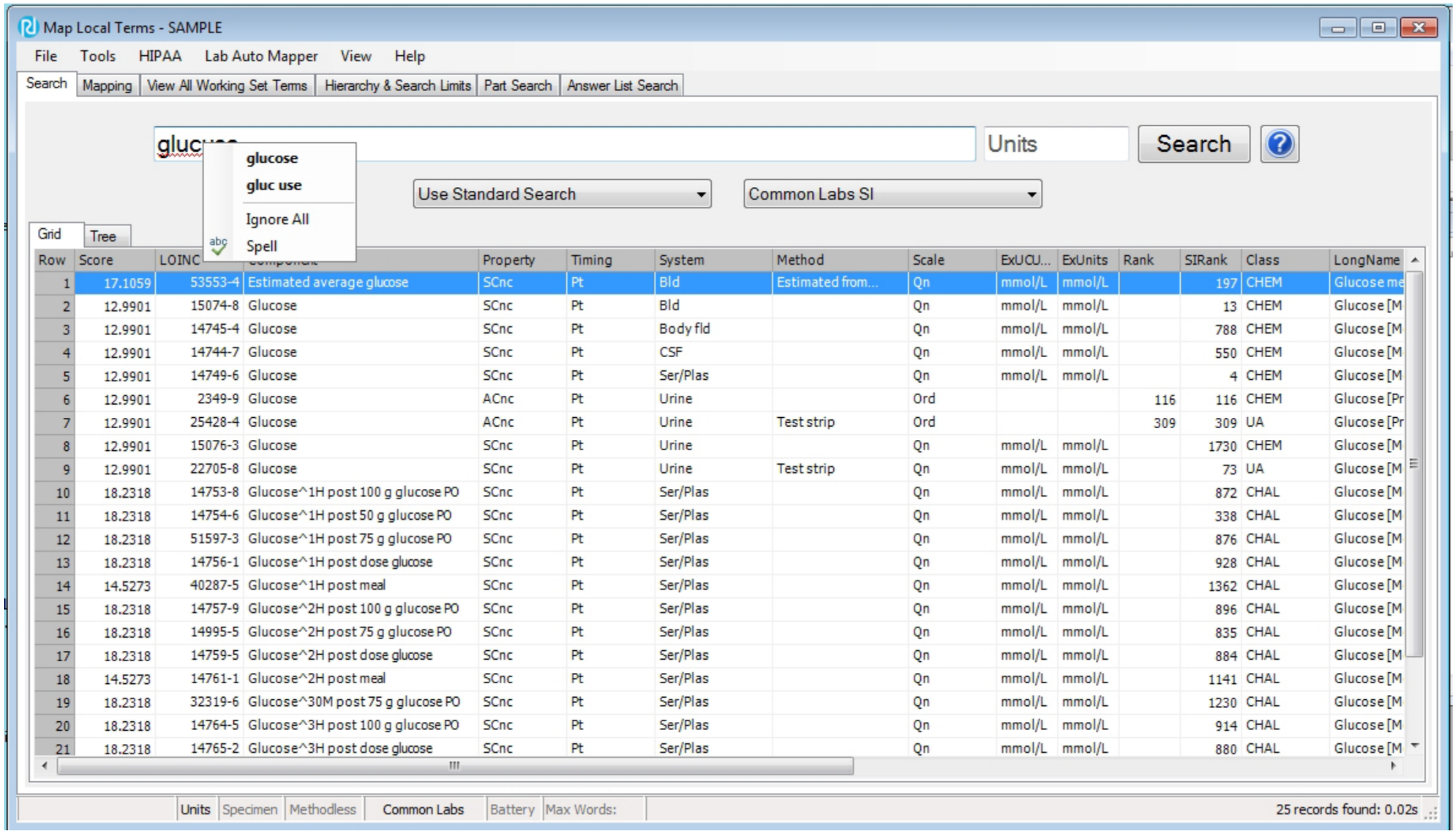
Double-clicking on an Answer List Search result (in the left pane) brings up the details for that Answer List.

The search string must follow the syntax described in the Syntax section of this document. The field names listed in the Answer List Field Names section of this document can also be used in the search string.

Additional description and discussion of LOINC Answer Lists is provided in the LOINC Users' Guide.

Keyword Spell Check

While entering keywords, you might notice some keywords flagged as unknown. Words that are unknown to RELMA are displayed with a "squiggle" underline. To review suggested keywords, right-click the word and select any provided term.



Please note if a Preferred Language Variant is in use, the spell check function will not highlight any unknown concepts for any language.

Import Local Terms from a Delimited File or Excel Spreadsheet

Using a Delimited File

One method to import your local codes into the RELMA program involves the creation of a flat, delimited text file. The file should be delimited using the vertical bar, tab, comma, or some other character that is not contained in your code or description fields. You may enclose fields using double quotes "" to include text delimiters in your code or description fields. The following information may be included in the file:

Using an Excel Spreadsheet

When importing a file with the extension of .xls or .xlsx, RELMA will recognize the file, surround all cell values with the text qualifier of " and disable the that option within the import form.

Details

Field (Column)	Requirement	Description
Battery Code	Optional	The battery code and description fields are required when your test codes are re-used for different specimens or methods - i.e. use of same code for PO2 whether your battery is ABG (arterial blood gas) or VBG (venous blood gas). Reported in HL7 v2.x OBR-4.
Battery Description	Optional	
Battery Code System	Optional	Name of the coding system associated with this code.
Test Code	Required	Reported in HL7 v2 OBX-3.1.
Test Description	Required	Reported in HL7 v2 OBX-3.2.
Test Code System	Optional	Name of the coding system associated with this code. Reported in HL7 v2 OBX-3.3.
Units	Optional	Reported in HL7 v2 OBX-6.
Lab Section	Optional	The lab section often gives hints about the specimen, when the specimen is not explicitly stated in the test description.
Tag With	Optional	Assigns a tag to the local term using the value(s) contained in this field (see more below).
LOINC Code	Optional	Please provide if this test was previously mapped.
Comments	Optional	Please provide any comments.
Sample Data	Optional	Please provide sample answers and results. Reported in HL7 v2 OBX-5.
Abnormal Flag	Optional	Reported in HL7 v2 OBX-8.
Normal Range	Optional	Reported in HL7 v2 OBX-7.
Related Code	Optional	A code from an external coding system like CPT4 or ICD9.
Related Code System	Optional	A code system identifier that specifies where the related code came from (e.g. "C4" for CPT4; "I9" for ICD9).
Related Code	Optional	A description of the external code.

Description		
Institution List	Optional	A list of institutions that use this local term.
Sort Order	Optional	An optional field that will allow special sorting within RELMA on the "Show All" screen.
Patient Count	Optional	Number of patients in system associated with the local term.
Observation Count	Optional	Number of recorded observations involving the local term.
Earliest Observation	Optional	Timestamp or date of earliest recorded observation for the local term.
Most Recent Observation	Optional	Timestamp or date of the most recent recorded observation for the local term.
Minimum Value	Optional	Minimum value stored for the local term.
Maximum Value	Optional	Maximum value stored for the local term.
Average Value	Optional	Average value stored for the local term.

For some laboratories, the test code and test description may contain enough details to perform the mapping. In other facilities, there is a close relationship between test batteries and individual tests that may not be apparent if only the test information is used. For example the OBR (battery) that says "Arterial blood gases" and the one that says "Venous blood gas" may share a common OBX code named "pO2". In such circumstances you need to consider the OBR (battery code) as well as the OBX code to map to the correct LOINC code. If the battery named ABG had a test code called "Art PO2" and the battery named VGB had a test code called "Ven PO2", you do not have to consider the battery test code to decide how to map the test code. You can also look at your HL7 messages or the database that relates battery to test codes to decide whether to include the OBR code in the import file.

In addition to your local terms, you can also import sample data values with units, abnormal flags, and normal ranges. RELMA will store these samples and display them in a dropdown box on the mapping screen. When you import local terms with sample data, RELMA expects each record to contain the complete code information.

RELMA also allows you to import other information like patient counts and minimum values from your local database. This information will be displayed on the "Show All" screen and the local term details dialog. This information is optional and exists strictly to assist the user in having access to information that may assist him or her in mapping the local terms to LOINC.

The following is an example showing the information that should be included in the import. See next page for a delimited text example.

Battery code	**Battery Description**	**Test Code**	**Test Description**	**Units**
		EOSAB	ABSOLUTE EOSINOPHILS BLD	K/CUMM
		EOSJT	EOS - JOINT FLD	%
		PURKRS	PURKINJE CELL AB SER	
		UDSB	BZDP	
		UDSBG	BENZOYLEC	
		UDSO	OPIATES	
		UDST	TCA	

		UTP4R	TOTAL PROTEIN UA	MG/24 HR
		UTPR	TOTAL PROTEIN UA	MG/DL
		WBCT	WHITE BLOOD CT	K/CUMM
AFBCL	ACID FAST CULT	CULT	CULTURE	
ANAC	ANAEROBIC CULTURE	CULT	CULTURE	
BGART	BLD GAS ART - RT	FIO2	O2 INSPIRED	
BGART	BLD GAS ART - RT	HCO3	BICARBONATE	MMOL/L
BGART	BLD GAS ART - RT	O2S	O2 SATURATION	%
BGART	BLD GAS ART - RT	PCO2	PCO2	MMHG
BGART	BLD GAS ART - RT	PH	PH	
BGART	BLD GAS ART - RT	PO2	PO2	MMHG
BLC	BLOOD CULTURE	CULT	CULTURE	
BLDAFB	ACID FAST CULT,BLD	CULT	CULTURE	
CBCDF	CBC+DIFF	HCT	HEMATOCRIT	%
CBCDF	CBC+DIFF	HGB	HEMOGLOBIN	G/DL
CBCDF	CBC+DIFF	LYMPH	LYMPHOCYTE	%
CBCDF	CBC+DIFF	MCH	MCH	PG
CBCDF	CBC+DIFF	MCHC	MCHC	G/DL
CBCDF	CBC+DIFF	MCV	MCV	FL
CBCDF	CBC+DIFF	META	METAMYELOCYTE	%
CBCDF	CBC+DIFF	MMYEL	MYELOCYTE	%
CBCDF	CBC+DIFF	MONO	MONOCYTE	%
CBCDF	CBC+DIFF	MPV	MPV	FL
CBCDF	CBC+DIFF	PLT	PLATELET COUNT	K/CUMM
CTFLD	CELL COUNT BF	APPRB	BODY FLD-APPR	
CTFLD	CELL COUNT BF	BASOB	BODY FLD-BASO	%
CTFLD	CELL COUNT BF	COLB	BODY FLD-COLOR	
CTFLD	CELL COUNT BF	EOSB	BODY FLD-EOS	%
CTFLD	CELL COUNT BF	LYMB	BODY FLD-LYMPHS	%
CTFLD	CELL COUNT BF	MACRB	BODY FLD-MACRPHG	%
EBVSOT	EPSTEIN-BARR SCREEN	EBNA	NUCLEAR AG ANTIBODY	TITER
EBVSOT	EPSTEIN-BARR SCREEN	VCAG	VIRAL CAPSID AG/IGG	TITER
EBVSOT	EPSTEIN-BARR	VCAM	AG/IGM-VIRAL CAPSID	TITER

	SCREEN			
GCMASS	GCMASS CONFIRM	AMPHCUT	AMPHET CUTOFF	NG/ML
GCMASS	GCMASS CONFIRM	AMPHET	AMPHET	NG/ML
GCMASS	GCMASS CONFIRM	MNACUT	MONOACETMORP CUTOFF	NG/ML
GCMASS	GCMASS CONFIRM	MONOAC	MONOACETMORP	NG/ML
GTT3H	GLUCOSE TOLERANCE 3H	GT0	GLUCOSE FASTING	MG/DL
GTT3H	GLUCOSE TOLERANCE 3H	GT1	GLUCOSE 1H	MG/DL
GTT3H	GLUCOSE TOLERANCE 3H	GT2	GLUCOSE 2H	MG/DL
GTT3H	GLUCOSE TOLERANCE 3H	GT3	GLUCOSE 3H	MG/DL
HIAA5	5HIA UA 24H	DUR	DURATION OF COLLECTION	HRS
HIAA5	5HIA UA 24H	HIAAR	5HIAA	MG/24H R
HIAA5	5HIA UA 24H	UVOL	VOLUME UA	ML
THC	THROAT CULTURE	CULT	CULTURE	
UAMCP	UA MICROSCOPIC	BACT	URINE-BACTERIA	/HPF
UAMCP	UA MICROSCOPIC	COCRY	CRYSTALS-CA OXAL	/HPF
UAMCP	UA MICROSCOPIC	EPIU	URINE-EPI CELL	/HPF
UAMCP	UA MICROSCOPIC	HYAL	CASTS-HYALINE	/LPF
UAMCP	UA MICROSCOPIC	MUC	URINE-MUCUS	/LPF
UAMCP	UA MICROSCOPIC	UAMRPH	URATE CRYSTALS-AMORPH	/HPF
ZZ01	SUSCEPTIBILITY	AK	AMIKACIN	
ZZ01	SUSCEPTIBILITY	AM	AMPICILLIN	
ZZ01	SUSCEPTIBILITY	AMC	AMOXICILLIN/CLAVULANIC A	
ZZ01	SUSCEPTIBILITY	AMS	AMPICILLIN/SULBACTAM	
ZZ01	SUSCEPTIBILITY	AZM	AZITHROMYCIN	
ZZ01	SUSCEPTIBILITY	MTYP	METHOD	

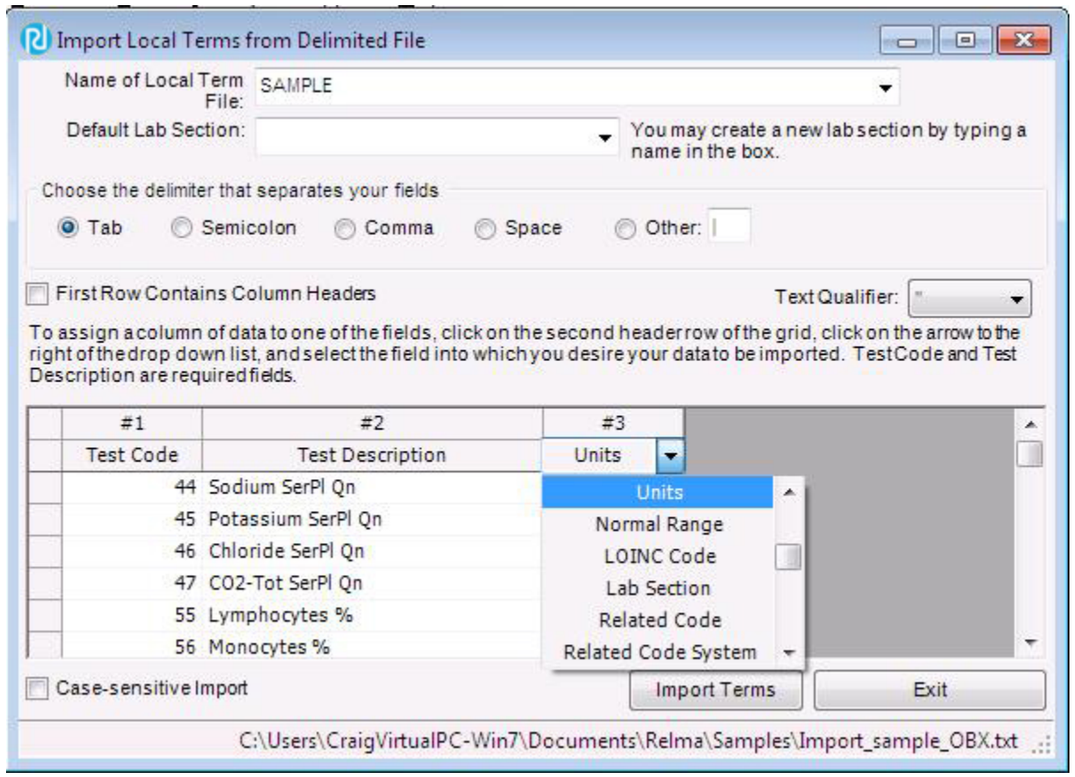
This is the same example in delimited form using the vertical bar character.

```
||EOSAB|ABSOLUTE EOSINOPHILS BLD|K/CUMM
||EOSJT|EOS - JOINT FLD|%
||PURKRS|PURKINJE CELL AB SER|
||UDSB|BZDP|
||UDSBG|BENZOYLEC|
||UDSO|OPIATES|
||UDST|TCA|
```

```
||UTP4R|TOTAL  PROTEIN  UA|MG/24  HR
||UTPR|TOTAL  PROTEIN  UA|MG/DL
||WBCT|WHITE  BLOOD  CT|K/CUMM
AFBCL|ACID  FAST  CULT|CULT|CULTURE|
ANAC|ANAEROBIC  CULTURE|CULT|CULTURE|
BGART|BLD  GAS  ART  -  RT|FIO2|O2  INSPIRED|
BGART|BLD  GAS  ART  -  RT|HCO3|BICARBONATE|MMOL/L
BGART|BLD  GAS  ART  -  RT|O2S|O2  SATURATION|%
BGART|BLD  GAS  ART  -  RT|PCO2|PCO2|MMHG
BGART|BLD  GAS  ART  -  RT|PH|PH|
BGART|BLD  GAS  ART  -  RT|PO2|PO2|MMHG
BLC|BLOOD  CULTURE|CULT|CULTURE|
BLDAFB|ACID  FAST  CULT,BLD|CULT|CULTURE|
CBCDF|CBC+DIFF|HCT|HEMATOCRIT|%
CBCDF|CBC+DIFF|HGB|HEMOGLOBIN|G/DL
CBCDF|CBC+DIFF|LYMPH|LYMPHOCYTE|%
CBCDF|CBC+DIFF|MCH|MCH|PG
CBCDF|CBC+DIFF|MCHC|MCHC|G/DL
CBCDF|CBC+DIFF|MCV|MCV|FL
CBCDF|CBC+DIFF|META|METAMYELOCYTE|%
CBCDF|CBC+DIFF|MMYEL|MYELOCYTE|%
CBCDF|CBC+DIFF|MONO|MONOCYTE|%
CBCDF|CBC+DIFF|MPV|MPV|FL
CBCDF|CBC+DIFF|PLT|PLATELET   COUNT|K/CUMM
CTFLD|CELL  COUNT  BF|APPRB|BODY  FLD-APPR|
CTFLD|CELL  COUNT  BF|BASOB|BODY  FLD-BASO|%
CTFLD|CELL  COUNT  BF|COLB|BODY  FLD-COLOR|
CTFLD|CELL  COUNT  BF|EOSB|BODY  FLD-EOS|%
CTFLD|CELL  COUNT  BF|LYMB|BODY  FLD-LYMPHS|%
CTFLD|CELL  COUNT  BF|MACRB|BODY  FLD-MACRPHG|%
EBVSOT|EPSTEIN-BARR  SCREEN|EBNA|NUCLEAR  AG ANTIBODY|TITER
EBVSOT|EPSTEIN-BARR  SCREEN|VCAG|VIRAL  CAPSID AG/IGG|TITER
EBVSOT|EPSTEIN-BARR  SCREEN|VCAM|AG/IGM-VIRAL  CAPSID|TITER
GCMASS|GCMASS  CONFIRM|AMPHCUT|AMPHET  CUTOFF|NG/ML
GCMASS|GCMASS  CONFIRM|AMPHET|AMPHET|NG/ML
GCMASS|GCMASS  CONFIRM|MNACUT|MONOACETMORP   CUTOFF|NG/ML
GCMASS|GCMASS  CONFIRM|MONOAC|MONOACETMORP|NG/ML
GTT3H|GLUCOSE  TOLERANCE  3H|GT0|GLUCOSE  FASTING|MG/DL
GTT3H|GLUCOSE  TOLERANCE  3H|GT1|GLUCOSE  1H|MG/DL
GTT3H|GLUCOSE  TOLERANCE  3H|GT2|GLUCOSE  2H|MG/DL
GTT3H|GLUCOSE  TOLERANCE  3H|GT3|GLUCOSE  3H|MG/DL
HIAA5|5HIA  UA 24H|DUR|DURATION  OF COLLECTION|HRS
HIAA5|5HIA  UA 24H|HIAAR|5HIAA|MG/24HR
HIAA5|5HIA  UA 24H|UVOL|VOLUME  UA|ML
THC|THROAT  CULTURE|CULT|CULTURE|
UAMCP|UA  MICROSCOPIC|BACT|URINE-BACTERIA|/HPF
UAMCP|UA  MICROSCOPIC|COCRY|CRYSTALS-CA   OXAL|/HPF
UAMCP|UA  MICROSCOPIC|EPIU|URINE-EPI   CELL|/HPF
UAMCP|UA  MICROSCOPIC|HYAL|CASTS-HYALINE|/LPF
UAMCP|UA  MICROSCOPIC|MUC|URINE-MUCUS|/LPF
UAMCP|UA  MICROSCOPIC|UAMRPH|URATE   CRYSTALS-AMORPH|/HPF
ZZ01|SUSCEPTIBILITY|AK|AMIKACIN|
ZZ01|SUSCEPTIBILITY|AM|AMPICILLIN|
ZZ01|SUSCEPTIBILITY|AMC|AMOXICILLIN/CLAVULANIC    A|
ZZ01|SUSCEPTIBILITY|AMS|AMPICILLIN/SULBACTAM|
```

```
ZZ01|SUSCEPTIBILITY|AZM|AZITHROMYCIN|
ZZ01|SUSCEPTIBILITY|MTYP|METHOD|
```

To initiate the import program option, click on the "Import Local Terms" button or select File > Import Local Terms from Delimited File or Excel Spreadhsheet from the menu on either the welcome or mapping screens. A Windows Explorer window will open, prompting you to select the file to import. Locate the file you created, highlight it, and then click the [Open] button. A screen similar to the one shown in the figure below should appear.



The first part of the screen is a place for you to enter the name of the Local Term File and a default lab section for the group of local codes being imported. The Local Term File name is required and is simply a grouping mechanism provided to allow you to work on a subset of all the records stored in the LMOF database file. If you enter a new name into the text box, you will create a Local Term File. If you enter a Local Term File name that already exists in the database, you will append the imported terms to the existing group of local terms. A default lab section allows you to categorize those imported local codes for individualized lab sections that have not been specified. For example, you may wish to import a group of codes that include lab sections like HEMATOLOGY, UROLOGY and SEROLOGY, but for those codes that do not have a lab section defined you wish to assign the more generic CHEMISTRY.

If you are importing with a delimited text file, the frame in the center of the screen allows you to select the delimiter. Once you select the proper delimiter, you should see the first 250 records of your data displayed in the grid change to reflect your selection. If you are importing using an Excel Spreadhseet, the grid should automatically display the first 250 records of your data. The top row of the grid displays the physical field number from your file based on the currently selected delimiter.

The task now is to assign the fields in your file to the proper field in the LMOF database. The LMOF allows you to import data into the following fields. These are:

- Battery Code
- Battery Description
- Battery Code System

- Test Code
- Test Description
- Test Code System
- Units
- Lab Section
- LOINC Code
- Comments
- Sample Data
- Abnormal Flag
- Normal Range
- Related Code
- Related Code System
- Related Code Description
- Institution List
- Sort Order
- Patient Count
- Observation Count
- Earliest Observation
- Most Recent Observation
- Minimum Value
- Maximum Value
- Average Value

To assign a column of data to one of the eight fields, click on the second header row of the grid, click on the arrow to the right of the dropdown list, and select the field into which you desire your data to be imported. In the figure above, the user has assigned column #1 from the input file to the Test Code field. Likewise, column #2 from the input file is assigned to the Test Description field and column #3 is assigned to the Units field.

It is possible to join multiple fields together from the input file into a single field in the LMOF. This is accomplished by assigning the same field name to more than one column of data. When the data is imported, the columns are concatenated together, separated with a SPACE character. The columns are concatenated from left to right across the screen. You can control the order of this by rearranging the columns to suit your needs. To move a column, click and hold on the column header. When you see a thick vertical bar appear, you can drag the column to a new position.

Another option that exists in the list of field mappings is a feature named **"Tag With"**. Instead of mapping a specified field to the pre-defined LMOF database field, you may use the value(s) contained in this field as a logical grouping (e.g., workflow management, labels).

Note: *Fields that are delimited with multiple values will result in multiple tags. For instance, if a file is comma delimited and the specified field contains "high, lab, Jane", separate tags of high, lab, and Jane will be created and assigned to this local term.*

Directly below the grid on the left side of the screen is a checkbox labeled "Case Sensitive". This checkbox enables RELMA to determine whether or not you wish to import case sensitive data, meaning data that are interpreted differently based on upper and lower case combinations of letters (e.g., apple, APPLE, Apple). If this box is checked, several records containing the same text but with different combinations of upper and lower case letters can be imported into your Local Term File. For example, records containing test codes of "INPC76", "inpc76", and "INpc76" would all be imported as individual records. If this checkbox is unchecked, only the first of the codes will be imported.

If you have followed the steps outlined above, you are now ready to import your data. Click the button labeled [Import Terms] and the process will begin. Please note that any data longer than the maximum field size will automatically be truncated. As your records are imported, the status bar at the bottom of the screen will display a progress message. Once the import is complete, a message will be displayed showing the total record count, imported record count, duplicate record count and the number of records skipped due to improper data. Additionally, you will see at the bottom of the screen stating "Import complete. X records added to the [Name of Local Term File] Local Term File". Upon closing the results message, the process to identify unrecognizable concepts will begin. For details

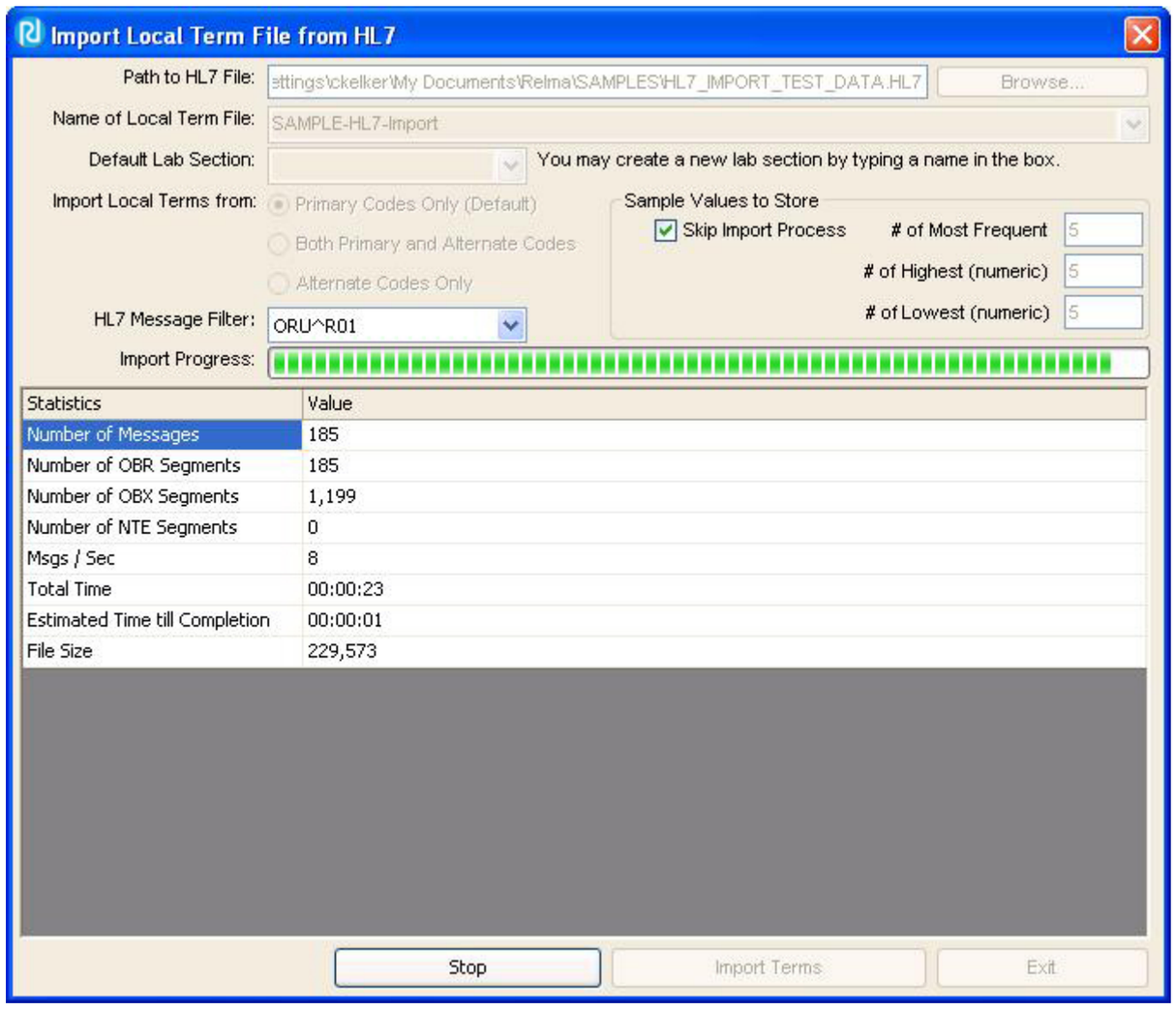
of this process, please refer to the Pre-Mapping Activities section of this document. Click the [Exit] button to return to the welcome screen.

Import Local Terms into RELMA from an HL7 File

Another method for importing your local codes into RELMA involves creating one or more files which contain HL7 messages. RELMA can scan a version 2.x HL7 file for OBR and OBX codes and create local term file records for each unique pair that it finds in your file(s). RELMA can also store the sample data, units, abnormal flags, and normal ranges if they are provided in the messages. At minimum, in order for a local term file record to be created, your HL7 messages will need to provide OBX codes and descriptions.

To resolve local term information, RELMA scans your HL7 file(s) for MSH segments. After it finds an MSH segment, RELMA then looks for the OBR and OBX segments. If the OBR and OBX segments are found, RELMA attempts to read data stored in the OBR-4 and OBX-3. OBX segments are also examined for sample data, units, normal ranges, and abnormal flags in the OBX-5, OBX-6, OBX-7, and OBX-8 segments, respectively.

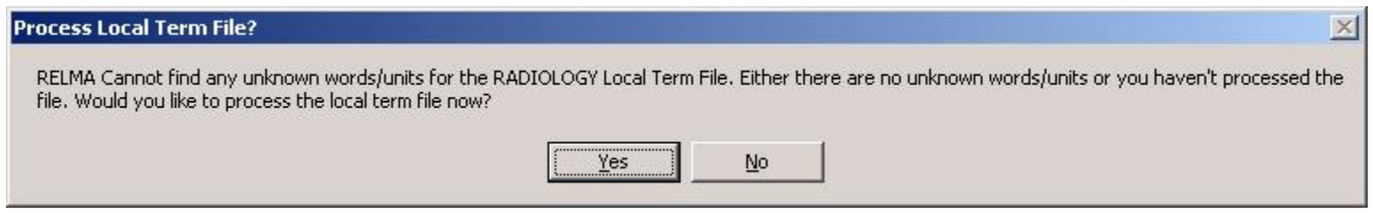
Users may choose to import the primary, alternate, or both code sets found in the OBR-4 and OBX-3 segments. Null values in the OBX-3 will be ignored. Additionally, users can filter the import process by HL7 Message type by focusing on the important messages. In scenarios where sample data would not be beneficial, the user can forgo the Import Process for sample data by clicking the "Skip Import Process" under the Sample Values section.



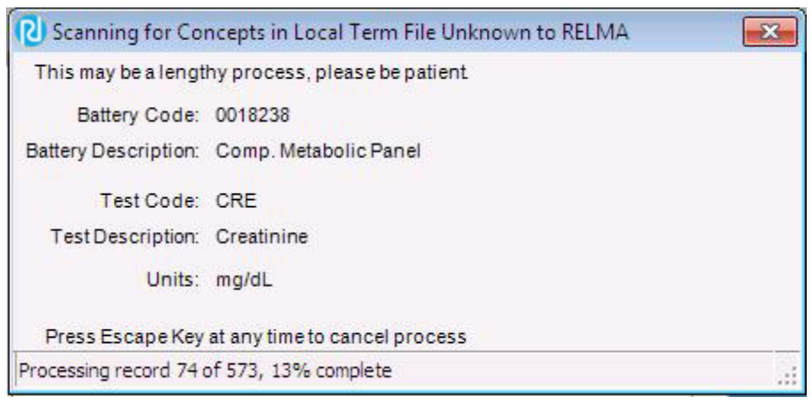
Pre-Mapping Activities

Check the Test Names in Local Term File

Prior to mapping, you may wish to locate the words and units in your local term descriptions that are not known to the RELMA program (i.e. they are not part of the LOINC vocabulary). This is accomplished by choosing Tools > Check the Test Names in Local Term Submission on the dropdown menu on either the welcome or mapping screen. If this is the first time running the RELMA program or you have not previously scanned the local term file in use, you will see a message similar to the one shown in the figure below. Otherwise, choosing this menu option will bring you to the Review Unknown Concepts screen.



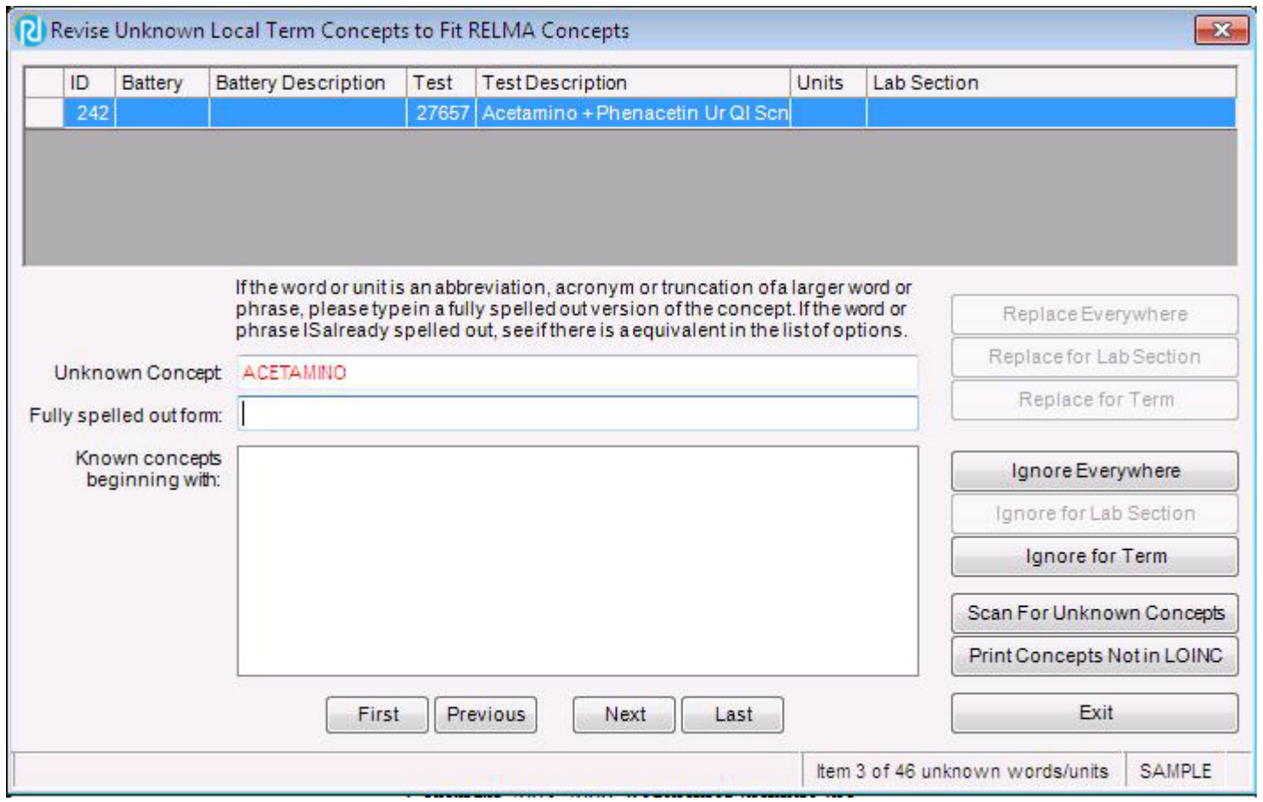
Clicking "Yes" will begin the scan process. During the scan, you should see a screen similar to the figure below.



During the scan, RELMA will examine both the battery descriptions and the test descriptions of each of the records in the current Local Term File. The text of the record currently being processed is displayed in the center of the dialog box and the program's progress is displayed in the status bar at the bottom of the screen.

In the example, the program is currently processing the 74th record out of 573 total records in the Local Term File. As noted above the status bar, you can interrupt the processing of records by pressing the ESC key on your keyboard. However, you should run the process to completion before proceeding to the next step. If you terminate the process before completion, it will return to the beginning when the process is restarted.

After the program has completed its search for unknown words and units, the program will take the user to the screen shown below.



ReviewingUnknownConcepts

Once the scan is complete, you are given the opportunity to replace your abbreviations and institution-specific terminology with words that the RELMA program can use to assist you in the mapping process. This word replacement process is very similar to running the spell checker in a word processor or other program.

In the top area of the screen is a grid. The grid will be filled with those terms from the current Local Term File that contains the current unknown word and units. In the example shown above, the program has found and identified the unknown string "ACETAMINO". This string appears in only one record in the Local Term File so we see one row in the grid at the top of the screen.

In the center of the screen, the unknown word is labeled. Just below the unknown word is a text box where you can type in a replacement word. As you begin to type the correct word in the text box, the program will try to assist you by displaying a list of words from the LOINC lexicon that match the characters that you have typed. When you see the correct word in the list, click it with the mouse, and it will be placed in the replacement text box (you can also finish typing in the entire word).

Now that you have the replacement word, you have to tell the program how you want to make the replacement(s). On the lower right side of the screen is a series of buttons: The first three provide options for making a word translation and the second three buttons provide options to tell RELMA to ignore the string.

To eliminate redundant work, there are three options for replacing words:

1. The [Replace Everywhere] button allows for the unknown word to be translated into your replacement word everywhere it occurs in the current Local Term File.

2. The [Replace for Lab Section] button is only available if you select a record from the grid at the top of the screen that has been assigned to a Lab Section. In these instances, the translation will be made for all other records in the Local Term File that also belong to that Lab Section. Using this option, you can instruct RELMA to translate the same unknown word into different LOINC words in

different lab groups. For example, the string "ag" might be translated to "silver" in one lab section and "antigen" in another lab section.

3. A third level of granularity is available with the [Replace for Term] button. With this option you assign word translations on a record-by-record basis. Simply select the record for which the translation is appropriate and then click the button. Records can be selected using the standard Windows selection keys strokes.

The three "Ignore" buttons are used in those instances where a word should be ignored or for which there is no replacement. For example, the word "CLERICAL" is probably a word that would not be helpful to RELMA when looking for LOINC terms and can be safely ignored. The "Ignore" buttons are used exactly like the replace buttons and each ignore option has the same scope as its "Replace" counterpart.

At the bottom of the screen are buttons for traversing the unknown words in the current Local Term File. The button labeled [First] will move you to the first unknown word in the Local Term File. Likewise, the [Last] button will take you to the last unknown word in the Local Term File. The [Previous] and [Next] buttons move you through the list one word at a time.

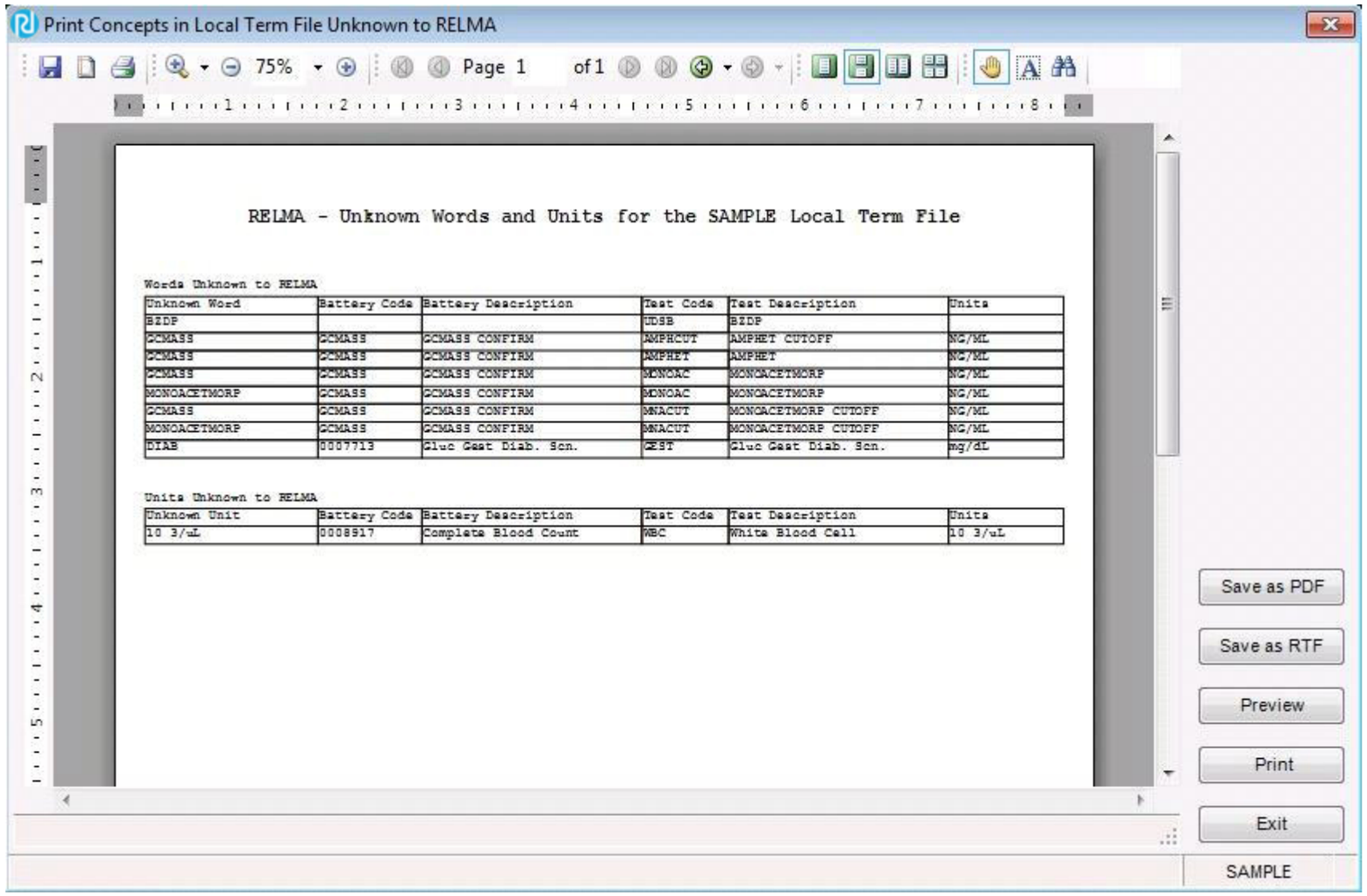
Printing Unknown Concepts

After all of the unknown words and units have been identified, those that were not replaced or ignored can be displayed and printed using the [Print Concepts Not in LOINC] button. From this screen, shown in the figure below, you can view, zoom and print the results of a word search.

When the screen first appears, the main viewing area will be blank. Clicking on the [Preview] button will cause the search results to be summarized and formatted for display and printing.

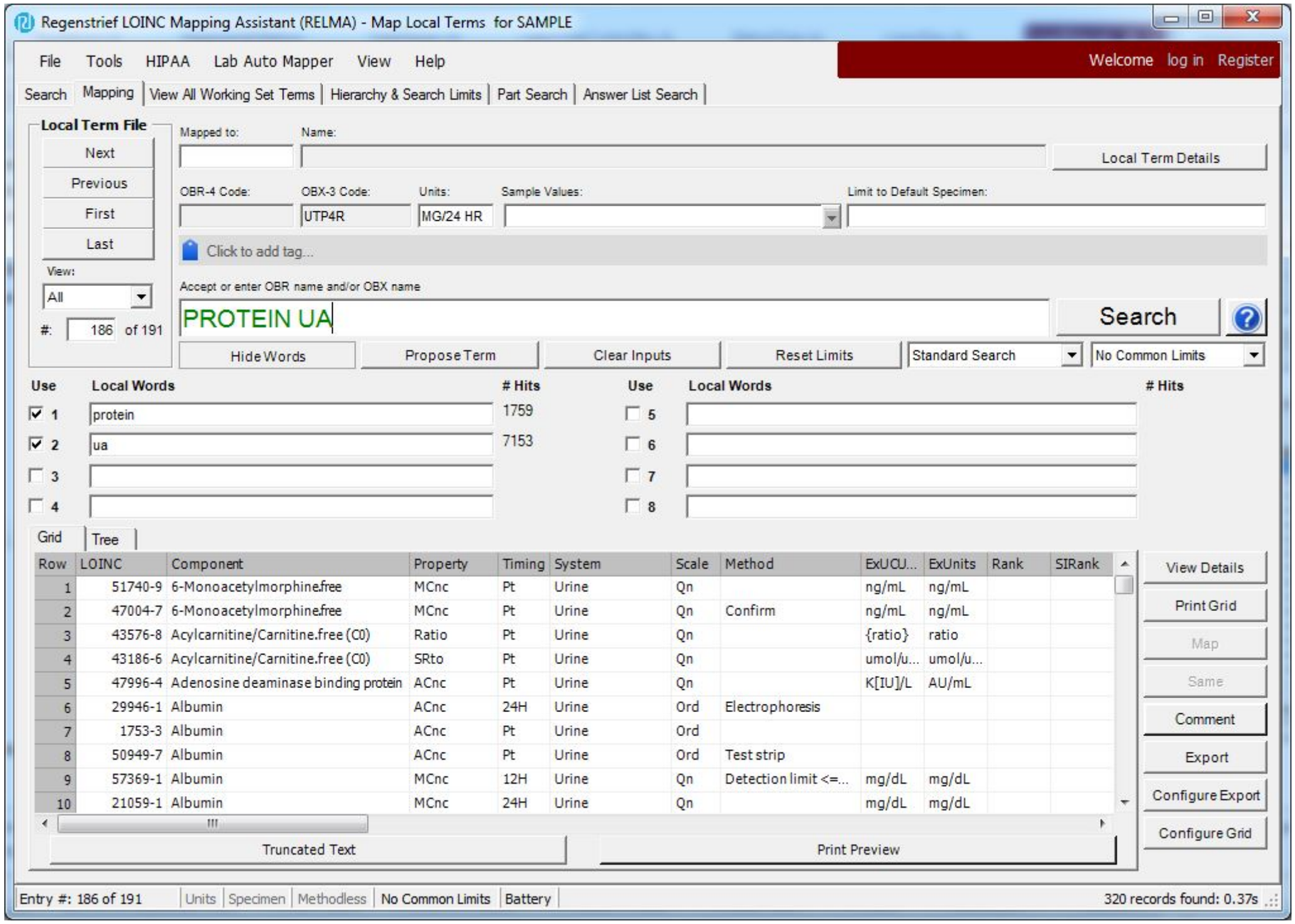
The example in the figure below shows the results from the Local Term File named SAMPLE. You can see from the display that page 1 of 1 pages is currently being displayed. The controls on either side of the page number display allow you to traverse the report a page at a time either forward or backward. The dropdown list box with the magnifying glass icon provides the ability to zoom the size of the display to different magnifications. The printer icon displays the Windows print dialog box allowing you to select a printer.

The example in the figure below shows four unknown words. The string "GCMASS" appears four times, "MONOACETMORP" appears in two records and the other two words appear once each. In the next step of the process, you will be given the opportunity to provide a translation for these words.


Print Concepts in Local Term File Unknown to RELMA
75%
Page 1
of 1
RELMA - Unknown Words and Units for the SAMPLE Local Term File
Words Unknown to RELMA
Unknown Word | Battery Code | Battery Description | Test Code | Test Description | Units
BZDP | | | UDSB | BZDP |
GCMASS | GCMASS | GCMASS CONFIRM | AMPHCUT | AMPHET CUTOFF | NG/ML
GCMASS | GCMASS | GCMASS CONFIRM | AMPHET | AMPHET | NG/ML
GCMASS | GCMASS | GCMASS CONFIRM | MONOAC | MONOACETMORP | NG/ML
MONOACETMORP | GCMASS | GCMASS CONFIRM | MONOAC | MONOACETMORP | NG/ML
GCMASS | GCMASS | GCMASS CONFIRM | MNACUT | MONOACETMORP CUTOFF | NG/ML
MONOACETMORP | GCMASS | GCMASS CONFIRM | MNACUT | MONOACETMORP CUTOFF | NG/ML
DIAB | 0007713 | Gluc Gest Diab. Scn. | GEST | Gluc Gest Diab. Scn. | mg/dL
Units Unknown to RELMA
Unknown Unit | Battery Code | Battery Description | Test Code | Test Description | Units
10 3/uL | 0008917 | Complete Blood Count | WBC | White Blood Cell | 10 3/uL
Save as PDF
Save as RTF
Preview
Print
Exit
SAMPLE

Mapping Local Terms to LOINC

After clicking the "Map Local Term to LOINC" button on the main screen, you should see a screen similar to the one shown in the figure below. The following pages describe in detail the screens used to conduct searches within the LOINC database and to interactively map local terms to LOINC terms.



The Mapping Screen

The mapping screen is the default screen that is displayed when a user chooses the "Map Local Terms to LOINC" option on the main screen. The screen displays a combination of data from the local term file and the LOINC database. The following sections describe, in more detail, different aspects of the mapping screen.

Navigating the Local Term File

In the upper left corner of the screen is a box labeled "Local Term File". This box contains several buttons, a dropdown list, and a textbox that let you navigate through the current local term file.

The "Next", "Previous", "First", and "Last" buttons allow you to traverse the terms in the current local term file. The order in which the terms are displayed is controlled by the current sort order of the local terms as displayed in the grid on the "View All Working Set Terms" TAB. To change the order of traversal, simply resort this grid as desired by clicking on the column headings at the top of the grid. The textbox below the buttons shows the row number from the grid for the local term which is currently being displayed on the mapping screen (#: X of Y). So, for example, the user could move from record #186 of 191 to record #187 of 191 by clicking on the "Next" button. You can also move directly to a particular record # by typing the number into the textbox and hitting the Enter key.

The dropdown list labeled "View:" gives you the ability skip local terms based on their mapping status. The default value is "All" which indicates that every record in the local term file can be displayed by navigating through the file using the buttons. Other options include "Mapped Only" which will cause the navigation buttons to skip any local terms which have not yet been mapped to a LOINC code. This option is useful for reviewing existing mappings. The "Unmapped Only" option will cause the navigation buttons to skip any records which have been already been assigned a LOINC term. This option is useful when you are focusing your efforts on mapping unmapped terms.

Mapped LOINC Information

If a local term has previously been mapped to a LOINC term, the "Mapped to" and "Name" fields will be populated with data from the LOINC database. The "Mapped to" field will contain the LOINC number of the term to which the local term is mapped. The "Name" field will contain the LOINC long common name associated with the LOINC code.

Users can edit the value of the "Mapped to" field by typing in a different LOINC number to remap the local term to the different value or double-clicking on the field to un-map the local term (i.e. delete its current LOINC mapping).

RELMA does not restrict the input in this field to LOINC codes. You can enter any text that you like. This feature allows you to map your local codes to codes from other coding systems.

Local Term Information

Beneath the mapped LOINC fields are several fields that contain data from the local term record the user is currently mapping to LOINC. The "OBR-4" and "OBX-3" fields contain the local term's battery and test codes respectively. "Units" is an editable field contains the units of measurement for the local term. The "Sample Values" dropdown control contains sample data as loaded into the RELMA program by the user during the "Import into RELMA" process. The "Limit to Default Specimen" field contains an editable list of default LOINC Systems associated with the local term's lab section (see the lab section of this manual for more information).

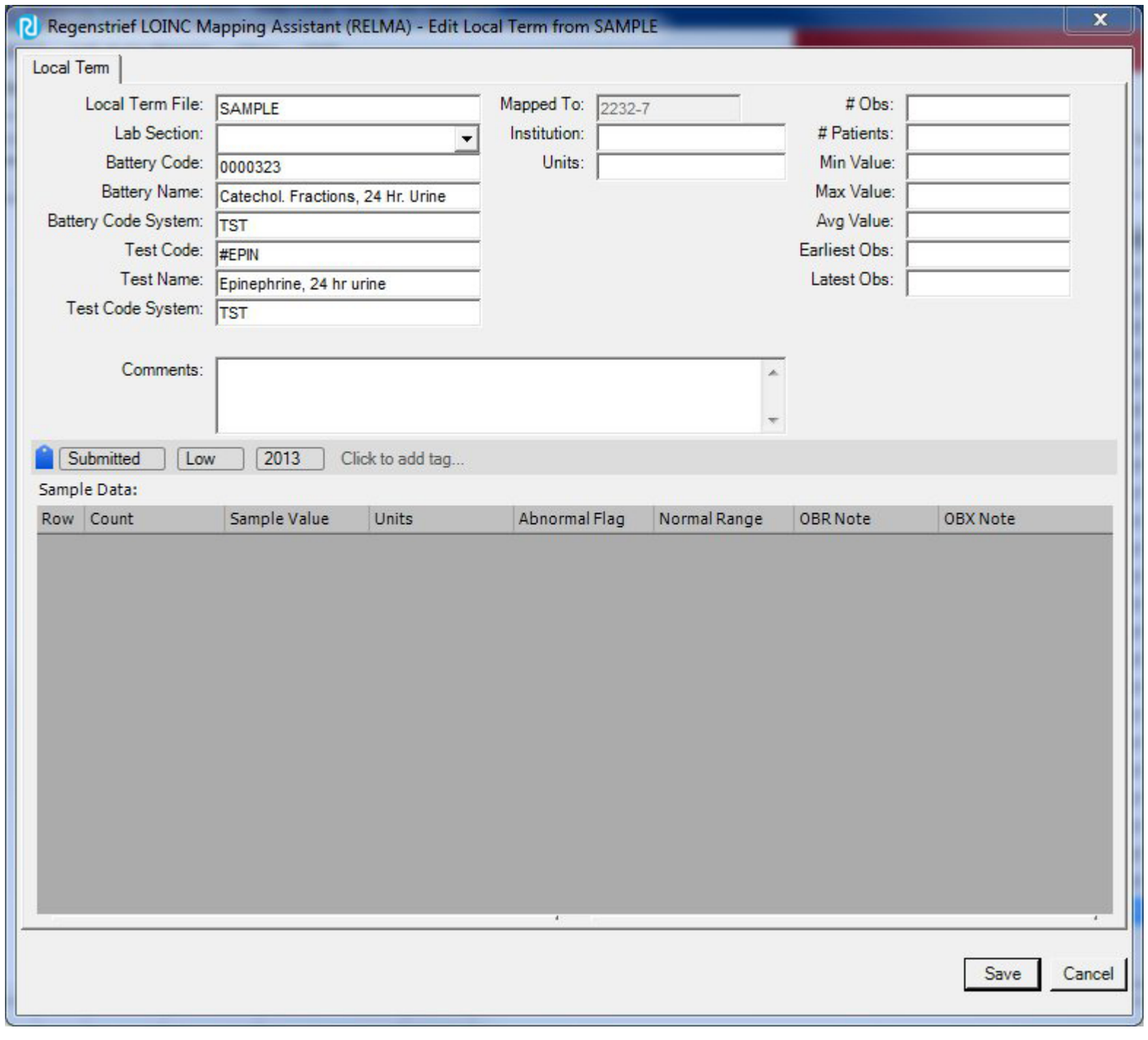
The field labeled "Accept or enter OBR name and/or OBX name" contains words from the local term's battery and test description fields. Words from the local term's battery description field are shown in red and can be turned off using the option in the User Preferences dialog (see the "Setting User Preferences" section for more details). Words from the local term's test description field are shown in green. Words that are unknown to RELMA are displayed with a "squiggle" underline.

Note: *Any translations created using the "Check the Test Names in Local Term Submission" option described elsewhere in the manual are applied to the raw battery and test description data before being entered into the mapping screen display field.*

Local Term Details

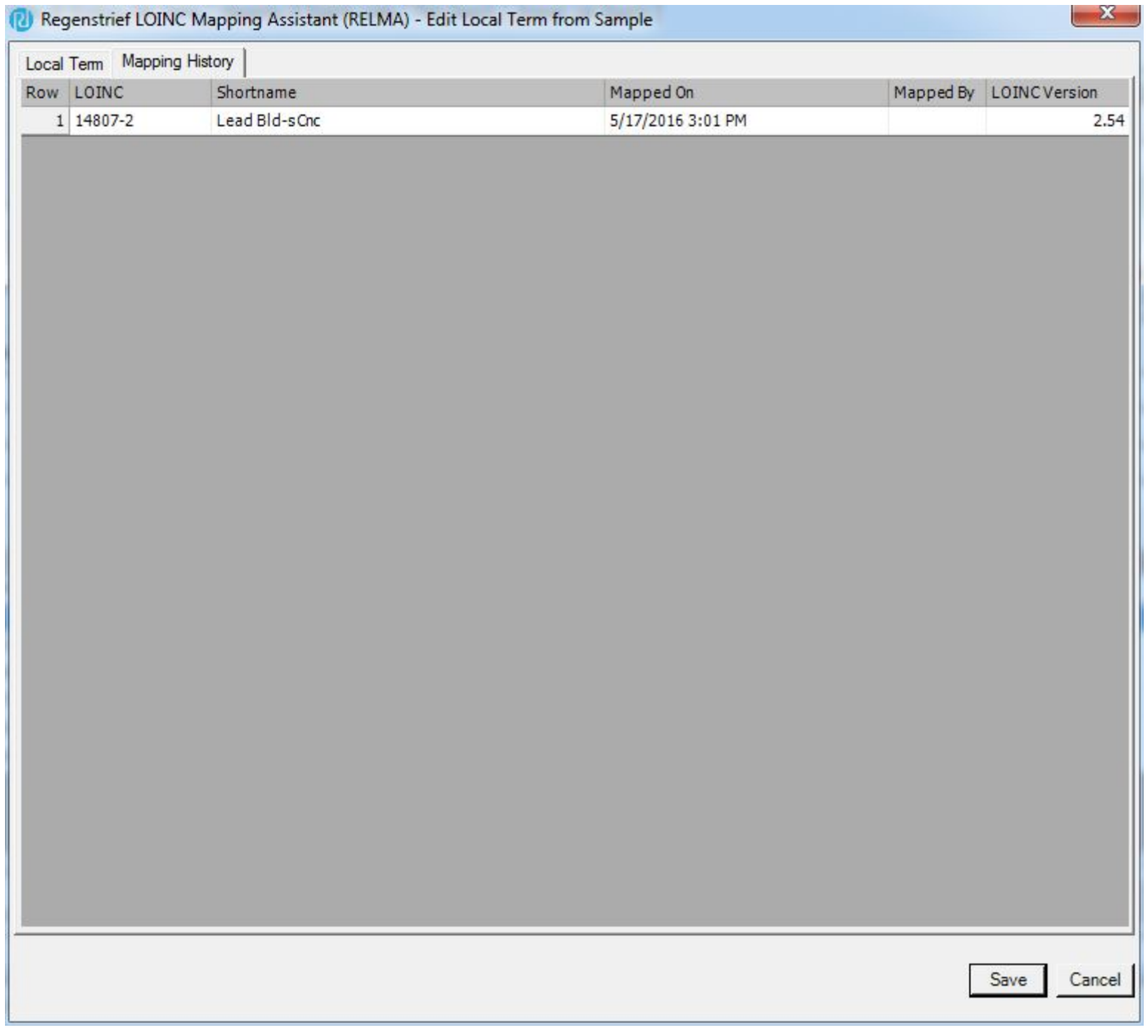
The button labeled "Local Term Details" displays a popup box that contains the complete local term record. This screen should resemble the figure below. This screen is handy when parts of the local term are cut off from being displayed on the search screen or when the user desires to view comments which are not displayed on the search screen.

Users can edit the local term's data using this popup box. Once edits have been made, the user simply presses the "Save" button and is returned to the search screen after the changes have been made.



Mapping History

The tab with "Mapping History" will display all mappings made to the currently selected local term. See the figure below. This display is useful for seeing the history of mapping changes in the local term file.



Search Button

The button labeled "Search" executes a search against the LOINC database (the keyboard shortcut Ctrl+Enter has the same functionality). For more information, please refer to the "Conducting a

Search" section of this manual.

Auto Mapper Search Dropdown Box

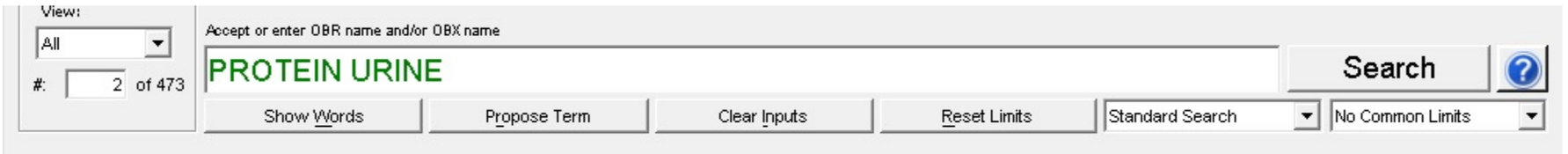
The dropdown box labeled "Auto Mapper Search" lets you select whether you use the Auto Mapper Search (which tries to find the LOINC Parts in your search phrase) or the standard Search (which just searches for the words in your search phrase). For more information, please refer to the "Conducting a Search" section of this manual.

Propose Term Button

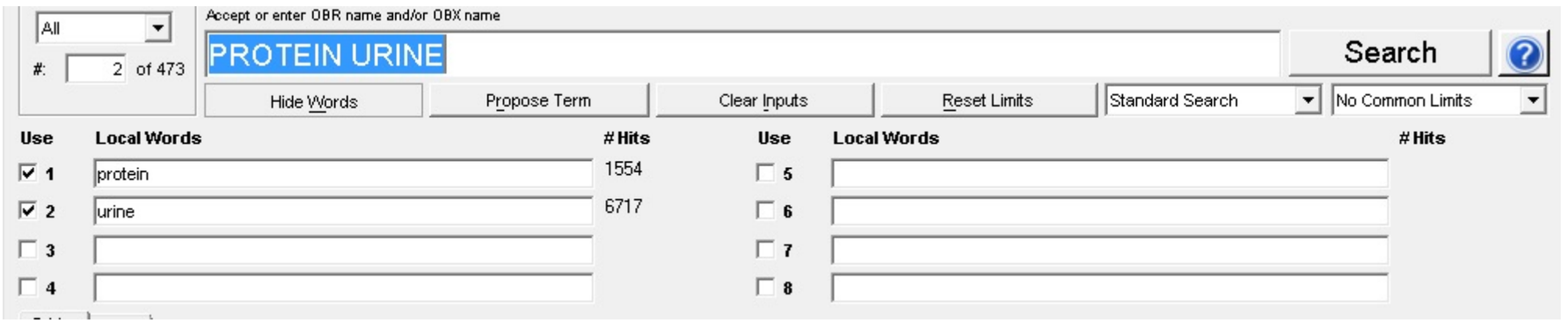
The button labeled "Propose Term" button takes users to the "Propose a new LOINC" screen. This screen is used to define new LOINC terms the user would like to see created. For more information, please refer to "Appendix A: LOINC Submissions" for more information.

"Local Words" Boxes

RELMA parses the text associated with each local code and puts each word into a "Local Words" text box located in the center of the screen. The boxes that contain the individual keywords are displayed on the screen by default; however, users may elect to hide the boxes by toggling the "Hide Words" button to an off state. The figure below shows an example of the mapping screen with the keyword boxes hidden.



The figure below shows an example of the mapping screen with the keyword boxes displayed.



By default the keywords in the Test (OBX-3) and Battery (OBR-4) description are copied into the "Local Words" text box, but an option in the User Preferences dialog will also turn off copying the keywords in the Battery (OBR-4) description. One or more of these keywords may be used for searching the LOINC database, which will be discussed in more detail later in this manual.

RELMA automatically converts each keyword to uppercase even though the matches between the "Local Words" and those found in the LOINC database are case-insensitive.

Any special characters in the description, such as those found in the table below, will be translated by RELMA into space characters. For example, if the local description was "GRASS SORGHUM AB.IGE" then "GRASS", "SORGHUM", "AB", and "IGE" would each be placed into their own "Local Words" text box since RELMA would translate the period between "AB" and "IGE" into a space before separating the description into keywords. The exception is when a period appears between two numbers (e.g. 2.5) or before a single number (e.g., .6) and is used to represent a decimal number.

Character	Description
&	Ampersand
'	Apostrophe
(	Open Parenthesis
)	Close Parenthesis
+	Plus
,	Comma
.	Period
/	Slash
\	Backslash
:	Colon
;	Semicolon
=	Equal Sign
^	Carat
[	Open Bracket
]	Close Bracket
{	Open Curly Brace
}	Close Curly Brace
**	Double Star
>	Greater Than
<	Less Than
-	Dash

Local Words "Use" Checkboxes

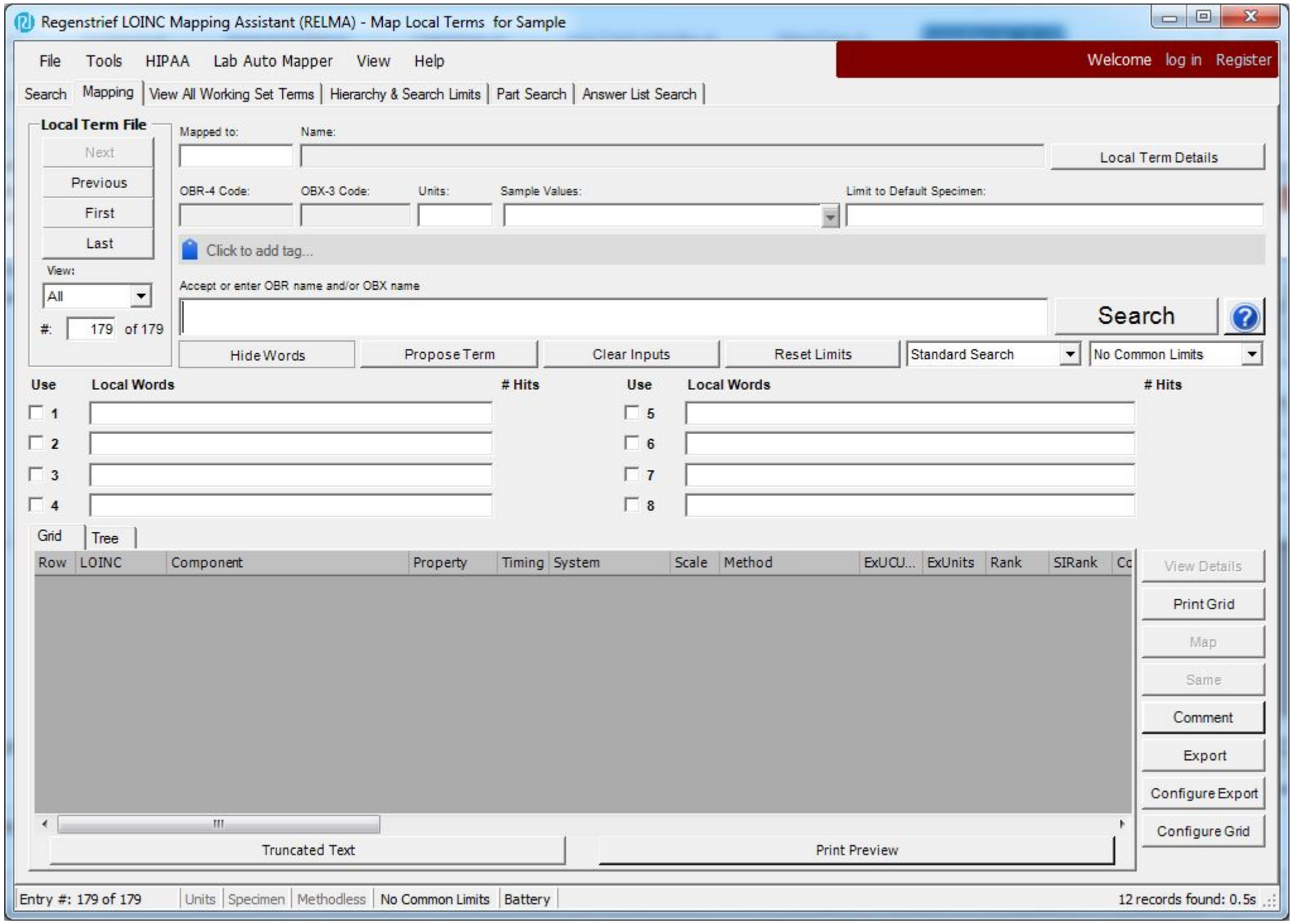
To the left of each "Local Words" text box, under the bold heading "**Use**", is a Local Words checkbox. When a checkmark appears in the checkbox before a given Local Word, you are telling RELMA that you wish to use that Local Word in a LOINC database search. If there is no checkmark in the checkbox, it tells RELMA that you do not wish to use that Local Word in a LOINC database search. For example, in the figure above the checkboxes before "protein" and "UA" are checked so that both of those are included in the search.

Enabled by default, RELMA automatically places a checkmark next to words copied from the local term's OBR-4 and OBX-3 description fields. Similarly, if a user types a word into a Local Word text box and moves the cursor out of the textbox or presses the enter key, its associated Local Word checkbox will be automatically checked. Users can elect to turn off this automatic behavior by un-checking the "Auto Select Keyword" checkbox using the User Preferences dialog.

If a keyword copied from the description fields of the local term is not present in any LOINC term, the checkbox of the Local Word will not be checked and the word will be excluded from a LOINC database search.

Clearing the Search Inputs

While the RELMA tool automatically populates the Local Words boxes with keywords as the user navigates through their local term file, it is often useful to manually enter search terms into the Local Words boxes. To clear the screen and start a search without any keywords preloaded from the local term file, simply click the "Clear Inputs" button located to the right of the "Search" button. After pressing this button, all the local term file information (and the extra words) should be cleared from the screen, as shown in the figure below, and the user is free to type in new search words.



The Reset Limits button

There are many different settings, toggles, and check boxes in RELMA that you can use to help restrict your search results to the terms of interest. After a while it becomes difficult to remember what boxes you have checked and what settings you have enabled. In this situation, the "Reset Limits" button can be used to return the restrictions to their default settings. This can be especially useful in situations where no LOINC terms are being returned and you just want to start over.

Be aware that this button does not clear all limits; rather, it just resets the settings to their default condition. For example, we think that it is very important that the search algorithm include unit checking. So the "Exclude terms inconsistent with local units" is checked by default. If you do want to disable this feature, you will need to do it manually. The subset restriction in the status bar under the search screen should be handled manually.

The Results Grid and Tree

Further down on the mapping screen there are two tabs - one for the results grid and one for the results tree. The results grid is a flat, spreadsheet-like display with column headers that represent several of the LOINC database fields (Number, Short Name, Component, Property, etc.). Every time a user performs a search, the results of that search are displayed in this grid. The results tree shows the result LOINCs in their position in the multi-axial hierarchy, which as of LOINC version 2.61, contains all LOINCs.

NOTE - Export actions taken against the grid and tree (e.g. Print, Copy to Clipboard) affect either the selected rows or all rows, depending on what you pick on the Configure Export screen. (Other actions taken against the grid affect only the selected rows.)

Rearrange Column Order

To rearrange the column order, select a column by clicking on the column header and then drag the column to the preferred position.

The "Configure Grid" option can be used to select the columns being displayed and the order in which they are displayed on both the grid and the tree. That screen also allows you to reset the display to its default values.

Sort a Column

To sort a column in the grid, click on the column header. Clicking once sorts the grid in ascending order (A to Z). Clicking twice sorts the column in descending order (Z to A).

Sort Multiple Columns

To sort multiple columns, right-click and select "Sort Grid". Sort Grid settings are sticky during a RELMA session - for example:

1. You search for BLOOD.
2. You perform a Sort Grid so the results are sorted first by Component, then by System.
3. You search for SERUM.
4. The SERUM results are sorted first by Component, then by System.

Resizing a Column

To resize column width or row height, click on the line between two column or row headers and drag to resize the cell to the width or height you desire.

Printing

There are three ways to print the data in the grid. The first method uses the keyboard shortcut CTRL+P. The second method is to click on the "Print Grid" button located to the right of the grid. The third method is selecting File > Print Search Results from the menu. All of these methods will display the printer's dialog box and allow the user to customize his or her print job.

Note: *The grid/tree must have at least one result before the options for printing will become available for your use.*

Mapping

To map a local term to a LOINC term you may double click on a LOINC result in the grid or click the "Map" button to the right of the grid, which maps the local term to the highlighted LOINC term in the grid.

Exporting Search results

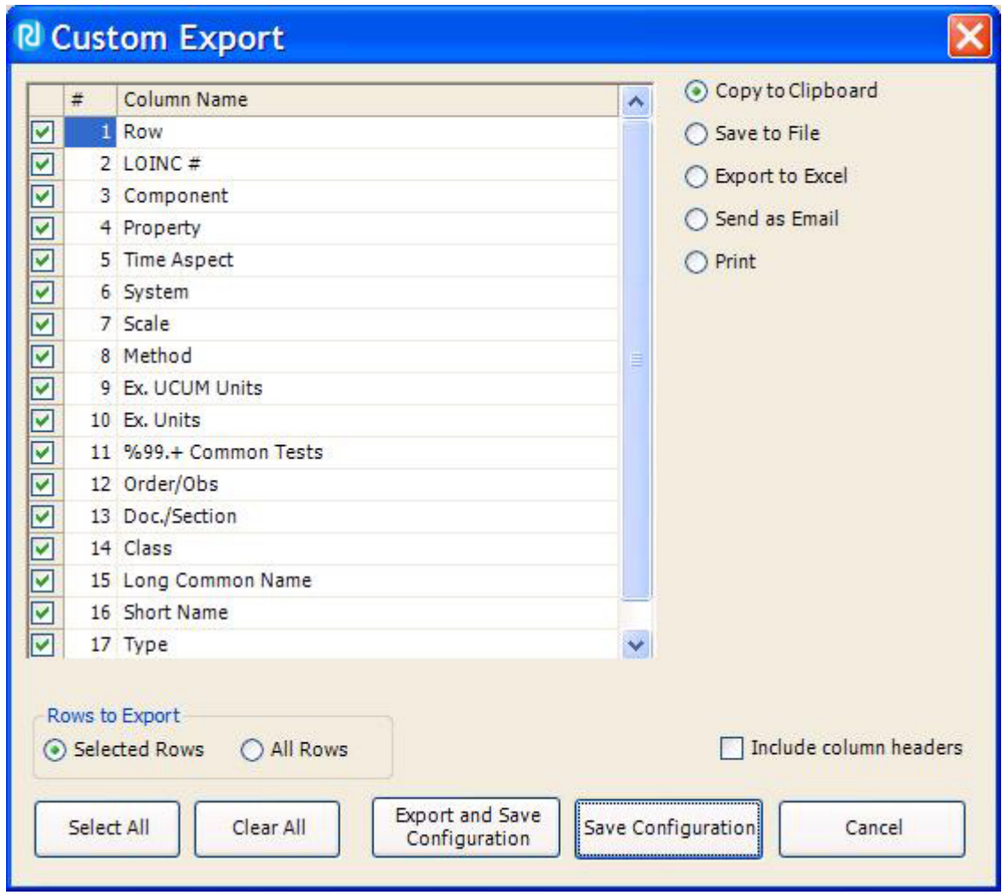
Most of the grids in the RELMA program provide robust options for exporting their contents to other programs. These options include:

- Copy to Clipboard
- Save to File
- Export to Excel
- Send as Email
- Print

By default, RELMA's standard action is to copy the highlighted rows to the Windows clipboard. To use this function, just highlight some rows in one of the grids, right click and select the "Export" option from the context menu. The selected rows are now in the Windows clipboard and available for pasting into another application. You can also use the standard CTRL-C keyboard combination.

Copy to the Clipboard is very useful, but sometimes you need more control over which fields are exported. Or you may want your output to go somewhere else. RELMA provides this additional control in the "Configure Export" option.

To use these options you first need to tell RELMA what action you want to perform, which fields to use, and whether to act on all rows or only the selected rows when performing the action. This is done via the "Configure Export" option available on the right click (context) menu and via the button on the mapping screen.



The "Custom Export" Screen allows you to configure your export preferences and then save those settings for the remainder of your RELMA session. Once saved, you execute the desired action simply by choosing the "Export" option from the context menu or by pressing CTRL-E. Each grid and tree in the program has their own "Custom Export" screen so you can configure each one differently to suit your situation.

As shown in the screen shot, there are three main things you need to tell RELMA - what action you want to perform, which fields you want included, and whether to include all rows or only the selected rows. The actions are selected via the radio buttons on the right side of the screen. Only a single action can be selected at one time. The fields from the grid that available for export are listed on the left side of the screen. You check or uncheck fields as desired to get exactly the data that you want. If you want the field names included in the export, check the "Include column headers" box in the lower left of the screen.

When everything is configured as the way you need it, click the "Export and Save Configuration" button. As the name implies, this button does two things. First, it saves all of your selections for this session and this particular grid or tree. Second, it performs the action selected. If you are not ready to do the export at this time, you can use the "Save Configuration" button to save your setting but not perform the action. You can also use the Cancel button to leave the screen without making any changes or performing any action.

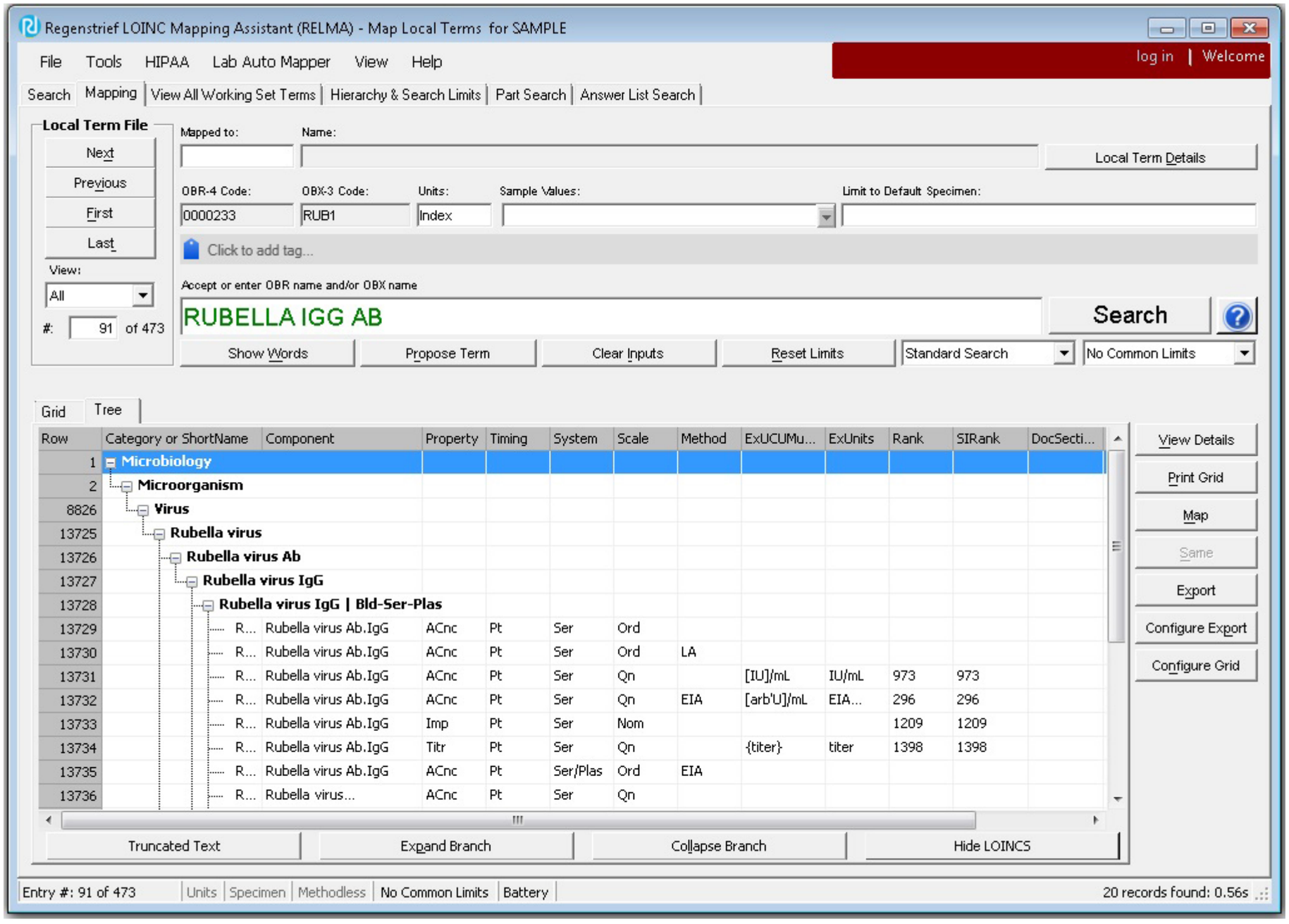
After you have saved your export configuration, you can repeatedly execute the selected action for the selected grid by simply clicking the "Export" option from the context menu or by pressing CTRL-E.

Tree Search Results

On the tree search results, the search results are displayed in a hierarchical fashion. This tree is organized identically to the "multi-axial" hierarchy on the search restriction screen.

To map a local term, highlight one of the LOINC codes returned from the search and click the "Map" button the right side of the screen. You can also map a term by double clicking on a LOINC row or from the context menu displayed when you right click on the search results screen.

NOTE - You cannot map a local code to one of the **bolded** rows of the trees. These rows represent LOINC parts and not LOINC codes per se.



The Status Bar

At the very bottom of the screen in the figure above you will see a status bar. Each field of the status bar contains a different text element aimed at increasing the functionality of the RELMA program.

The leftmost field ("Entry #: X of Y") contains information on navigating through your local input file. The first of the two numbers is the record currently displayed in the text boxes at the top of the screen. The second number is the total number of records for the current Local Term File. As you move forward or backward through the Local Term File of local terms, this field will be updated with

the new information in order to keep you informed of where you are within the set. If you click on the Clear All button, this box will be empty since you are no longer browsing the current Local Term File but entering search terms manually. As soon as you begin navigating through the set again, the box will resume marking your spot in the file.

The "Units" field is a bimodal indicator of the search restriction to limit search results to those in which the LOINC Property is compatible with the local term's units. The word "Units" will be gray when the restriction is OFF, meaning that terms with inconsistent Properties will still be displayed. The word "Units" will be black when the restriction is ON, meaning that only LOINC terms whose Property matches the local term's units will be displayed. To enable or disable the restriction a user may either click on the word "Units" directly or toggle the checkbox labeled "Exclude terms consistent with local units" located on the Search Constraints screen.

The "Specimen" field is a bimodal indicator of the search restriction to limit search results to those in which the LOINC system is one of the default specimens listed in the "Limit to Default Specimen" textbox on the mapping screen. To enable or disable the restriction a user may either click on the word "Specimen" directly or toggle the checkbox labeled "Exclude terms inconsistent with specimen" located on the Search Constraints screen.

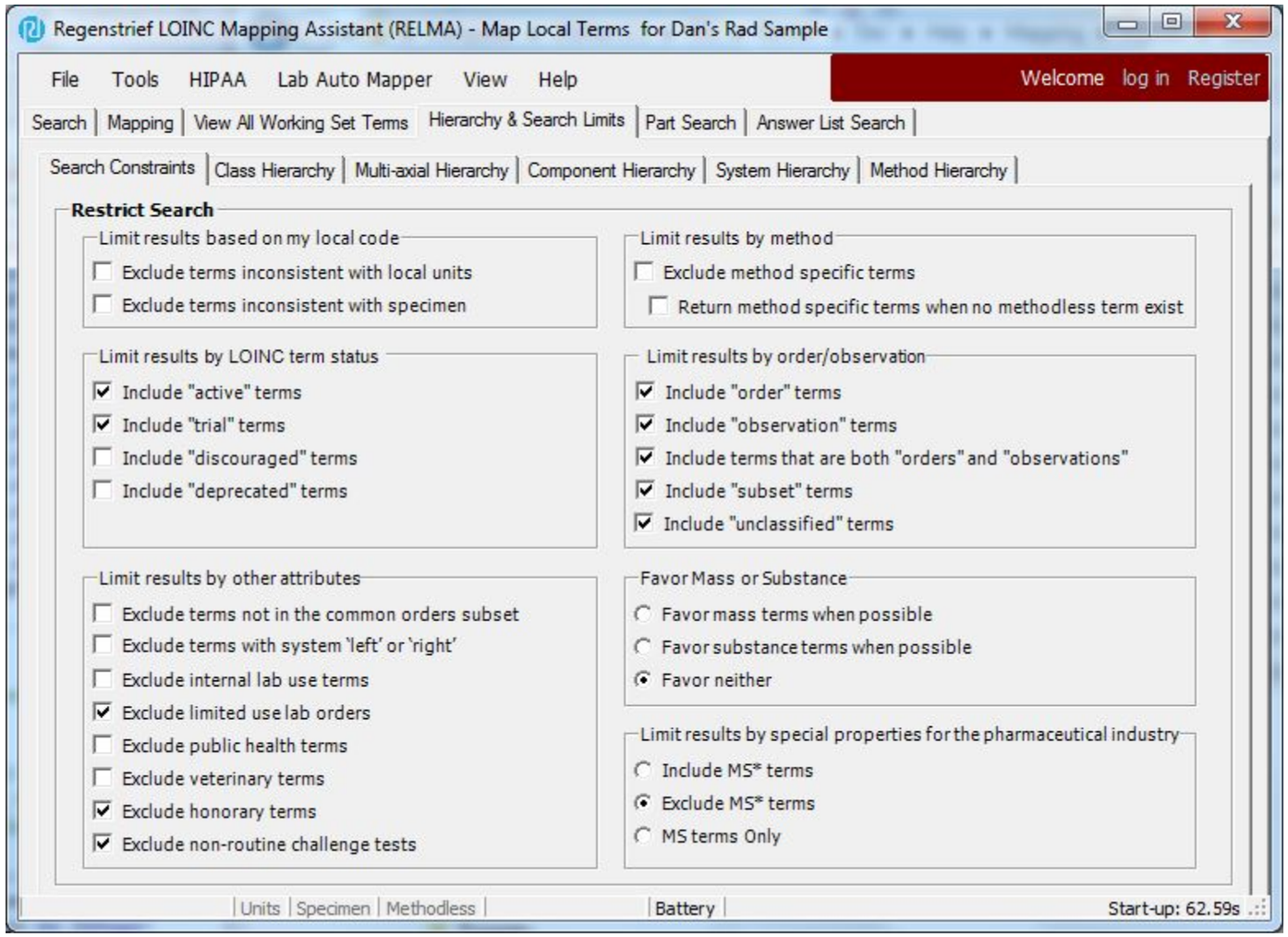
The "Methodless" field is a bimodal indicator that controls whether or not LOINC terms with a value in the Method part are returned during searches. If this field is ON (the word "Methodless" appears black), only terms with NULL methods will be returned. When it is OFF, no restrictions on the method are placed on searches and the word "Methodless" appears gray. To enable or disable the restriction a user may either click on the field directly or toggle the checkbox labeled "Exclude method specific terms" on the Search Constraints screen.

The "Filters" field displays the name of one of the available "common" search filters. When no fitler is selected, the string "No Common Limits" will be displayed. To change filters, use the drop down list located just under the search button.

The "Battery" field controls whether the battery (OBR) name is copied to the search TextBox ("Accept or enter OBR name and/or OBX name"). When the field is ON, the word "Battery" appears black and the battery (OBR) name from the current local term and the test (OBX) name from the local term are automatically copied to the search TextBox when you first switch to that local term. When it is OFF, the word "Battery" appears gray and only the test name is automatically copied to the search TextBox when you first switch to that local term.

The rightmost field displays the number of results found during a search and the time the search took to complete. This field is updated after each search.

The Search ConstraintsScreen



The following sections describe in more detail the search constraints you may employ to narrow searches performed against the LOINC database. The goal of the RELMA program is to aid users in finding the smallest pool of candidate LOINCs possible for each local term so that users can quickly and efficiently map their local terms to LOINC. Each restriction is intended to narrow results based on various facets of the LOINC data set.

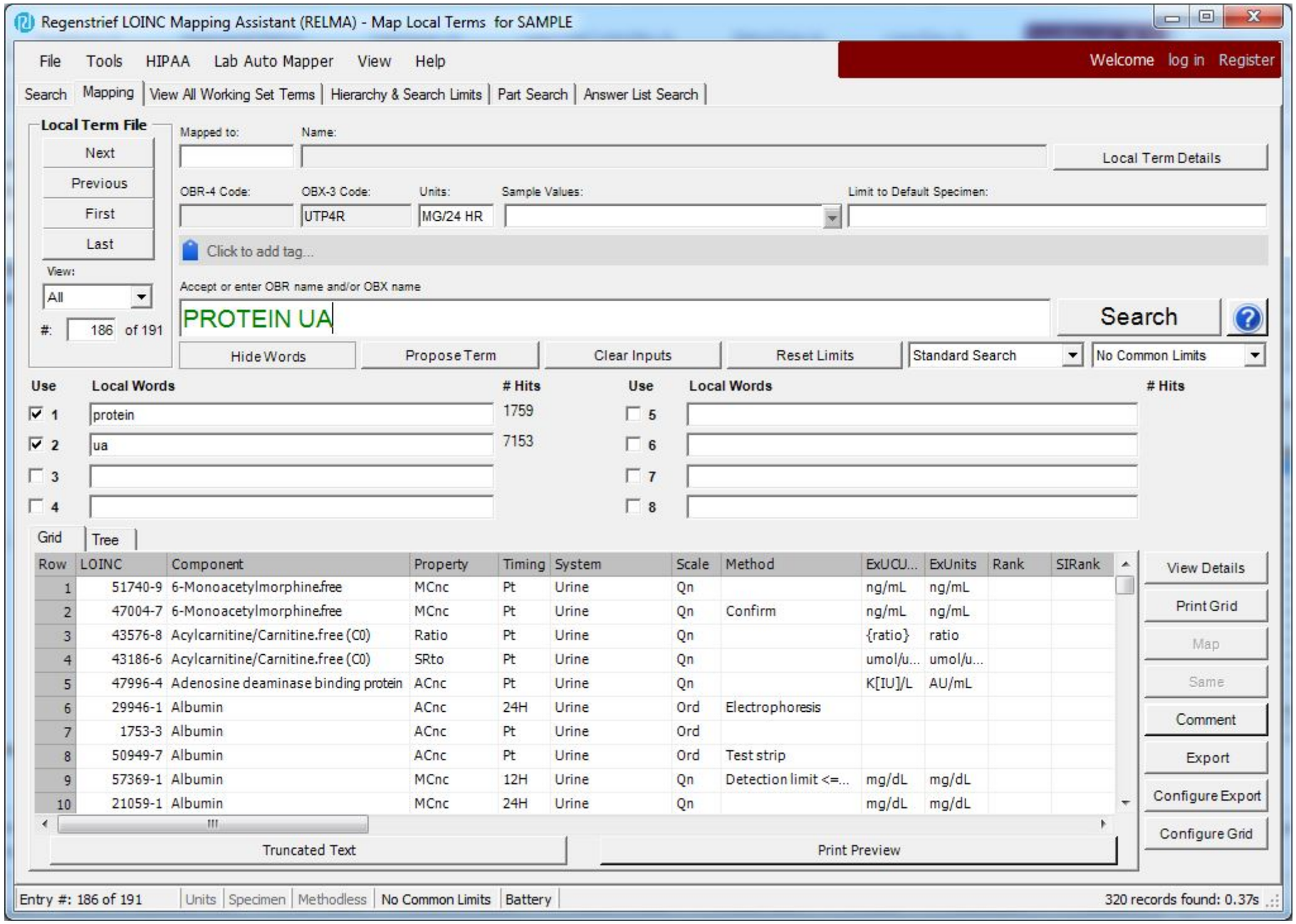
Limit results based on my local code

The options in this group are unique in that they use information about the current local code in conjunction with attributes of the LOINC term to eliminate incompatible LOINC terms from the search results. All of the other search restrictions are based on attributes of the LOINC code itself. This feature makes these option especially valuable when used on the mapping screen with your own local codes.

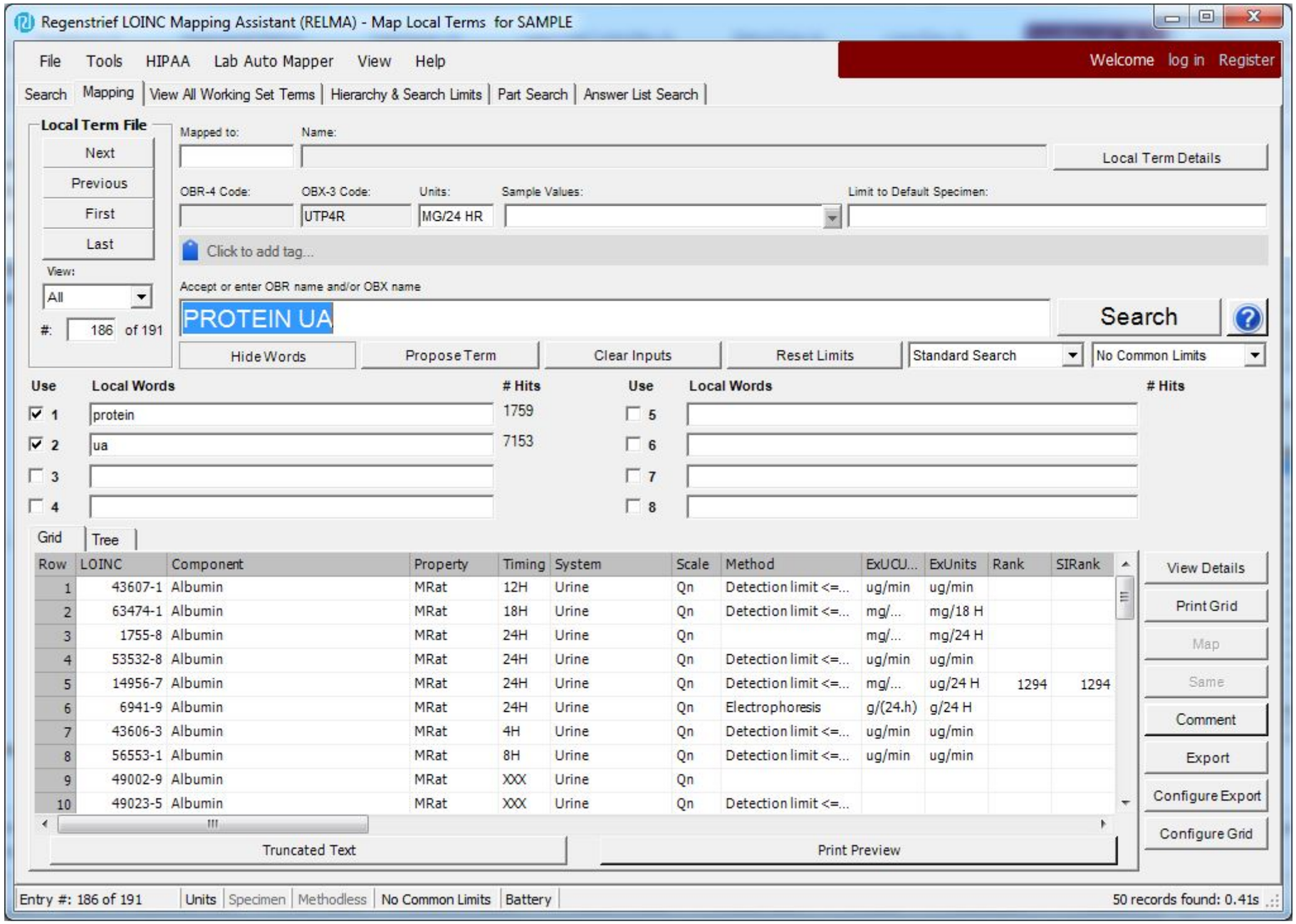
Exclude terms inconsistent with local units

When this option is checked, a search will only return LOINC codes that have a PROPERTY attribute compatible with the units provided on the search on mapping screen. This option is checked by default and is automatically checked when you click the "Reset Limits" button in the "Mapping" tab.

Consider the search for **PROTEIN UA** provided in the SAMPLE local term file. The figure below shows a search without the Units Restriction enforced (you can tell that the Units Restriction is turned off because the word "Units" appears gray in the status bar at the bottom of the screen). The search returned more than 300 candidate LOINCs (displayed in the results grid). This is quite a few terms to examine by hand to determine which one most closely matches the local term "UTP4R".



By enabling the Units Restriction, only LOINC terms with a property of **MRat** (mass rate) remain. The other candidate LOINCs were eliminated because their properties were not compatible with the term's units of "MG/24 HR". The figure below shows that the number of candidate LOINCs dropped significantly and is much more manageable for a user to manually review in order to determine the appropriate map.

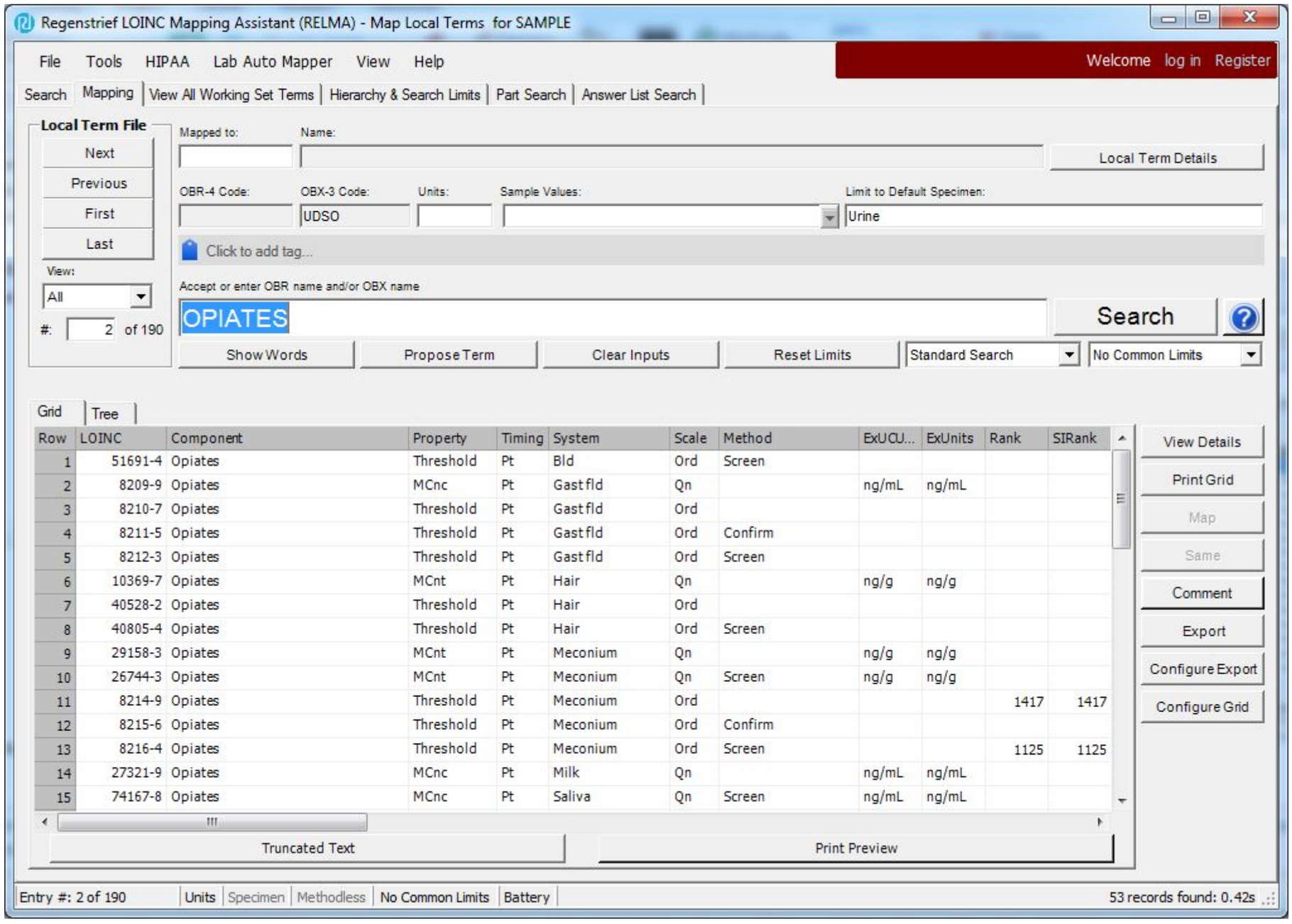


Exclude terms inconsistent with specimen

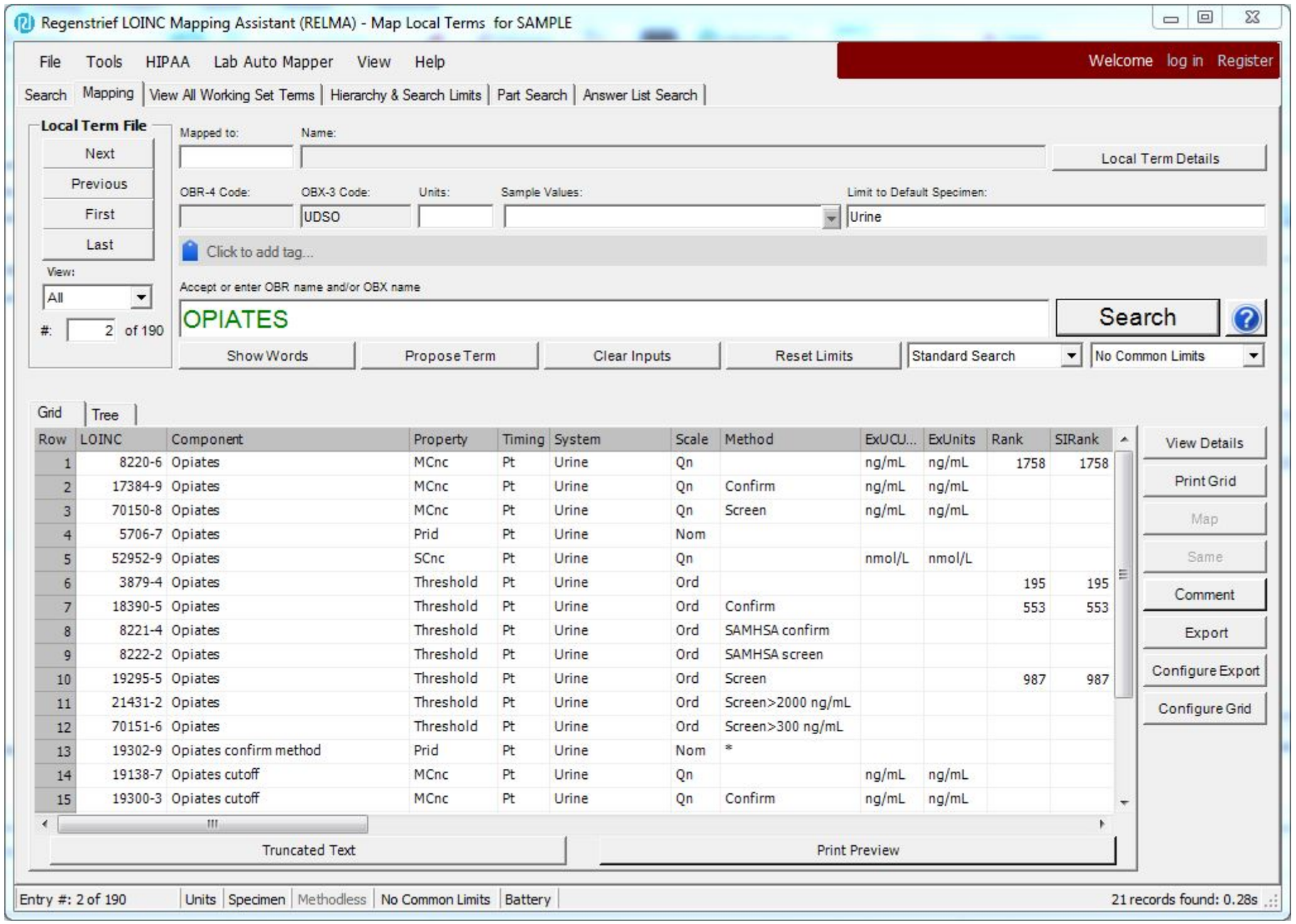
When this option is checked, a search will only return results whose LOINC System is assigned to the local term's lab section. For more information on lab section defaults, see the LAB section of the manual.

Consider the search for **OPIATES** provided in the sample local term file. The figure below shows a search without the specimen restriction enforced, which returned more than 50 candidate LOINCs

(displayed in the results grid).



By enabling the specimen restriction, only LOINC terms with a specimen (a.k.a. System) of UR (urine) remain. The LOINCs removed as candidates from the search were eliminated on UR because the term is a member of the DRUG SCREEN lab section which has only the UR system associated with it. Lab sections can be edited and the user can create custom lab section definitions. Please see the Lab Sections portion of this manual for more information. The figure below shows that the number of candidate LOINCs dropped significantly when the specimen restriction was turned on.



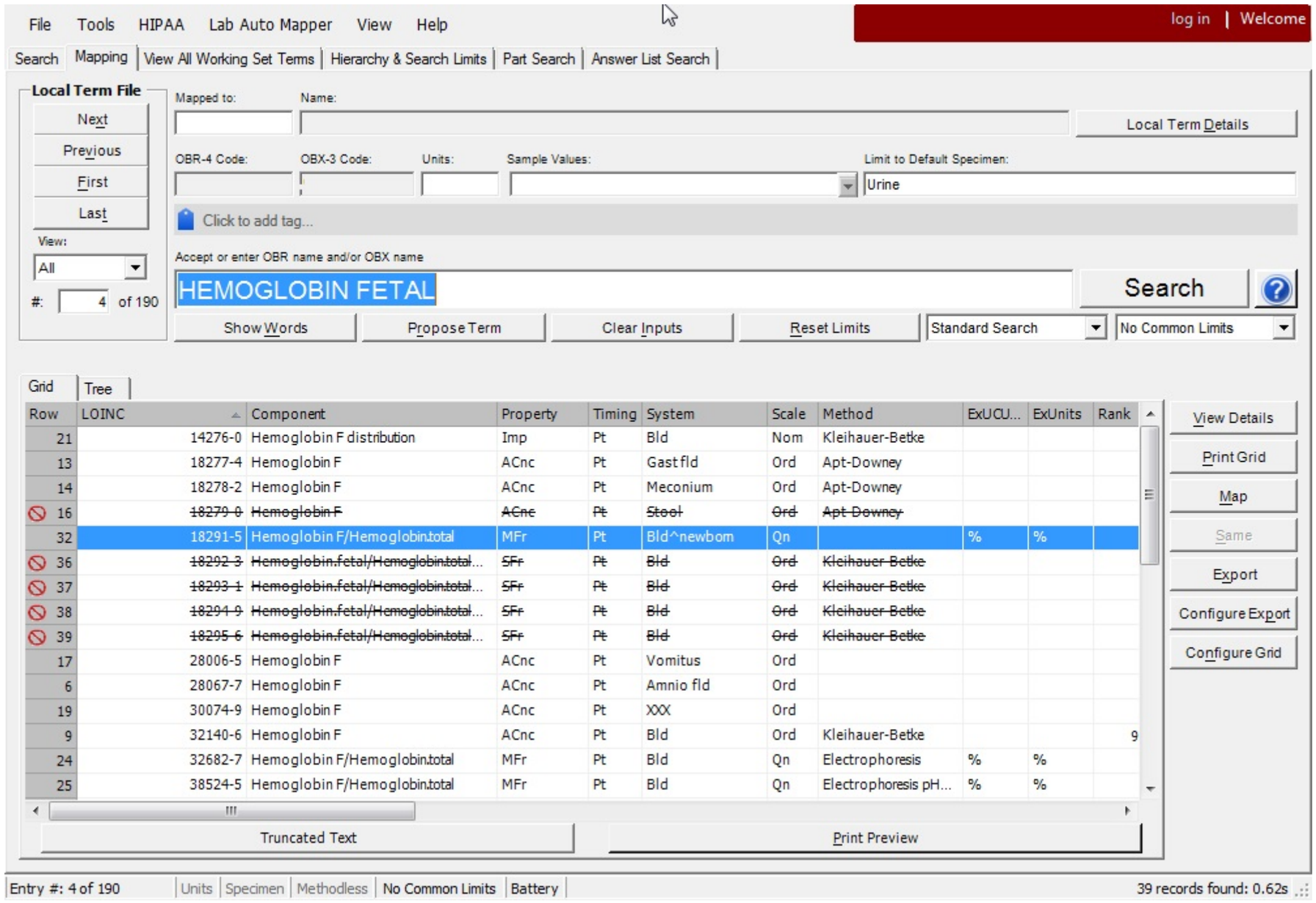
Limit results by LOINC term status

The options in this group control the base set of LOINC codes that are considered when performing a search. There is a check box for each of the four possible STATUS values that a LOINC may have. In general, you will almost always want to map your local codes to LOINC terms that have a status of **Active** so this check box should almost always be checked. The LOINC manual gives detailed guidance on the use of LOINC terms with a status other than **Active**.

The other options allow you to include terms with a status of **Trial**, **Discouraged** , and **Deprecated** in your search results. These options can be a handy way to look up older LOINC codes or codes to which you may have mapped your local terms that are no longer appearing in the search results grid. An example of a search that includes deprecated LOINCs is displayed in the figure below. Deprecated terms appear in a strikethrough font and have a "do not" sign to the left of the row number. Discouraged terms appear in the regular font (not strikethrough) but have an American "yield" sign to the left of the row number, and trial terms have an American "under construction" sign to the left of the row number. These variations in the display allow users to easily distinguish between active, trial, discouraged, and deprecated terms in the grid.

NOTES:

1. You cannot map your local terms to deprecated LOINCs.
2. RELMA warns you when you map your local term to a discouraged LOINC.



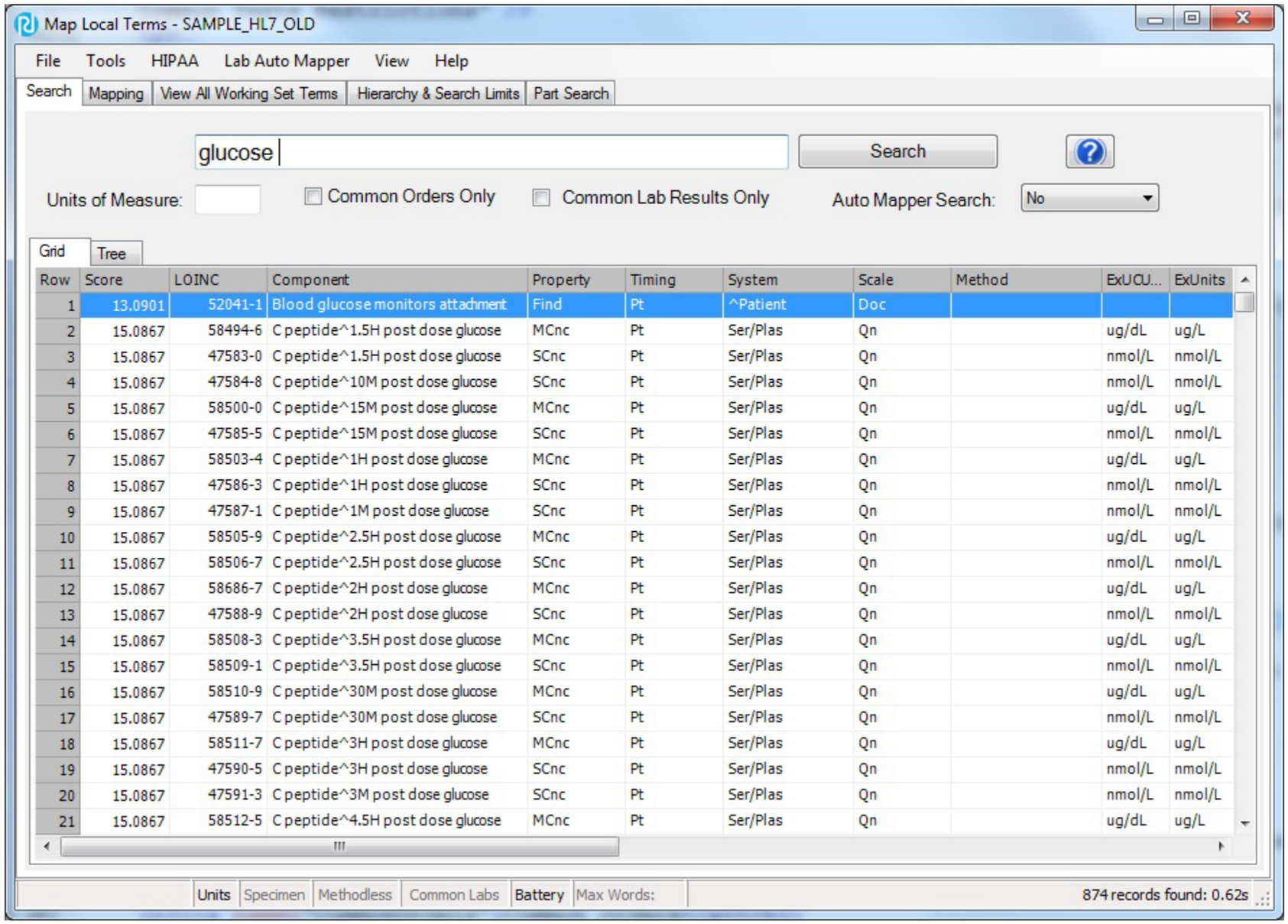
Limit results by other attributes

The options in this group can be used to further filter search results by eliminating LOINC codes with specific attributes or classifications.

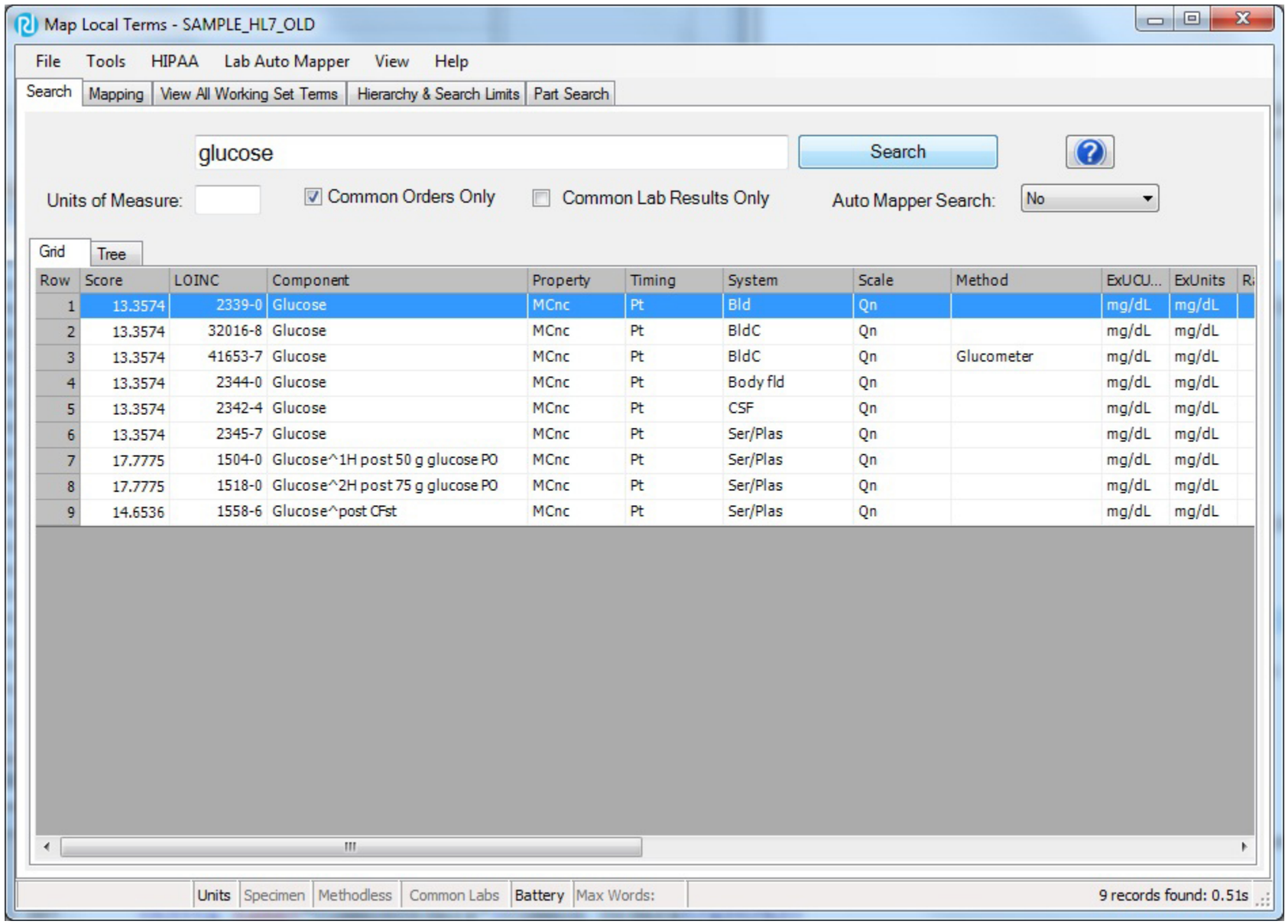
Exclude terms not in the common orders subset

When this option is checked, then the search results will only contain LOINC codes that are present in the Top 300 Lab Order Codes value set ("Value set of universal laboratory order codes from LOINC"), which is described in detail at http://loinc.org/usage .

For example, suppose the user searches for LOINC terms containing the keyword **GLUCOSE** . If the search restriction is not enforced then the results will include a large number of terms, similar to those shown in the figure below.



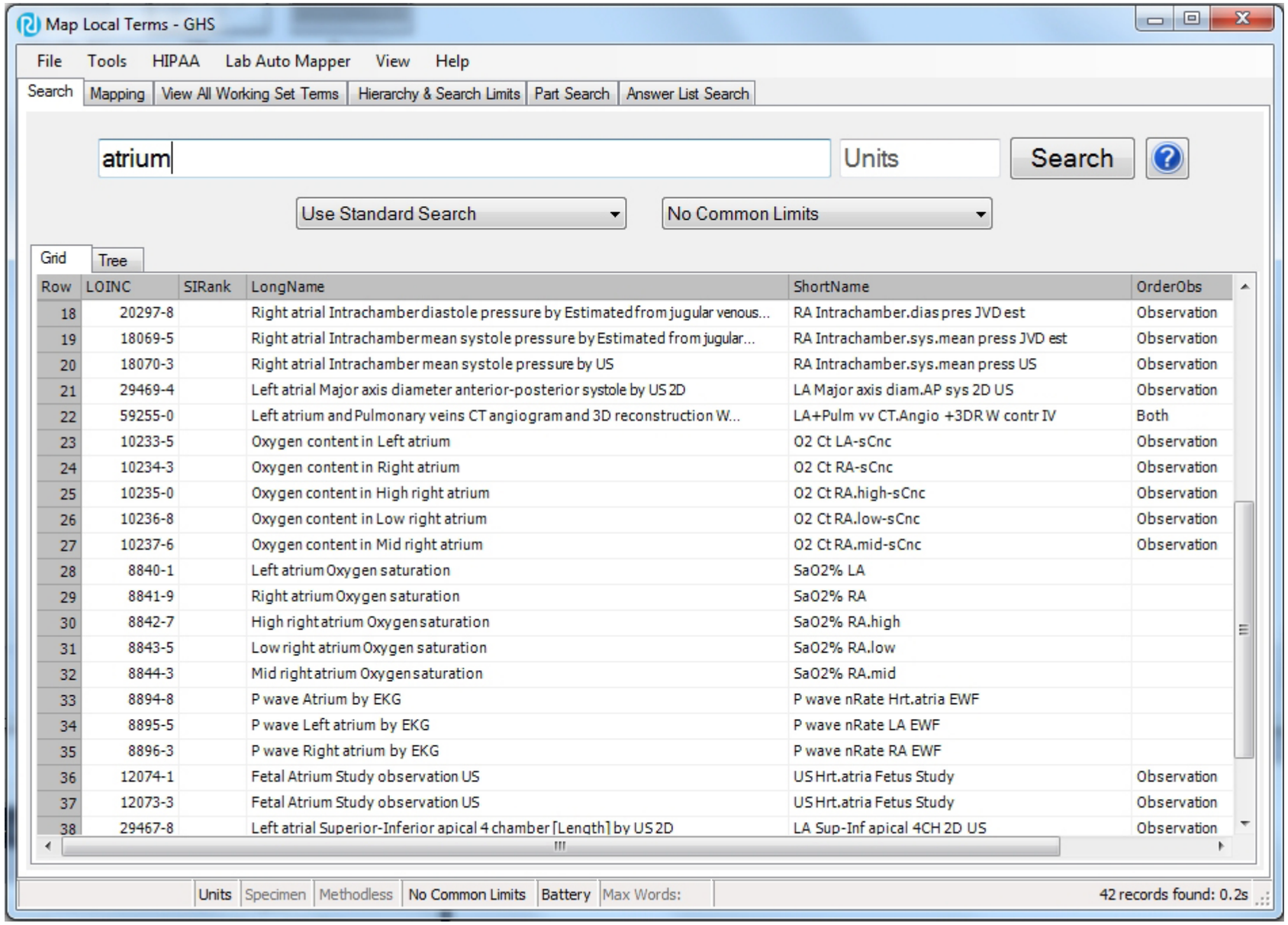
If the user enforces the search restriction, then the results set will be much smaller, similar to those shown in the figure below.



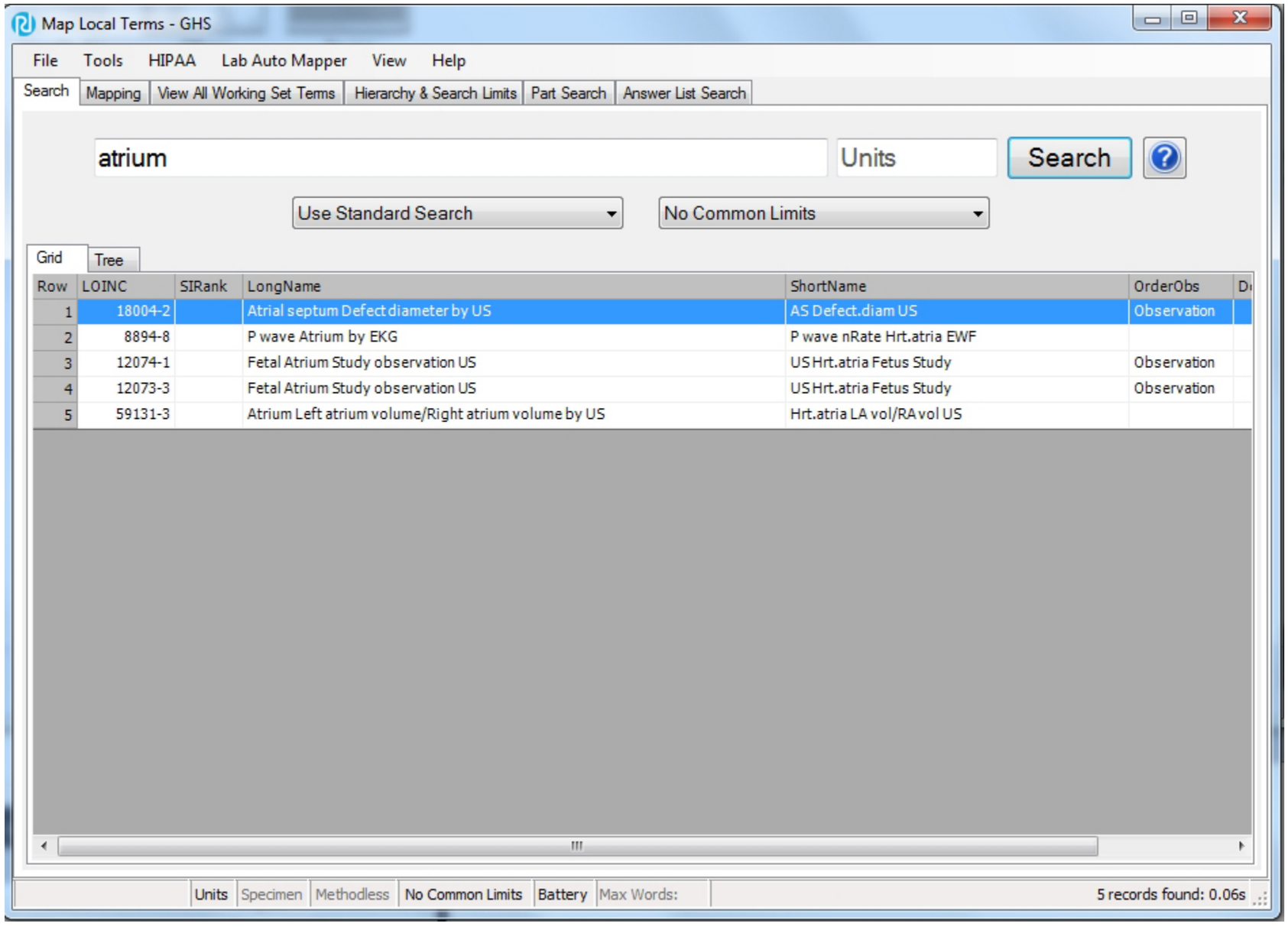
Exclude terms with System left or right

When this option is checked, the search will return only results that do not contain the keywords **left** or **right** in the System (a.k.a. specimen). The remaining LOINC terms will either be explicitly marked as bilateral or will have no explicit laterality.

For example, suppose your local term file contains a term for **ATRIUM**. A search on this keyword yields a fairly large number of results as shown in the figure below.



However, if you enable "Exclude terms with system 'left' or 'right'", then the search will yield only a handful of results as the terms with **left** or **right** in the system are excluded.



Exclude internal lab use terms

When this option is checked the search will eliminate LOINC terms that are primarily used for internal lab reporting.

Exclude limited use lab orders

When this option is checked the search will eliminate LOINC terms that were created ONLY for indistinct lab ordering (in response to a specific submitter). These terms include dashes in some LOINC fields (e.g. Property, Scale) to indicate that the ordering provider does not care about these attributes. The lab uses the reporting process they have set up for the observation result.

Exclude public health terms

When this option is checked the search will eliminate LOINC terms that are designated primarily for use in the world of public health.

Exclude veterinary terms

When this option is checked the search will eliminate LOINC terms that are primarily used in the field of veterinary medicine.

Exclude honorary terms

When this option is checked the search will eliminate LOINC terms that have been created to celebrate the contributions of an individual.

Exclude non-routine challenge terms

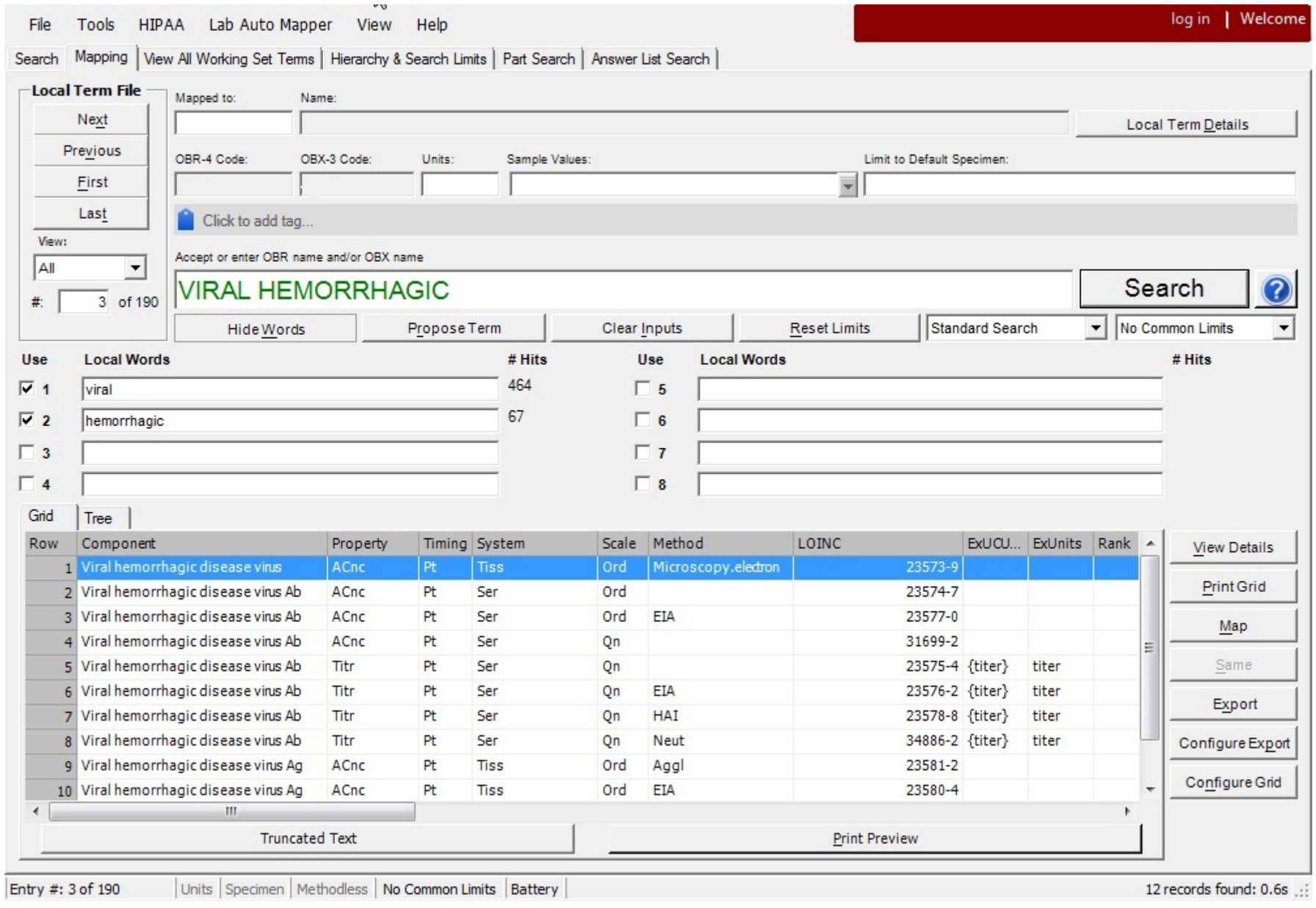
When this option is checked the search will eliminate all challenge tests that are not in the CHAL.ROUTINE LOINC class from the search results.

Limit results by method

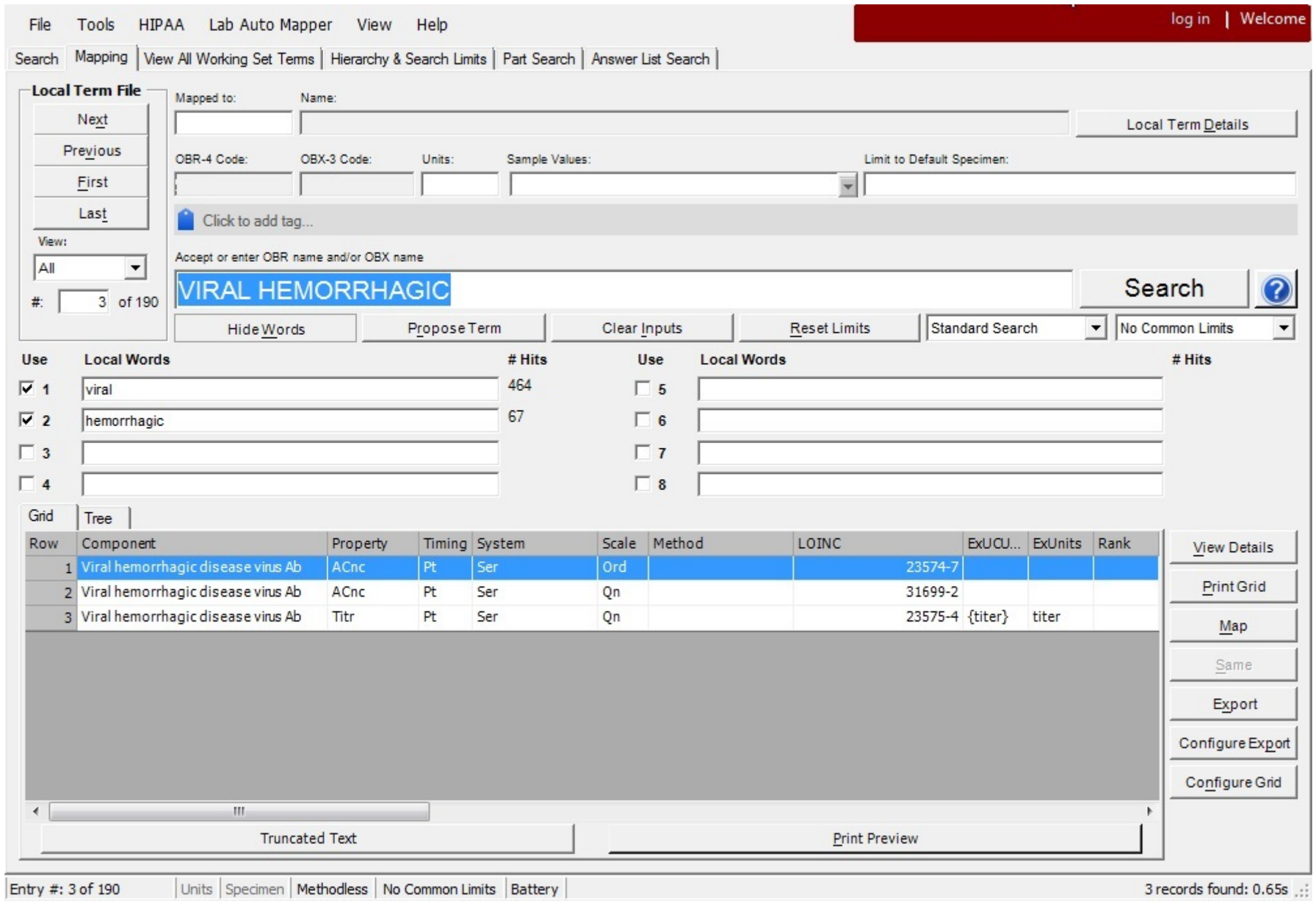
Exclude method specific terms

When this option is checked, then the search results will only contain LOINC terms that do not contain a method.

For example, suppose the user searches for LOINC terms containing the keywords **VIRAL** and **HEMORRHAGIC** . If the search restriction is not enforced then the results will include terms with various Methods as well as those that do not have a Method value, as shown in the screenshot below.



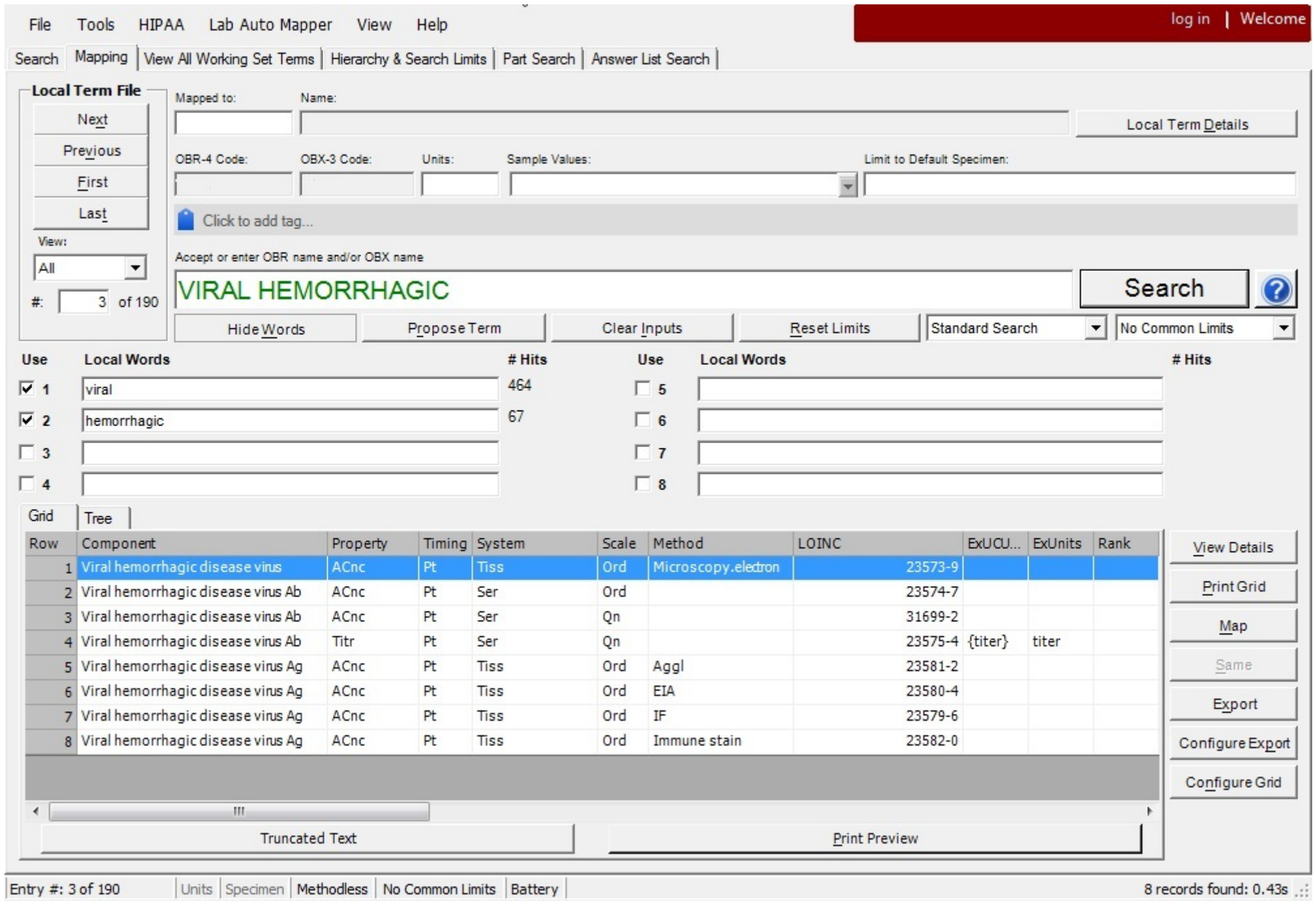
If the user performs the same search and enforces the "Exclude method specific terms" search restriction then only the few LOINC terms that do not contain a method are returned, as shown in the figure below.



Let's take a closer look at the methodless and method-specific LOINC terms that were returned in our original search. If we separate these terms into groups with the same Component, Property, Time, System, and Scale then the following 5 groups are created.

Row	LOINC #	Component	Property	Time	System	Scale	Method
1	23573-9	Viral hemorrhagic disease virus	ACnc	Pt	Tiss	Ord	Microscopy.electron
2	23574-7	Viral hemorrhagic disease virus Ab	ACnc	Pt	Ser	Ord	
5	23577-0	Viral hemorrhagic disease virus Ab	ACnc	Pt	Ser	Ord	EIA
11	31699-2	Viral hemorrhagic disease virus Ab	ACnc	Pt	Ser	Qn	
3	23575-4	Viral hemorrhagic disease virus Ab	Titr	Pt	Ser	Qn	
4	23576-2	Viral hemorrhagic disease virus Ab	Titr	Pt	Ser	Qn	EIA
6	23578-8	Viral hemorrhagic disease virus Ab	Titr	Pt	Ser	Qn	HAI
12	34886-2	Viral hemorrhagic disease virus Ab	Titr	Pt	Ser	Qn	Neut
9	23581-2	Viral hemorrhagic disease virus Ag	ACnc	Pt	Tiss	Ord	Aggl
8	23580-4	Viral hemorrhagic disease virus Ag	ACnc	Pt	Tiss	Ord	EIA
7	23579-6	Viral hemorrhagic disease virus Ag	ACnc	Pt	Tiss	Ord	IF
10	23582-0	Viral hemorrhagic disease virus Ag	ACnc	Pt	Tiss	Ord	Immune stain

When the "Exclude method specific terms" search restriction was applied, none of the terms in the first group or the last group were returned because all of the terms in these groups are method specific. However, in some cases the user may want to view these terms along with the terms that do not contain a method. This can be accomplished by also checking the "Return method specific terms when no methodless term exists" checkbox. Below are the results when both of the search restrictions are enforced.



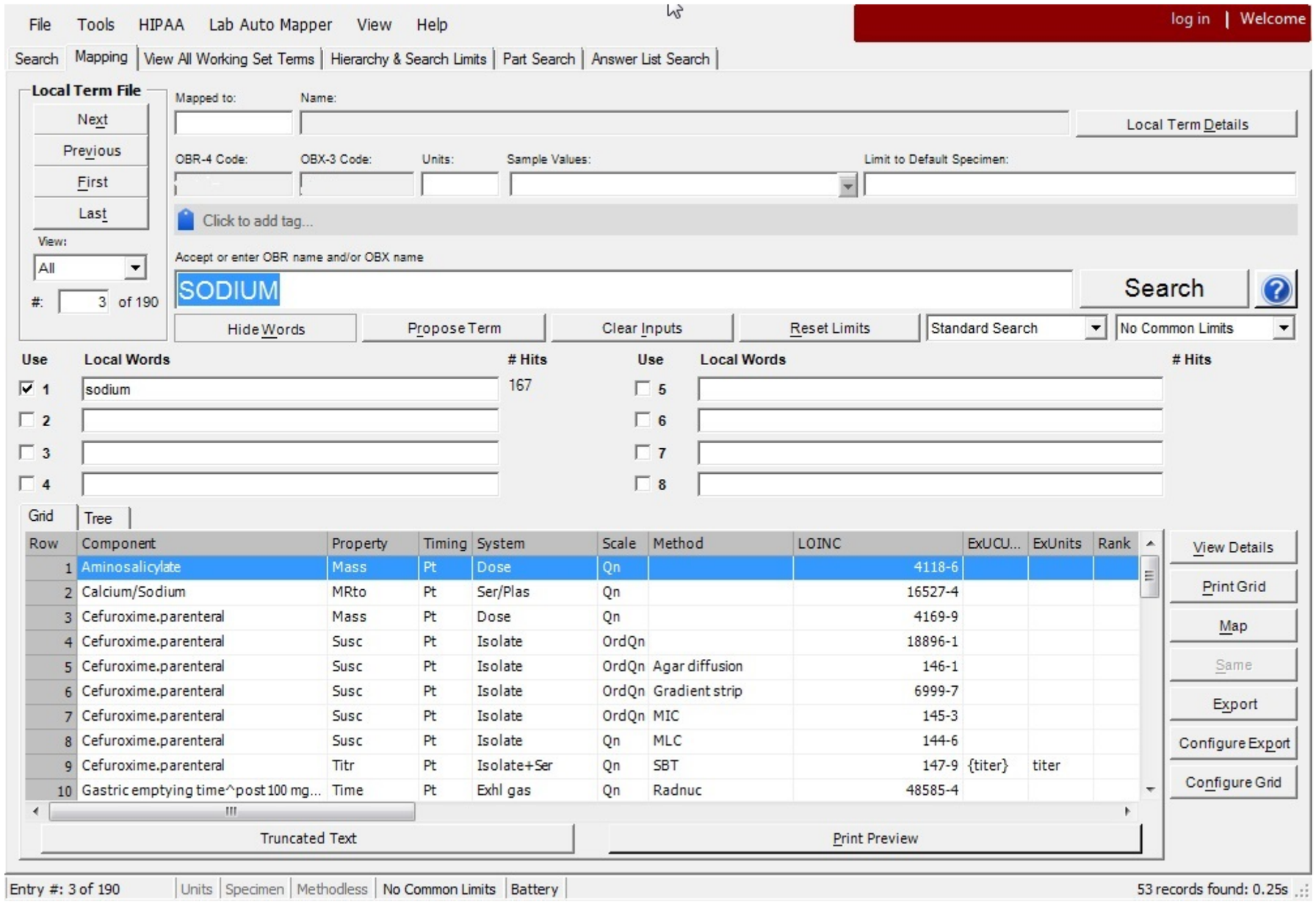
From the LOINC FAQ section "Mapping Local Codes to LOINC Questions"

> When do I use a methodless code?
>
> As a general rule, the methodless LOINC code is meant to include the LOINC codes with methods. In the hierarchy tree, the methodless terms pertain to methods that are unknown or multiple methods using the same reportable detail. Use a method specific LOINC code when the method has a meaningful clinical difference in the results. Refer to Type of Method (6th Part) of the LOINC Users' Guide for more information.

Limit results by Order/Observation

Many laboratory LOINCs can be classified as either Orders or Observations, while some can be considered as both Orders and Observations. By selecting one or more values from the Order/Obs checkbox group shown in the Search Constraints Screen, the user can choose to favor a specific kind of LOINC (e.g. the user can restrict by orders, observations, both and/or subset). The search restriction corresponds to the ORDER_OBS field in the LOINC table, which is described in the LOINC Users' Guide. By default, "Include Orders", "Include Observations" and "Include Both" is selected. Changes applied to these selections will be persisted by user.

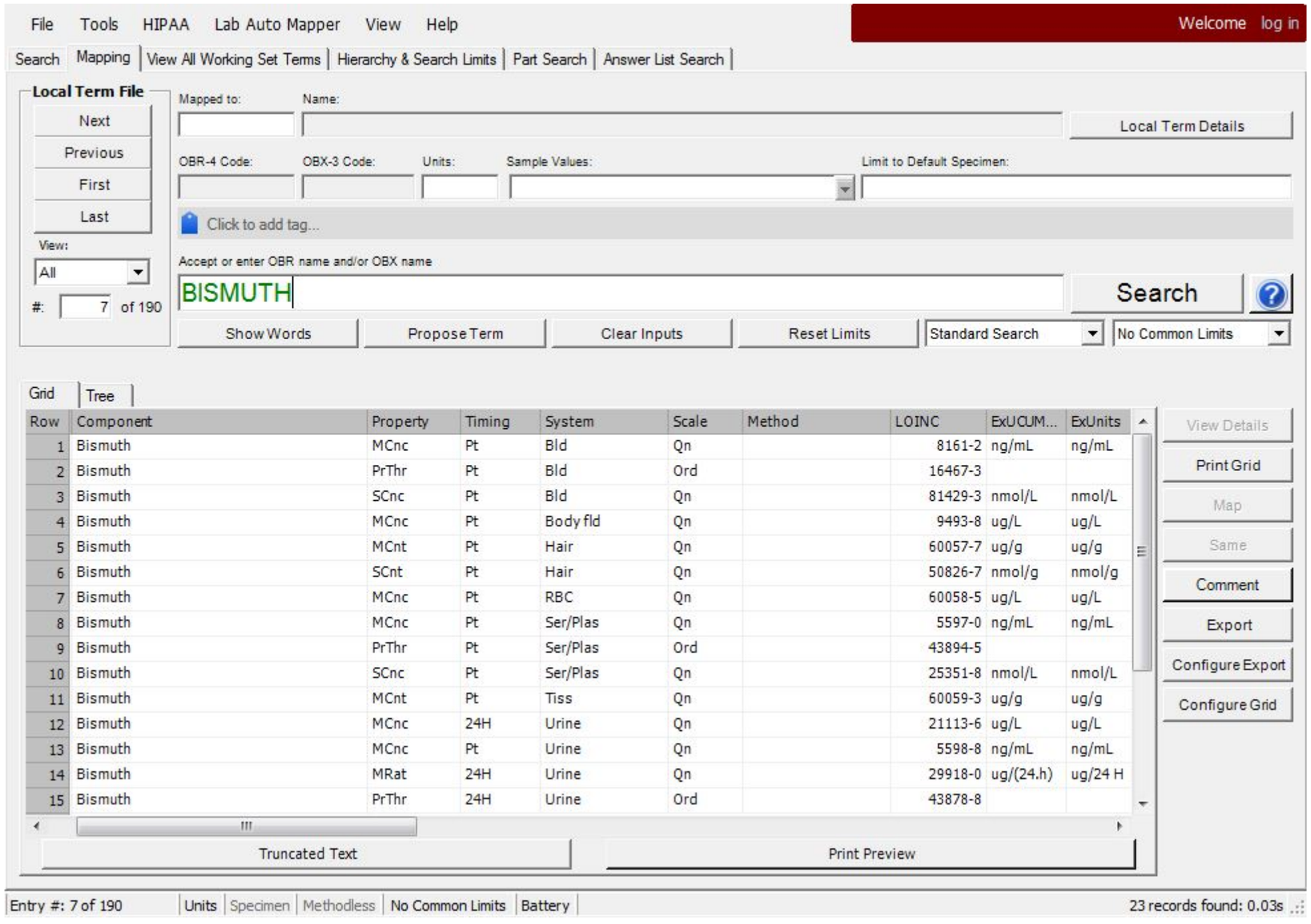
The value "Include "Observation" Terms" tells the program to return LOINC terms where the ORDER_OBS field equals "observation". The figure below shows a search on the keyword "SODIUM" with the ORDER_OBS restriction set to "Include "Observations" terms".



Favor Mass or Substance

Certain LOINC terms are identical in all respects except for their Property values. In many of these cases, the property only varies based on substance (commonly used in European, Canadian and Australian labs) versus mass (commonly used in American labs). Using the "Favor Property" dropdown box on the Search Constraints Screen, the user can tell the RELMA program that he or she prefers one type of Property over the other (e.g. the user prefers searches to return mass concentrations rather than substance concentrations).

Consider the search for **BISMUTH** in the figure below, which yields more than 20 candidate LOINCs. Given that our lab measures results in ug per L, our lab would prefer mass concentration LOINCs over substance concentration LOINCs.



By setting the "Favor Property" setting to "Favor Mass", the substance concentration results are eliminated and only the mass concentration results are returned. Leaving this setting selected while the user maps further terms in the local term file will hide future substance concentration tests when there is an equivalent mass concentration test available.

File Tools HIPAA Lab Auto Mapper View Help Welcome log in

Search Mapping View All Working Set Terms Hierarchy & Search Limits Part Search Answer List Search

Local Term File

Next
Previous
First
Last

View: All

#: 7 of 190

Mapped to: Name: Local Term Details

OBR-4 Code: OBX-3 Code: Units: Sample Values: Limit to Default Specimen:

Click to add tag...

Accept or enter OBR name and/or OBX name

BISMUTH Search

Show Words Propose Term Clear Inputs Reset Limits Standard Search No Common Limits

Grid Tree

Row	Component	Property	Timing	System	Scale	Method	LOINC	ExUCUM...	ExUnits
1	Bismuth	MCnc	Pt	Bld	Qn		8161-2	ng/mL	ng/mL
2	Bismuth	PrThr	Pt	Bld	Ord		16467-3		
3	Bismuth	MCnc	Pt	Body fld	Qn		9493-8	ug/L	ug/L
4	Bismuth	MCnt	Pt	Hair	Qn		60057-7	ug/g	ug/g
5	Bismuth	MCnc	Pt	RBC	Qn		60058-5	ug/L	ug/L
6	Bismuth	MCnc	Pt	Ser/Plas	Qn		5597-0	ng/mL	ng/mL
7	Bismuth	PrThr	Pt	Ser/Plas	Ord		43894-5		
8	Bismuth	MCnt	Pt	Tiss	Qn		60059-3	ug/g	ug/g
9	Bismuth	MCnc	24H	Urine	Qn		21113-6	ug/L	ug/L
10	Bismuth	MCnc	Pt	Urine	Qn		5598-8	ng/mL	ng/mL
11	Bismuth	MRat	24H	Urine	Qn		29918-0	ug/(24.h)	ug/24 H
12	Bismuth	PrThr	24H	Urine	Ord		43878-8		
13	Bismuth	PrThr	Pt	Urine	Ord		16468-1		
14	Bismuth	PrThr	Pt	XXX	Ord		43886-1		
15	Bismuth/Creatinine	MRto	24H	Urine	Qn		29940-4	ug/g...	ug/g...

View Details
Print Grid
Map
Same
Comment
Export
Configure Export
Configure Grid

Truncated Text Print Preview

Entry #: 7 of 190 | Units | Specimen | Methodless | No Common Limits | Battery | 16 records found: 0s

NOTE - Setting this restriction only eliminates LOINC terms where both a mass and a substance version of the term exists. If only a single version of the term exists, it will be returned by the search even though it may not have the correct property type.

Limit Results by special properties for the pharmaceutical industry

Taken from the LOINC Users' Guide:

> The pharmaceutical industry has the need for laboratory terms that are not specific as to whether the test measures a substance (substance concentration or substance rate) or mass (mass concentration or mass rate). We have created terms with the properties of MSCNC or MSRAT to represent these more general

```
test observations.
```

By default, RELMA does not include these terms in search result sets. In order for these terms to be included in searches, the user must set the Pharma MS* search restriction to either "Include MS* Terms" or "MS* Terms Only". The former value will tell RELMA to return both Pharma and non-Pharma terms while the latter value will tell the program to return only Pharma terms. The following examples demonstrate how the value of the Pharma MS* restriction will affect search results.

Consider a search for GLUCOSE SER PLAS. A search that uses the "Include MS* Terms" options returns two extra terms compared to a search that uses the default value for the Pharma MS* restriction (Exclude MS* Terms). The figure below shows those two extra terms in isolation by doing the same search, only this time using a value of "MS* Terms Only" for the Pharma MS* restriction.

Subset Restriction

The subset Restriction is added to the status bar on the search screen. The search limits the list to set of LOINC codes user has created.

Sample search criteria with subset restriction

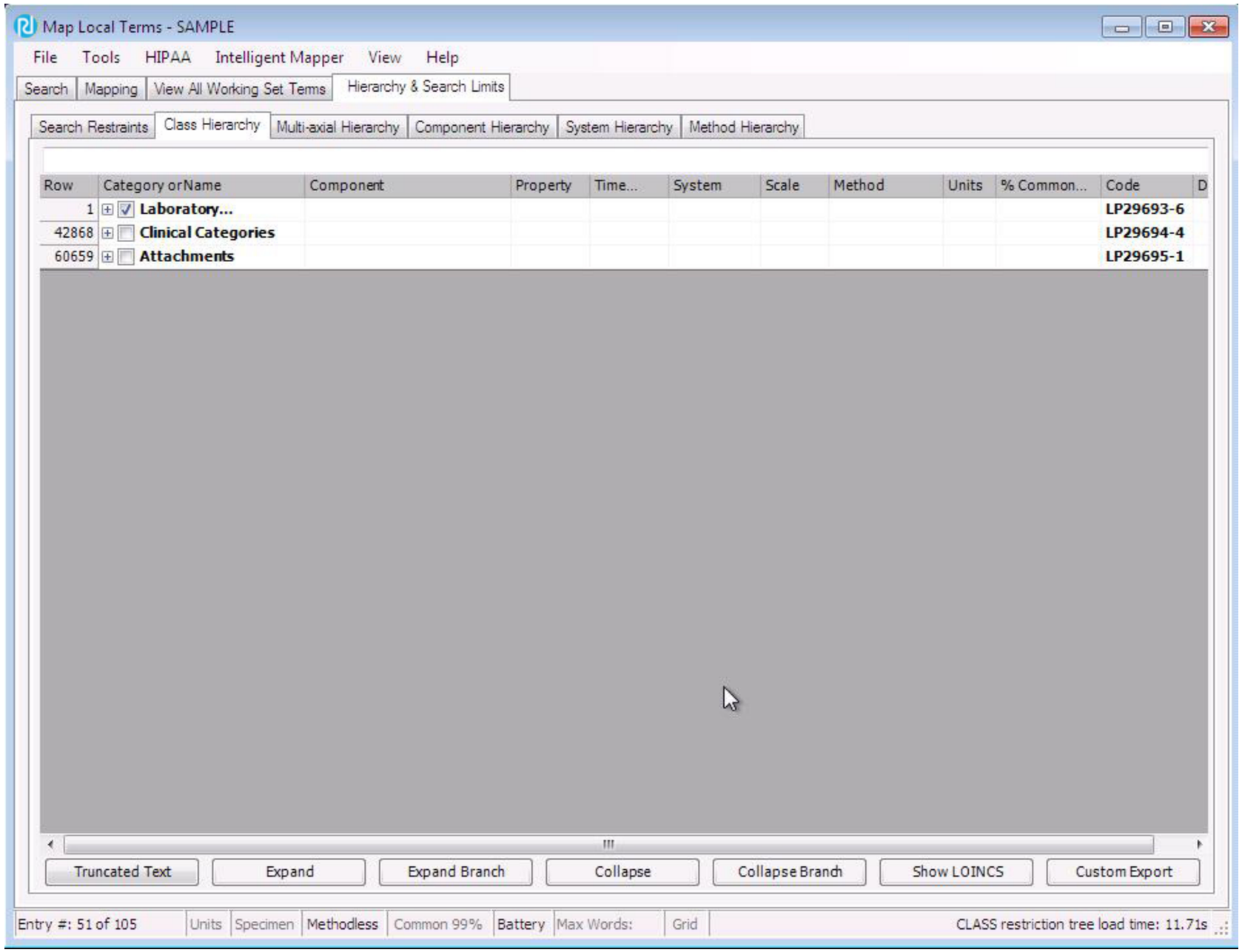
Sample search criteria without subset restriction

LOINC Hierarchies

Some natural hierarchies exist within the LOINC structure. These hierarchies can be useful aides in restricting searches for local terms.

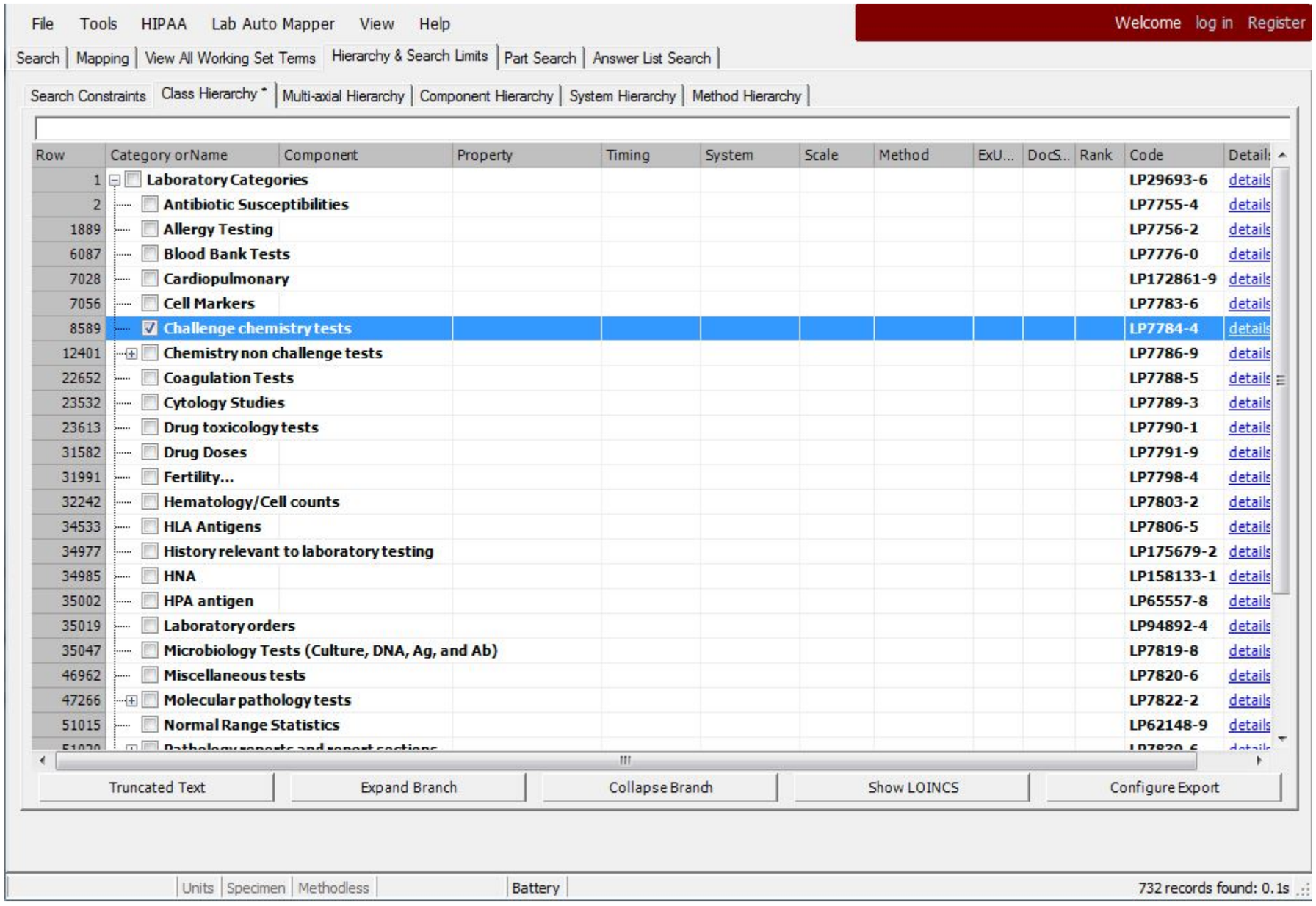
NOTE: All LOINC hierarchy structures (Class Hierarchy, System Hierarchy, etc.) function identically. You can apply the same methods described below for the Class Hierarchy to any of the other hierarchy structures.

For example, you may wish to limit your database searches by LOINC class. On the tab labeled "Class Hierarchy", you will find a tree structure containing LOINC classes. To restrict your search to records that are classified as one of the major class types, click on the checkbox next to the class name as demonstrated in the figure below.



Sub-class Restrictions

If you elect to restrict your searches to specific sub-classes within each class type, you may do so by expanding the branches of the tree structure and clicking on the checkboxes next to the individual elements. To expand or collapse a branch in the tree, click on the plus (+) or minus (-) sign to the left of the checkbox. When a branch is collapsed, it will display the plus (+) sign. When a branch is expanded, it will display the minus (-) sign. The figure below shows the expansion of the Laboratory branch with the "Challenge chemistry tests" branch selected, which you could do if you want to restrict results to only those LOINCs considered challenge chemistry tests.



NOTE: Hierarchy levels are mutually exclusive. As an example users may select multiple classes from the same level or different class types, but they may not select a parent along with any of its children. Using the figure above, users may select "Challenge chemistry tests" and "Cytology Studies" but not "Challenge chemistry tests" and "Laboratory Categories". Checking a child will uncheck its parent and vice versa.

Truncated Text

This button switches between truncated text and word-wrapped text.

Expand Branch Button

This button will fully expand the currently selected branch in the tree.

Collapse Branch Button

This button will fully collapse the currently selected branch in the tree.

Show LOINCs Button

This button will load all the LOINCs that are linked to each node in the tree.

Hide LOINCs Button

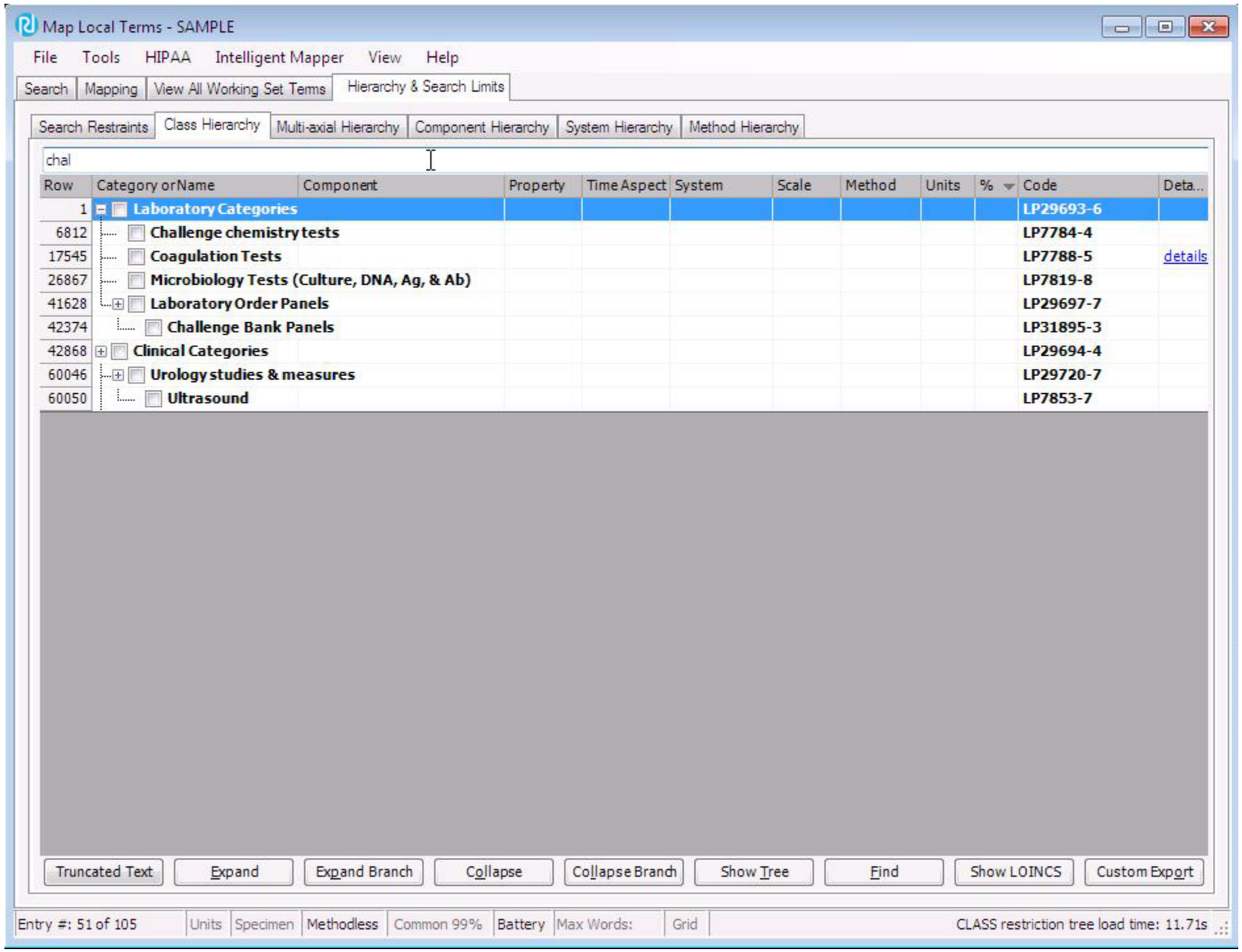
This button will hide all the LOINCs that are linked to each node in the tree.

Configure Export

Please see the "Exporting Search results" section.

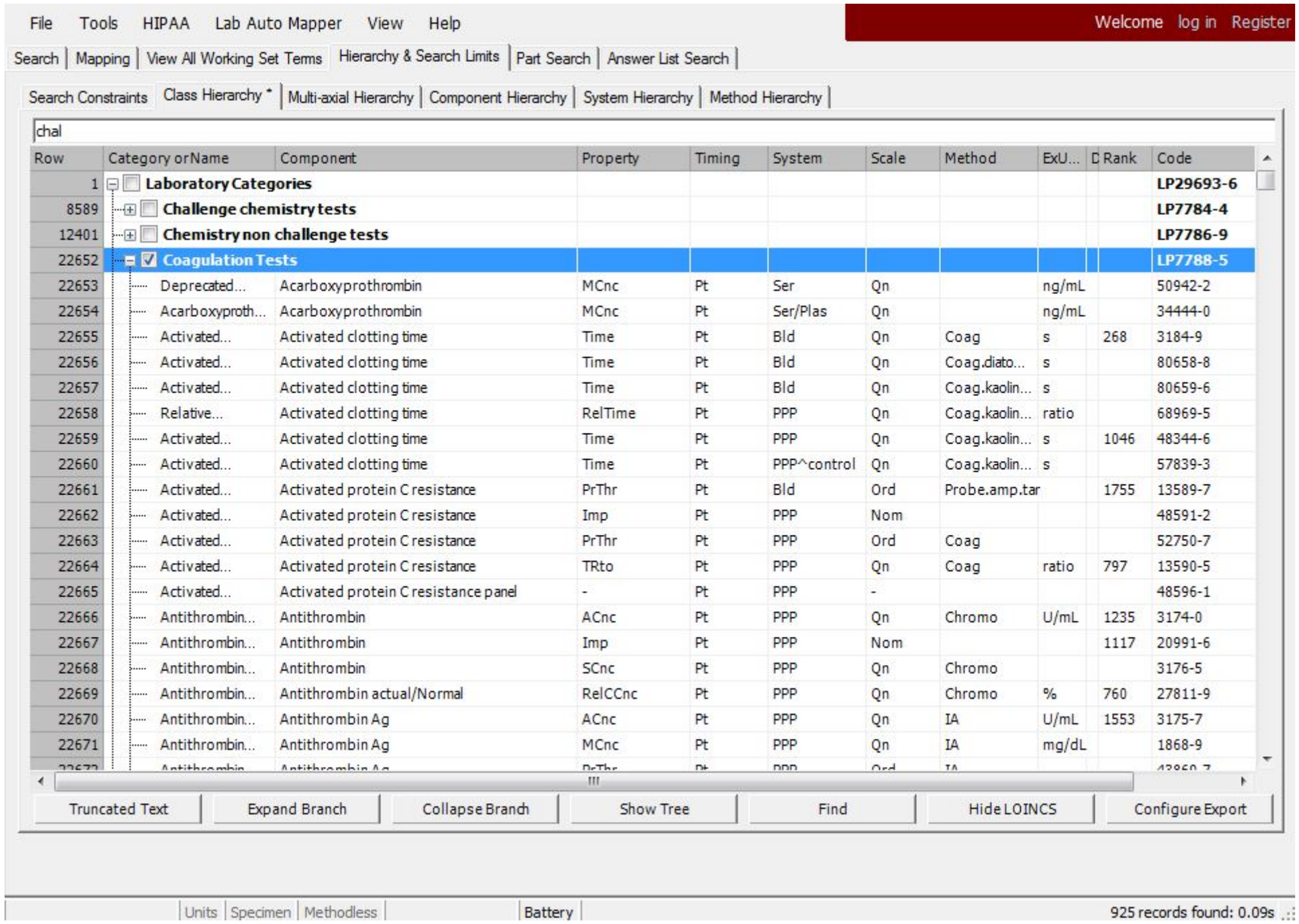
Searching the Tree

Users can type text into the textbox above the tree to search for words in the tree, as shown below. The user may then select items from the search results to restrict results in the primary Search tab.



Viewing LOINC Associations

As the small note below each tree indicates, users have the option of viewing or hiding the LOINCs represented by the nodes in the tree. This can be accomplished by pressing the Show LOINCs button (visible when LOINCs are hidden) or the Hide LOINCs button (visible when LOINCs are shown). The LOINCs which appear are linked to their tree node and will come up in a search when that node is selected. The LOINC data can be sorted in ascending or descending order by clicking on the column headers. The default sort order is in ascending order by short name. The column widths can also be adjusted by clicking and dragging the right edge of the column header.



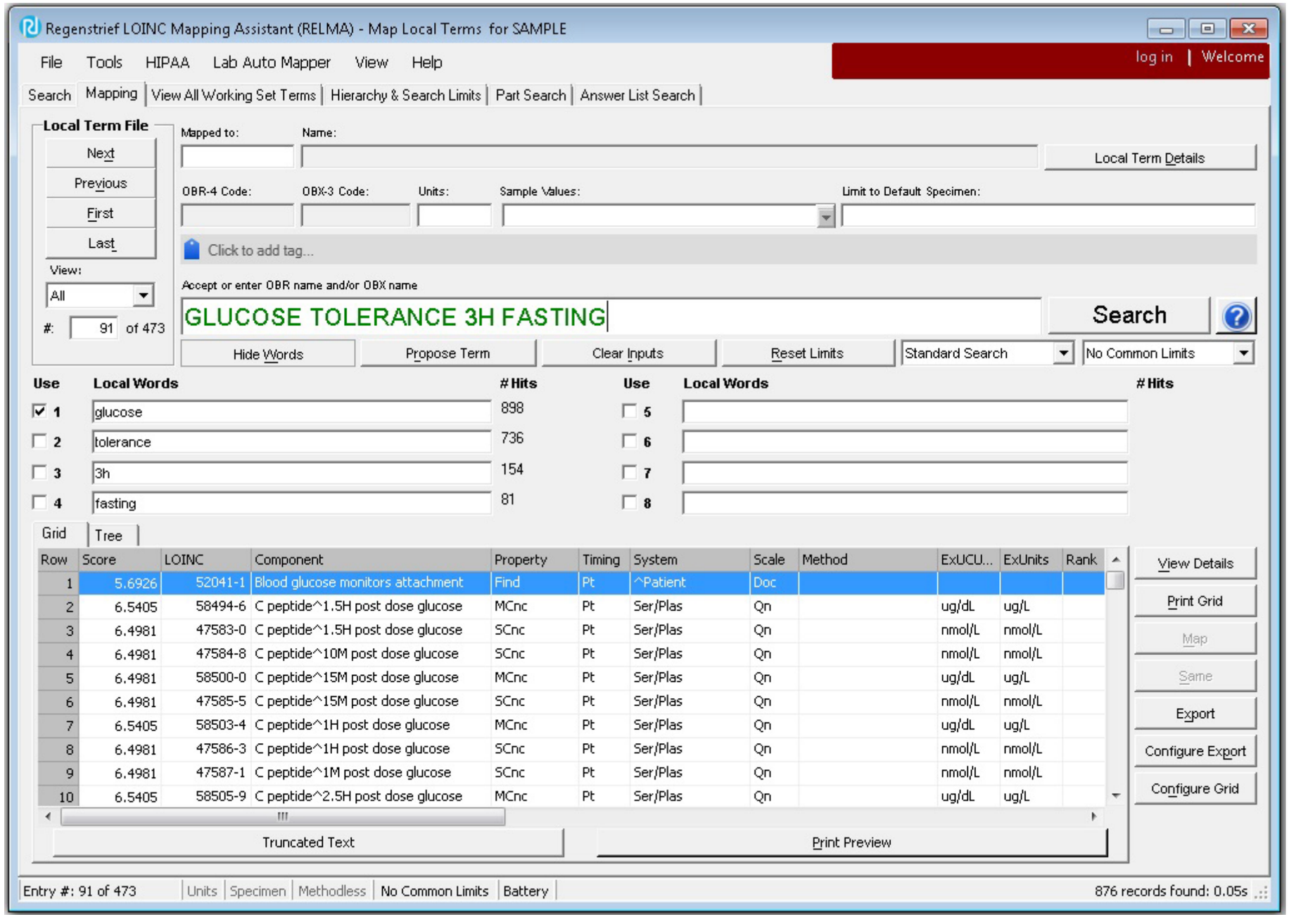
NOTE: Some nodes in the trees are linked to a large number of LOINCs, so there may be a small delay between when the user clicks on the node and when the LOINCs appear on the screen.

Conducting a Search

Searching is the heart of the RELMA program. The following sections cover topics related to performing a search using the mapping screen.

How Local Words are Used in a Search

To the right of each local word under the bold heading "**# Hits**" is a count of the number of times the given word appears in LOINC database records. For example, the figure below shows how many times each of the local search words **glucose**, **tolerance**, **3h** and **fasting** were found in LOINC database records.



The number of times a local word is located in the LOINC database can vary greatly. It is also quite possible that one or more of your keywords does not exist in any LOINC record. Therefore, the

frequency of any given search word could range from zero to several thousand occurrences.

The results of the database search appear at the bottom of the display screen. The data is presented in a table format with one row for each successful record match on the selected local words. By using the scroll bar on the right edge of the table you can scroll up and down through the data in the table. You may also scroll the table horizontally by using the scroll bar at the bottom of the table. For more information about the results grid, please refer to the Results Grid section of this document.

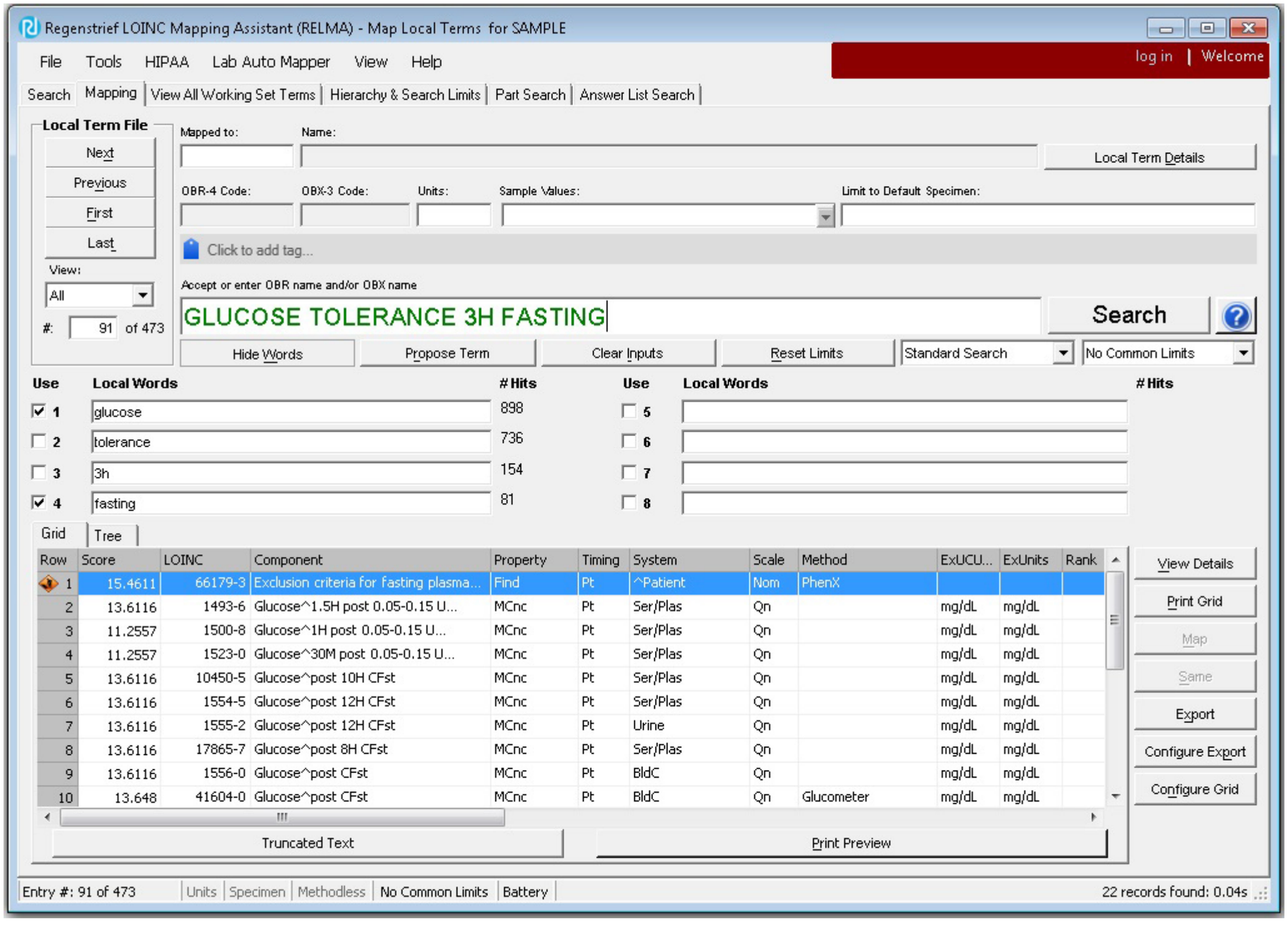
At the very bottom of the screen is a status bar, which contains additional information about the search being performed. In the rightmost panel is a message similar to "X records found in Y sec" where X is the number of records satisfying the search and Y is the number of seconds to complete the search. For more information about the status bar, please refer to the Status Bar section of this document.

Expressingan AND Condition

In the figure above, only the checkbox next to **glucose** was checked, so the search was only performed using one keyword. In the example below, a database search was performed using both the local words **glucose** and **fasting**. Because two keywords have been selected, RELMA will only return records that contain both of the search words, i.e., both **glucose** and **fasting** must be included in the each of the terms returned in the search.

When the search is executed, the RELMA program examines the number of hits for **glucose** and **fasting**, selects the smaller of the two, and uses that keyword for the initial search. In the example below, a search on the word **fasting** will be performed first. Next, RELMA searches for the word **glucose**, but only within the records that were returned with the **fasting** search, which makes the search much more efficient. On slower machines, the search time usually noticeably decreases if search words with relatively small hit counts are included in the search.

In the rightmost panel of the status bar in the figure below it shows how many records were found. Note that this number is smaller than either of the hit numbers for the individual search terms, because the final result only includes those records that contain both key words. As a general rule, the more search words you include in a database search, the fewer records will be returned.



Searching the Database Using Wild Cards in the Keyword(s)

Below is a description of each of the acceptable methods of searching using partial search words along with how and when to use them.

Wildcard 1: The asterisk (*)

The asterisk wildcard character is commonly used in searches where you know the first few characters or last few characters of the term you are searching for, and can be used to replace one or more characters. If you know the first few characters of the term, enter those characters into a Local Words text box followed by an asterisk and execute the search. Likewise, if you know the last few characters of the term, enter an asterisk followed by those characters and execute the search.

Local Word	Test Description	Search Result
GLUC*	AMYLO-1, 6-GLUCOSIDASE	Match on GLUCOSIDASE
*ASE	AMYLO-1, 6-GLUCOSIDASE	Match on GLUCOSIDASE
G*ASE	AMYLO-1, 6-GLUCOSIDASE	Match on GLUCOSIDASE

For example, if you are searching for the AMYLO-1, 6-GLUCOSIDASE test description, entering any of the Local Words listed in the table above would yield a match on GLUCOSIDASE and would display the test description you are looking for as one of the search results.

Wildcard 2: The question mark (?)

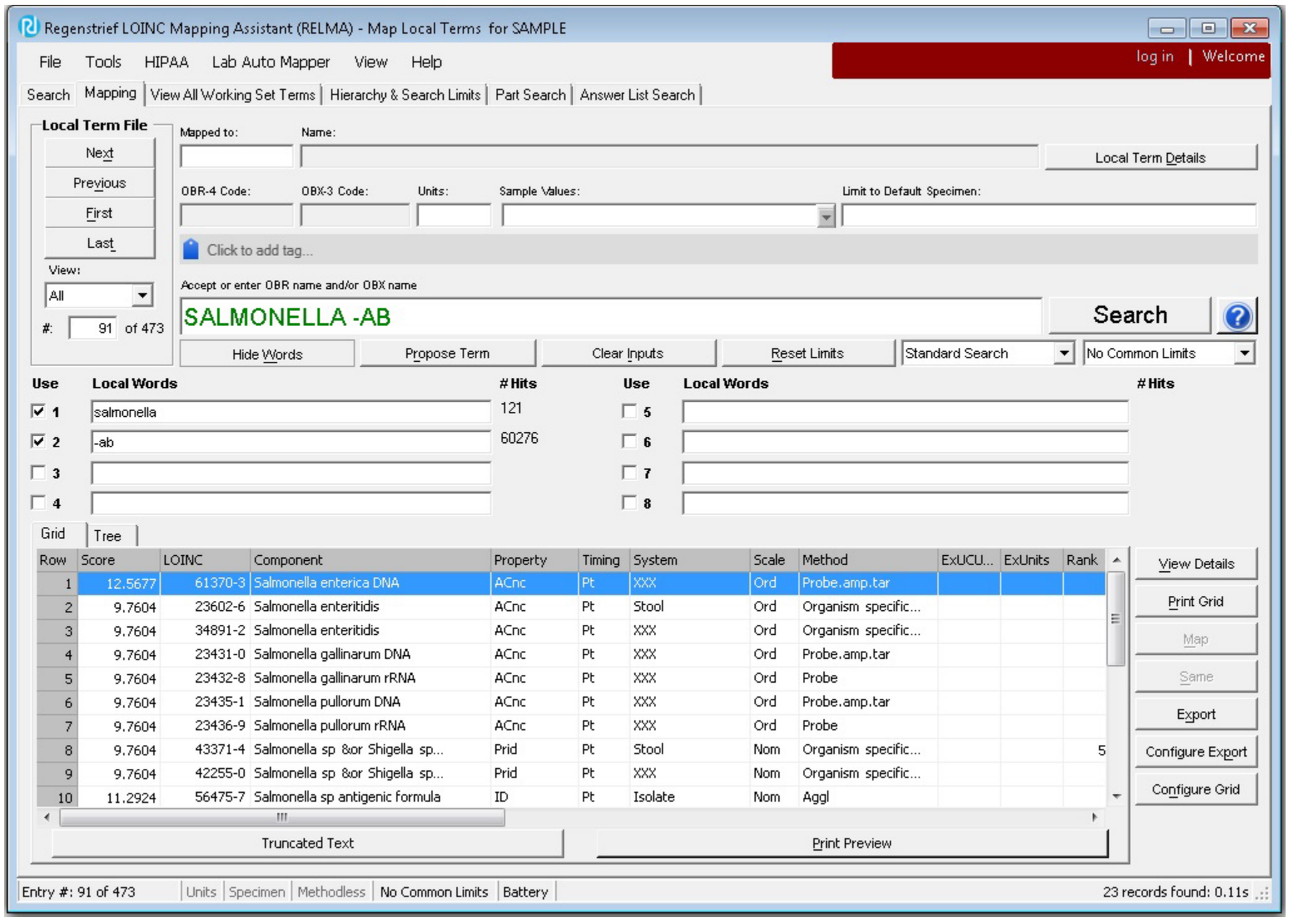
The question mark wild card character is commonly used in searches to replace only a ***single*** character. Simply enter the entire term to search for into the Local Words text box replacing the single unknown character with a question mark and execute the search.

Local Word	Test Description	Search Result
GLUC?	AMYLO-1, 6-GLUCOSIDASE	No match
?LUCOSIDASE	AMYLO-1, 6-GLUCOSIDASE	Match on GLUCOSIDASE
G?UCOSIDASE	AMYLO-1, 6-GLUCOSIDASE	Match on GLUCOSIDASE

For example, if you are searching for the AMYLO-1, 6-GLUCOSIDASE test description, the table above presents several examples of how the question mark wild card could be used and the results they would produce. The first Local Word would fail to match GLUCOSIDASE since there is more than one character following the "C" in GLUCOSIDASE. The other examples would yield a match on GLUCOSIDASE because of the single character replacement in the Local Word and would display the test description you are looking for as one of the search results.

ExpressingA NOT condition

To express a *NOT* condition, include a minus sign (-) in front of the word that should *NOT* be contained in the LOINC records of interest.

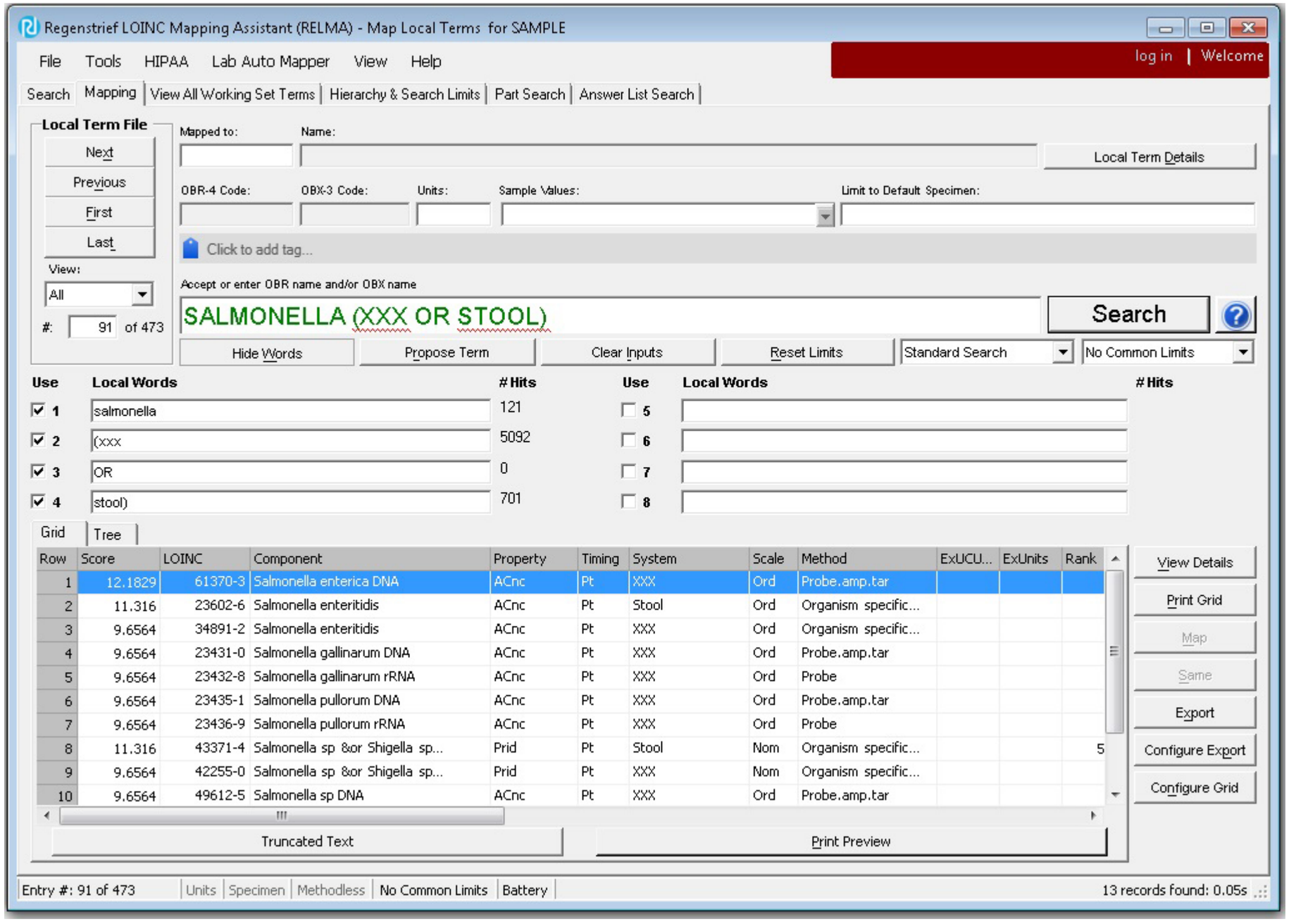


For example, if you wanted to find all LOINC terms containing SALMONELLA but not AB, enter SALMONELLA in the first Local Word text box and -AB in the second. The results of this search are shown in the figure above.

Expressingan OR Condition

To express an *OR* condition, place the Local Words to be connected by a logical OR in the same Local Words text box with each word separated by " OR ".

You can have more than one OR condition per text box and per search. Searches for most combinations of logical conditions can be searched in this manner.



For example, if you wanted to find all LOINC terms containing SALMONELLA and either XXX or STOOL, enter SALMONELLA in the first Local Word text box and (XXX OR STOOL) in the second. The results of this search are shown in the figure above.

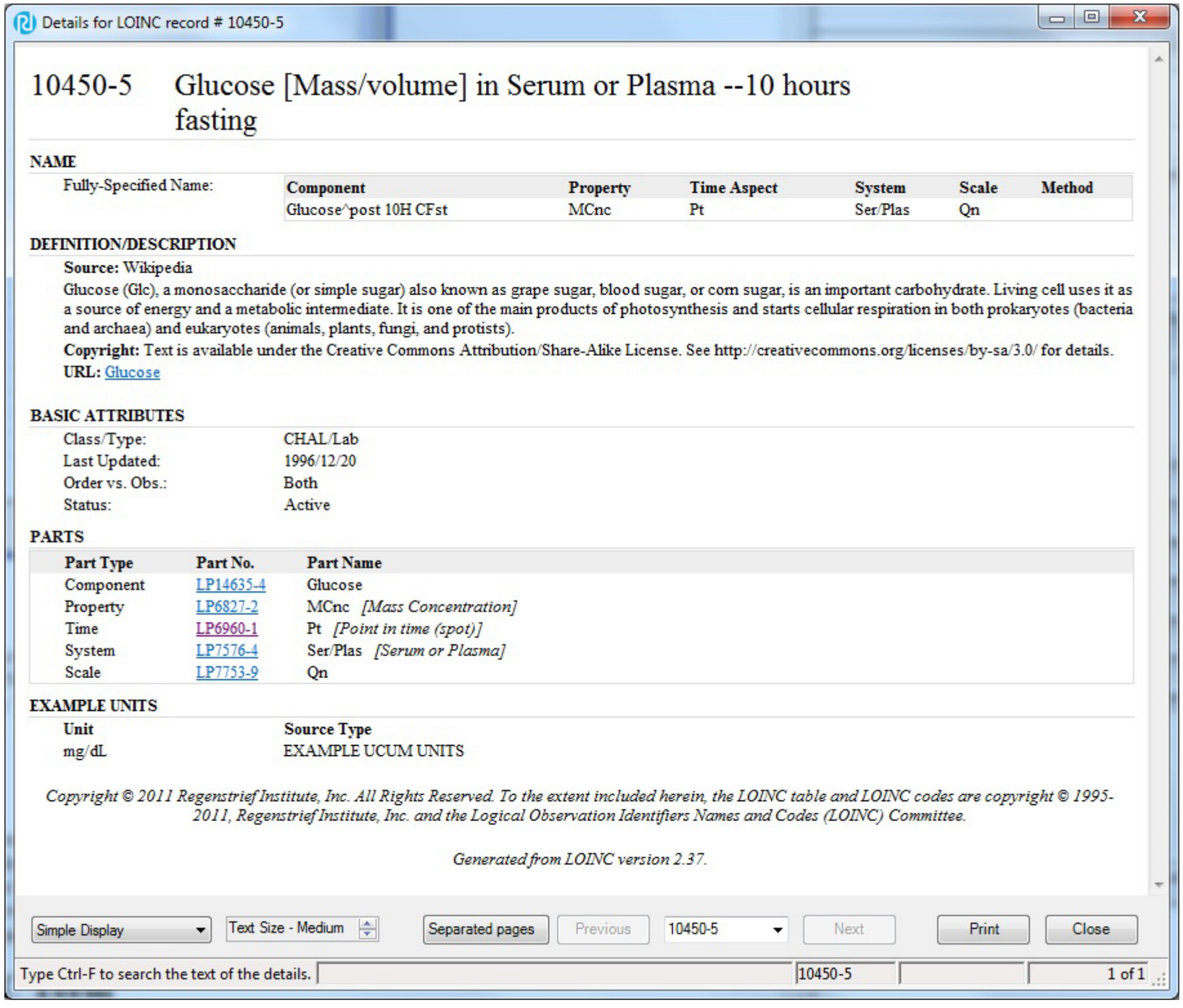
Auto Mapper Search

Selecting "Auto Mapper Search: Lab" or "Auto Mapper Search: Clinical" means that RELMA will try to find the matching LOINC Parts (Component, System, Time Aspect, Property, Scale, Method) in your search string. Auto Mapper Search then limits the LOINCs returned to the specified type of LOINC: Lab or Clinical (non-Lab). This increases the precision of your search, so the right LOINC will (hopefully) be near the top of the search results.

Selecting "Auto Mapper Search: No" means RELMA will try to find the matching LOINCs based on the combination of your search phrase words (without trying to find the matching LOINC Parts).

Viewing LOINC Details

If several similar records are returned after performing a mapping search and additional information is necessary to decide which record is best, right click the record of interest and select one of the "View Details" right-click actions. A screen similar to the figure below appears.

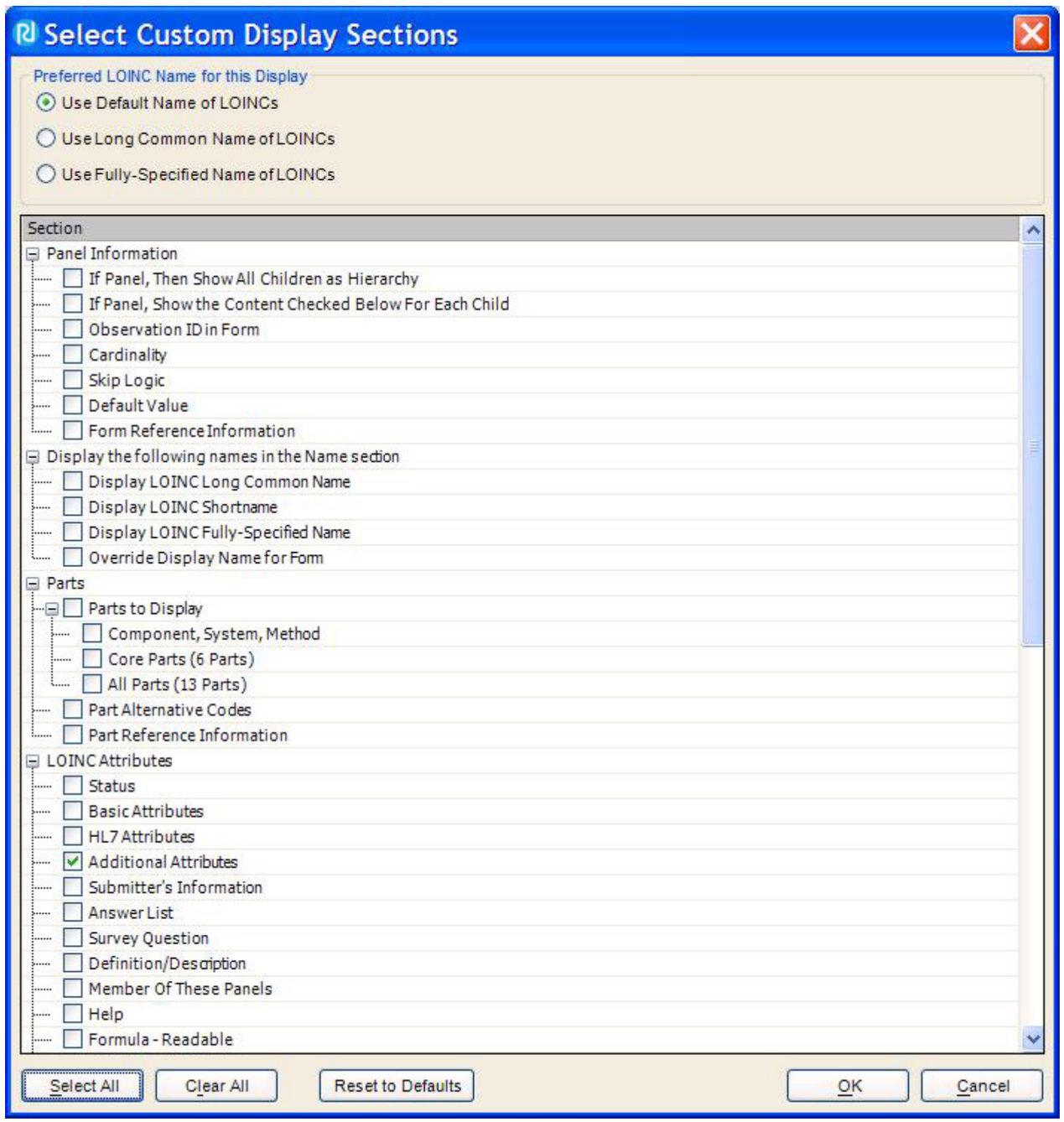


The interpretation of the additional LOINC fields is explained in the LOINC documentation. The additional details should prove useful when mapping your local codes to the LOINC codes. Please note that Part details for the LOINC are provided via links.

There are three levels of LOINC details to view, accessible from the lower left-most button on the details form as well as from the right-click menu.

1. "Simple Display" - Displays the most-commonly used fields during mapping.
2. "Comprehensive Display" - Displays all details of a LOINC.
3. "Custom Display" - Displays only the selected sections of the LOINC details report.

"Custom Display" in the figure below lets you pick which LOINC attributes to view by dividing the attributes into named, selectable sections of the details display. "Reset to Defaults" on that form resets the selected sections to the default set of sections (as displayed by "Simple Display"). The "Preferred LOINC Name for this Display" lets you set which name of the LOINC will be displayed as the title of the page. RELMA saves the selected Custom Display sections on exit, so you will see the same selected sections when you start RELMA again.



Viewing Details of Multiple LOINCs

If you select multiple LOINC codes from the search results and select a "View Details" action, the Previous and Next buttons on the form allow you to examine the details of other records from the display grid. If you click on the Next button, the next record after the current record in the grid is displayed. If you click on the Previous button, the record before the current record is displayed. You can also enter a valid LOINC number or LOINC Part number directly into the text box to view the details for any specific LOINC or LOINC Part code.

Options for Viewing Details

RELMA defaults to retrieving the details page for Simple and Comprehensive LOINC Displays from loinc.org (Custom LOINC details pages, details pages with multiple LOINCs, and Part details pages are always built locally). This default is often faster (and is always up-to-date) as compared to building the LOINC details page locally. You can change this default by using File > User Preferences > Details Pages. The default setting is 'Get from Internet', but you can change it to 'Build Locally' if you need to (for example, when you do not have an Internet connection). (Locally-built LOINC Simple and Comprehensive Display details pages are cached so you pay the price of building the details page locally once per LOINC version.)

Mapping Your Local Term to a LOINC Term

Now that you are familiar with the general features of the RELMA mapping program, you can begin mapping your local terms to those found in the LOINC database. The mapping task is a four-step process.

1. Selecting the keyword(s)/local word(s) from your local description by clicking the appropriate keyword checkboxes.
2. Initiating a search using the local word(s) by clicking the Search button.
3. Choosing a single, active LOINC record from the table of matches that best describes your local term.
4. Associating the LOINC record with your local term.

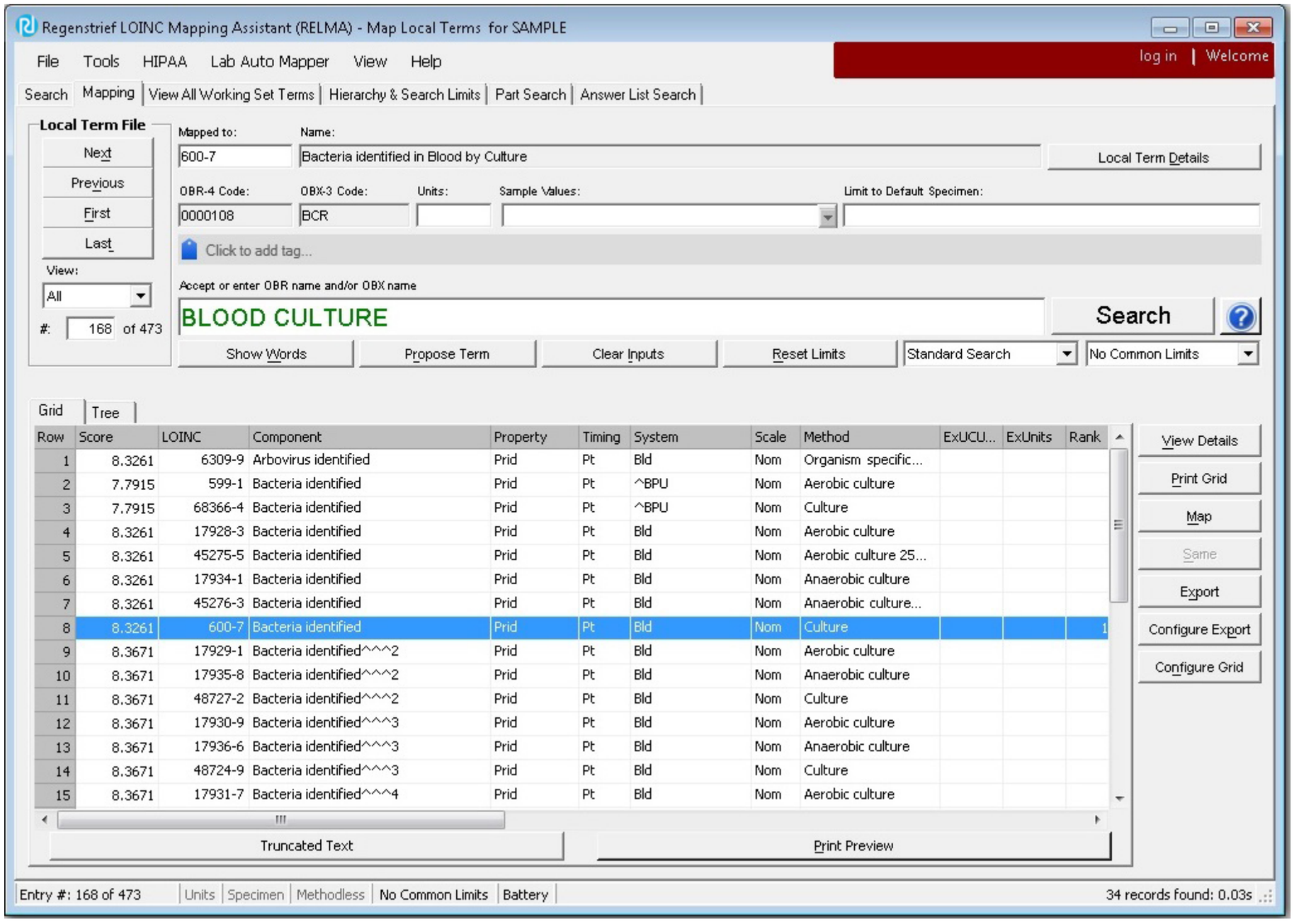
After you find a LOINC record that describes your local term, you need to associate or ***map*** your local term to the LOINC term you've selected.

Please refer to the figure below. To map your local term, click on the LOINC term in the grid that you wish to associate with your local term. The program highlights the row you clicked on. Now double-click on the same row. The program then copies the LOINC number and description into the local term's LOINC field--you have successfully mapped your local term to a LOINC term. If your local term had previously been mapped to a LOINC, the program would have asked you to confirm that you are overwriting the existing LOINC mapping.

Clicking the "Comment" button on the lower right side of the screen will allow you add/edit the comment associated with the current local term. You can add/edit a comment at anytime, not just at the time you are mapping the term.

IMPORTANT : You **cannot** map your local code to a deprecated LOINC. Deprecated LOINCs are displayed in the results grid with the international NO sign displayed in the left-most column of the grid and displayed with a strikethrough font to emphasize they are no longer active LOINC terms.

NOTE: You may also map your local term using several other methods. You can right click on the row in the results grid that best matches your local term and choose the Map option from the context menu. You may also type in a valid LOINC code in the text box provided (manually mapping to a LOINC term).

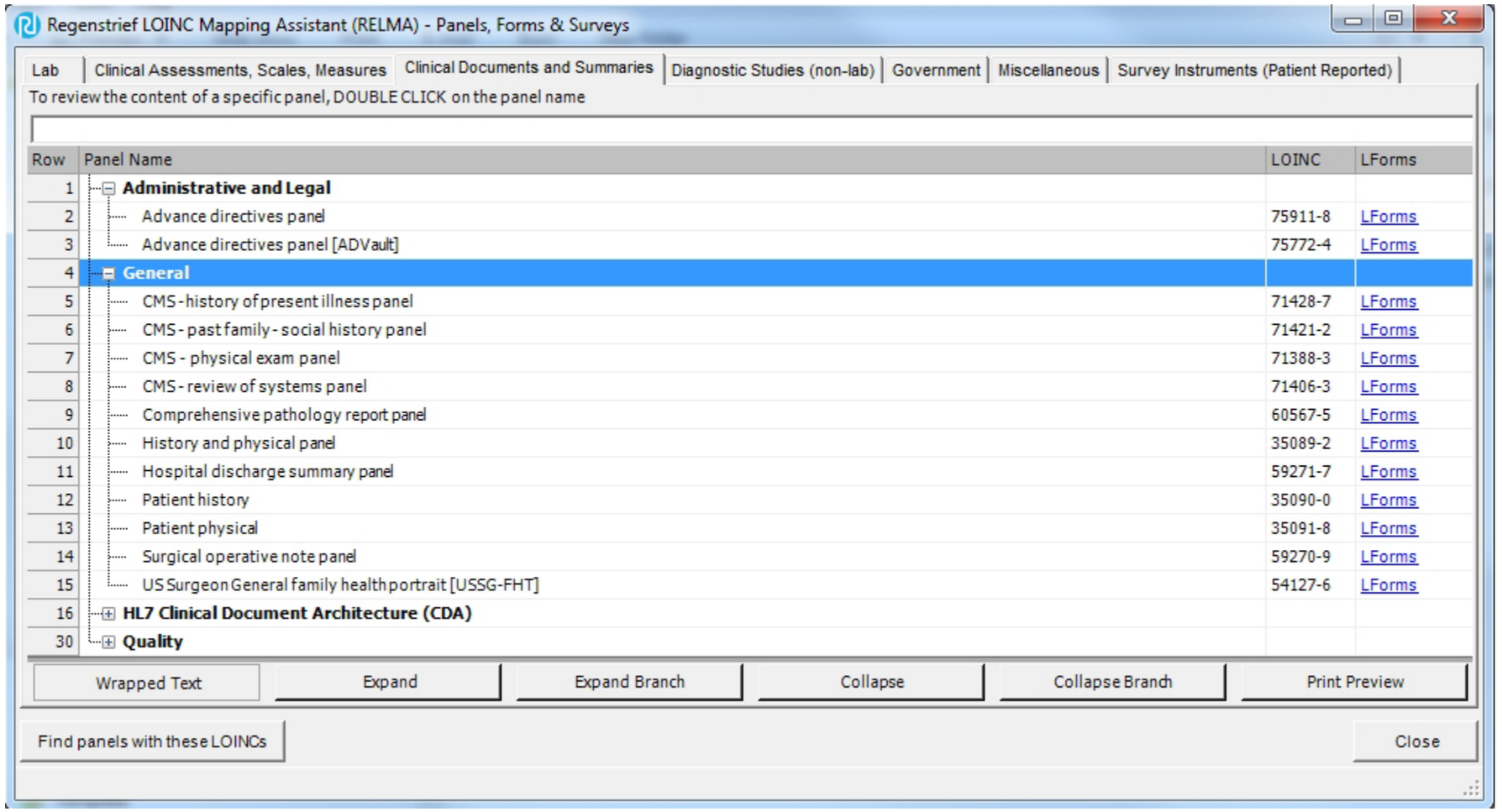


You should repeat the mapping process for all other records in your Local Term File.

NOTE: RELMA does not require you to map everything "in one sitting". You can always pick up where you left off. You may want to use the "View Unmapped" option (found below the Next/Previous/First/Last buttons) for subsequent mapping sessions.

Browsing Panels, Forms & Surveys

You can browse the LOINC panels and surveys by clicking the "Panels, Forms, & Surveys" button on the main screen or selecting the "Review Panels, Forms, & Surveys" menu option. In either case you will be presented with a screen similar to that shown in the figure below.



The panels and surveys are divided into groups. Each group is displayed in its own TAB on the screen. Clicking a TAB will display the listing for that particular group.

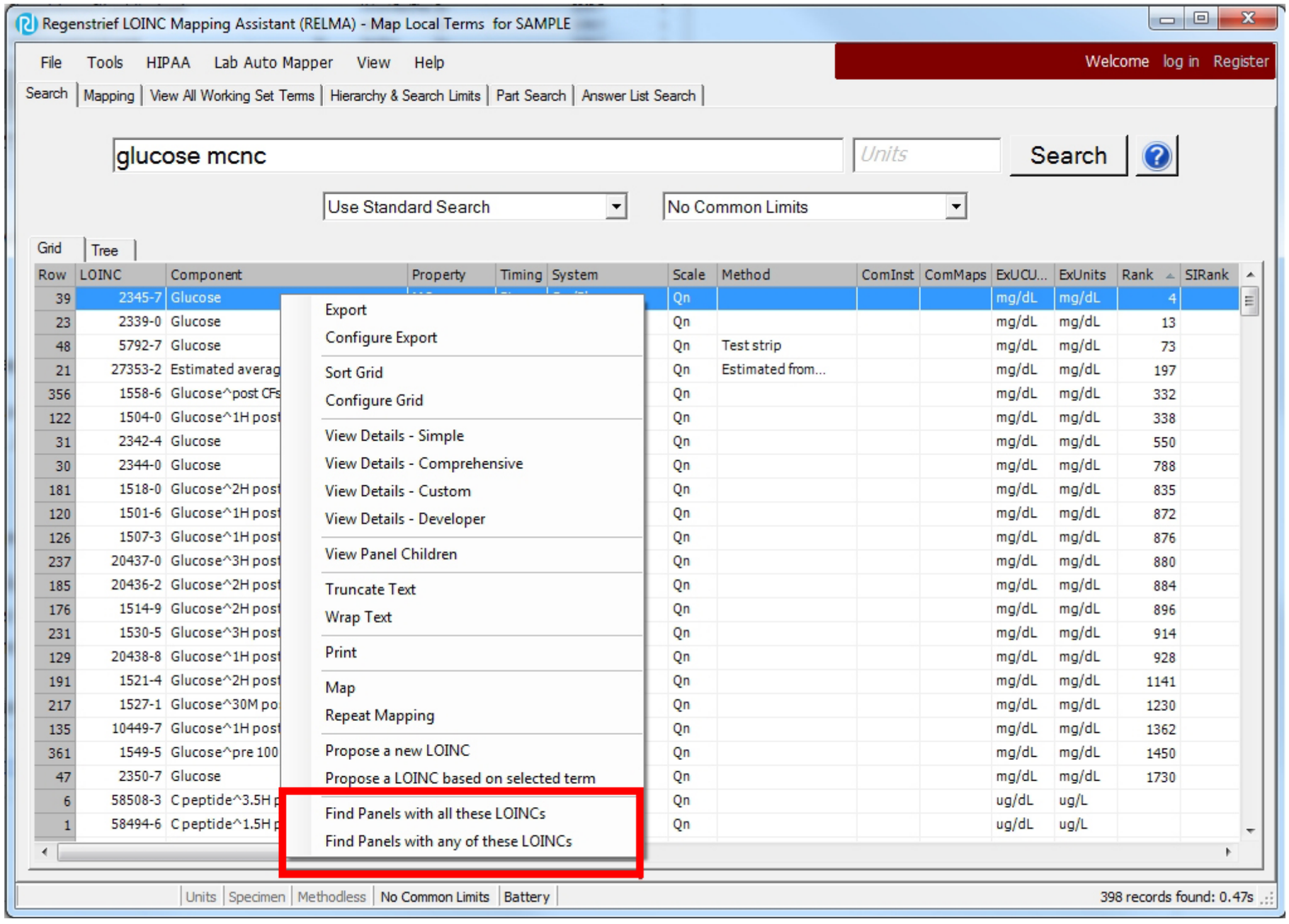
You can view the details of a panel by double-clicking the panel name with the mouse. Alternately, you can use the "View Details" right-click actions to display the currently highlighted panels. You can also select multiple panels for viewing using by dragging the mouse over the display.

Clicking the LForms hyperlink will display the LOINC term in the LForms demonstration program. Viewing the LOINC in LForms allows you to interact with the LOINC terms inputing information as an end user might do.

You must be logged in to view the LOINC term in LForms. Just use the same user-name and password that you use with login into RELMA or the loinc.org website. We have tried to automate this process as much as possible, but it is very dependent upon the web browser that you are using. You will have the best experience if you use Chrome as your default browser. You will have the worst experience if you use Internet Explorer as your default browser.

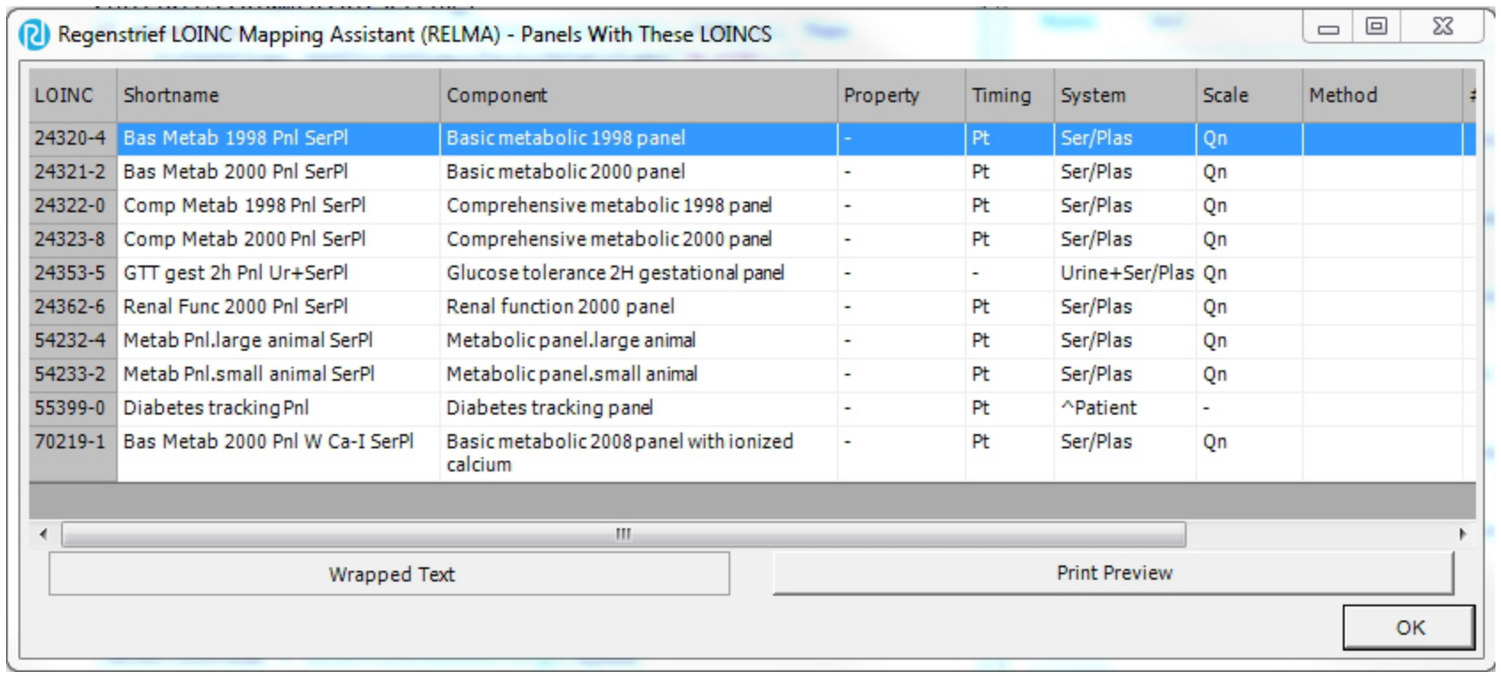
Finding Panels that contain specific LOINC codes

The context menu on both the mapping and search screens contain options for listing the panels to which the selected LOINC code(s) belong.



The "Find Panels with all these LOINCs" option lists those panels that have each and every selected LOINC term as members. The more LOINC codes you have selected, the fewer panels will be returned. It is very easy to select enough LOINC terms so that no panels will will contain them all, so start small.

The "Find Panels with any of these LOINCs" option is much less constrained. It returns all of the panels that contain any of the selected LOINC terms. The screen shot below shows the results of this command for LOINC 2345-7.



HIPAA Claims Attachments

RELMA provides a convenient viewer for browsing the LOINC terms used in claims attachment as specified by HIPAA. The HIPAA Administrative Simplification provision mandates the adoption of standards for electronic claims attachments. A claims attachment includes the clinical and administrative information often necessary to adjudicate claims for ambulance, rehabilitation, or emergency room services. Regenstrief has worked closely with the HL7 Attachments Work Group to support the use of LOINC codes in the electronic exchanges of attachments between payers and providers.

The attachments viewer in RELMA is available from the "HIPAA" menu. For more information about browsing HIPAA Attachments with RELMA, see Appendix B - HL7 Attachments

Export full panel structure to Excel

See Appendix A - Export Full Panel Structure to Excel

The Lab Auto Mapper

The Lab Auto Mapper (LAM) tool can help automate the mapping process for laboratory terms. Lab Auto Mapper includes three options. The first option is the "Process Terms" button, which scans the Local Term File to find LOINC terms that it thinks closely resemble those local terms. This scan uses a series of algorithms along with the defined word substitutions and the default lab section definitions. Once the Lab Auto Mapper's analysis is done, the user can view the output via the Report button on the LAM screen (option 2). This report shows each of the user's local terms, along with the set of matching LOINCs found during analysis. After the analysis, the user can map his or her local terms to those matching LOINCs by pressing the Map to Results button on the LAM screen (option 3).

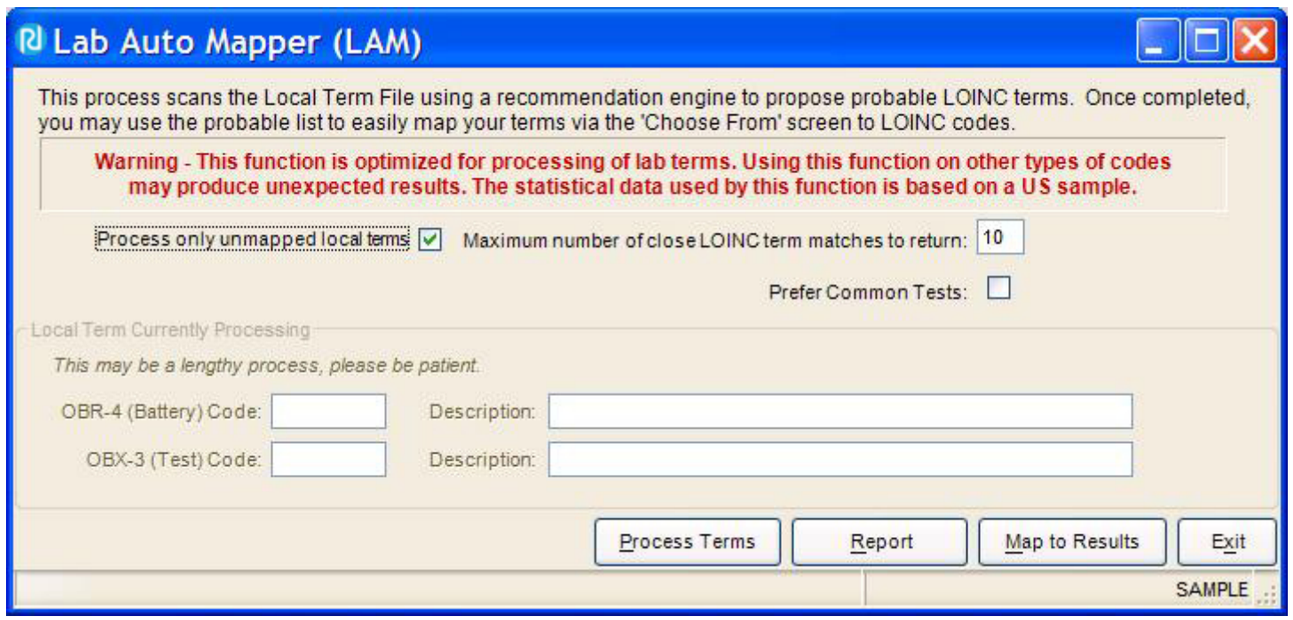
Note: *It is highly recommended that you take advantage of the pre-mapping functions RELMA provides. Using them will greatly improve the odds that the Lab Auto Mapper will choose the right LOINCs for your local terms.*

Finding the Best LOINCs that Match Local Terms

The process of mapping local terms to LOINCs using the Lab Auto Mapper begins with the Process Terms button. In general, the process loops through the current Local Term File, and finds a user-defined number of close matches to each local term. The matches are ranked using word combinations derived from the local terms.

The results of the searches performed against the user's local term file are stored in the user's LMOF3.MDB file. This allows the user to review them interactively or retrieve the results later and print them using the "Report" button.

The figure below shows the screen on which the user prepares and executes the processor. The bottom portion of the screen displays information for each local term analyzed by the processor. The user can limit the maximum number of candidate LOINCs returned for each search (the default value is 10). If you check "Prefer Common Tests", then more LOINCs that are common tests that otherwise match will end up in the search results.



NOTE: The user may press the escape key at any time during the automated mapping process to abort the operation.

Lab Auto Mapper Processing Explained In-Depth

The automated mapping process begins by looping through each term in the current local term file. The term's OBR and OBX description fields are combined and preprocessed using the same functions as used by the main mapping screen. This preprocessing includes duplicate word removal and translating local words (as in *OH* to the LOINC word *HYDROXY*).

A search object is created from the preprocessed descriptions, units, and the default specimen based on the lab sections. These search objects are passed to a batch search engine that looks for candidate matching LOINCs for the local term. The batch search engine starts by examining the longest combinations of preprocessed keywords to see whether they match a LOINC Part name and/or synonym. (A LOINC Part is one part of the fully-specified LOINC name - Component, Property, Time Aspect, System, Scale, and Method.) Matching LOINC Part names are appended to the search string. If the keywords are synonyms, their LOINC Part names are appended to the string and those synonyms are excluded. These keyword combinations are known as "probes" (as in "probing the LOINC database to find a matching Part"). The LOINC Part names found are known as "targets" (as in "targets of the probe").

For each set of targets derived from the pre-processed keywords, a search is conducted. A set of candidate LOINCs is then returned, constrained by a set of standard search restrictions for Lab LOINCs. The candidate LOINCs for each search are then scored by how closely the candidate term matches the local term. Scores are computed using the words in the targets. The engine counts the number of words in the targets that are found in that LOINC's fully-specified name. A ratio is then calculated which represents the number of target words matched to the number of total words in the fully-specified LOINC name (e.g. 4 out of 7 words or 4/7 = 0.57). (Some common words are ignored so they do not outweigh the other words in the LOINC names.)

After scoring, the set is sorted by score so that the closest matching candidates are first. If two terms have the same score, then the term with the higher match ratio is preferred. If two terms have equal scores and equal ratios, then the term with the higher match count (# of local words matched) is preferred. If two terms have equal scores, ratios and match counts, then the term with the lower number of total words (# of LOINC words) is preferred. If two LOINCs are otherwise identical, then the LOINC with the highest common test percentage is preferred. (Please note that this is separate from the action of the "Prefer Common Tests" checkbox.)

Once the set of candidate LOINCs has been sorted, the top N (defined by user; default is 10) are returned to the RELMA program. The candidate LOINCs and search statistics are then stored physically in the user's LMOF3.MDB database.

NOTE: The actual time taken depends on:

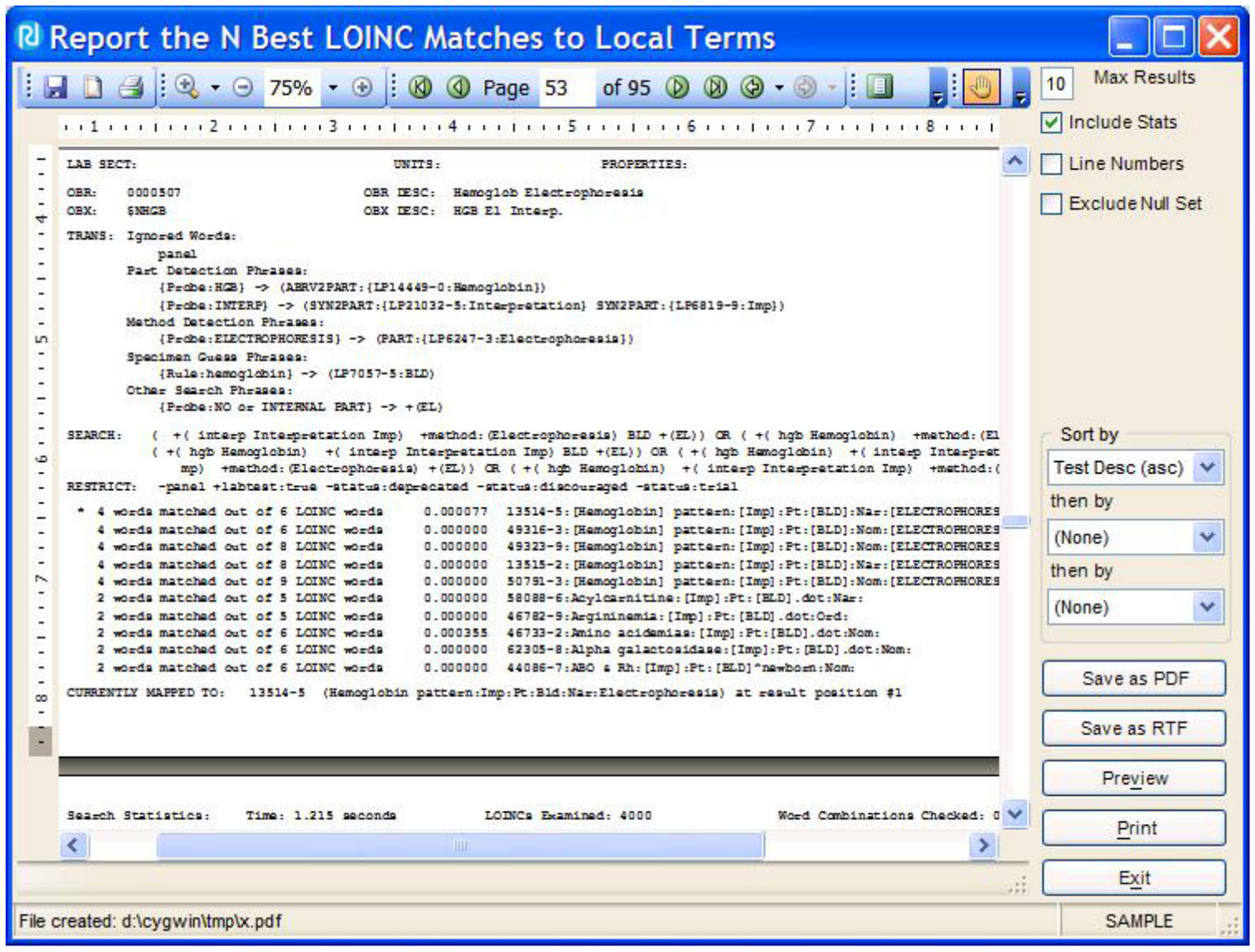
- The number of terms in the Local Term File;
- The number of words in the battery and test descriptions; and
- Whether those combinations of words exist in the LOINC database. (For example, "spleen AND antibiotic" never occurs in the LOINC database.) Because of this, it is important to map all unknown words in the local term file before using the Lab Auto Mapper.

NOTE: The Lab Auto Mapper has been tuned to process non-panel laboratory terms. Use on other local terms will return only non-panel laboratory LOINCs, which may not be the LOINCs that you need.

Report the LAM LOINC mapping suggestions

The Lab Auto Mapper stores its results in the user's LMOF3.MDB database. This is done so the user can return to RELMA after the process is completed to review and print the results. By pressing the Report button on the Lab Auto Mapper form, the user can access the report feature.

When the report screen first appears, the main display area is blank. This is so that you can enter your preferred options before generating the report.



Max Results

Printing or viewing a large Local Term File can result in a very large report. One way to control the size of the report is by limiting the number of LOINCs printed. You can set the number printed to any value between 1 and 99. The default value is 10 as shown in the figure above.

Include Stats

Selecting "Include Stats" prints some basic statistics. Using this option will add an additional 2 lines to the report for each record in the Local Term File. If you are trying to limit the size of the report, make sure this option is not selected.

Include Line Numbers

Selecting this option will cause sequential line numbers to be printed down the left hand side of the report.

Exclude Null Sets

Aborting Lab Auto Mapper means some terms in the local term file will not be examined. Less often, searches will return zero candidate LOINCs for a local term. When either of these two conditions occur, it can be helpful to exclude those empty result sets from the report.

Sorting options

The "Sort by" dropdown boxes allow the user to control how the local terms will be sorted. The first box is defaulted to sort by the test description words in ascending order.

Viewing the Report

After setting all the desired options, you can preview, print, or save your report to a file. These actions work the same as those described in other sections of this manual.

A Note on the Report's Content

The report prints a section for each term in the Local Term File. The first line is divided into 3 fields. The LAB SECTION field will indicate the Lab Section, if any, to which you have assigned this local term. If a term hasn't been assigned to a lab section, then this field will be blank. The second field indicates the UNITS used by the local term. The third field indicates the LOINC Property(s) that correspond to the units used by the local term.

The next three lines of the report show your local code.

The lines that begins with "TRANS:" are interesting. These lines show you what LOINC Parts (targets) match the combinations of pre-processed keywords (probes) derived (translated) from your local term. For example, a local term of OBR = "UA MICROSCOPIC" and OBX = "CASTS-HYALINE" with units = "/LPF" yields this "TRANS:" section:

```
751 TRANS:Ignored Words:
              panel
          Part Detection Phrases:
              {Probe:CASTS} -> (PART:{LP14044-9:Casts})
          Method Detection Phrases:
              {Probe:MICROSCOPIC} -> (ABRV2PART:{LP6392-
              7:Microscopic observation} SYN2PART:{LP6393-
              5:Microscopy})
          Specimen Detection Phrases:
              {Probe:UA} -> (SYN2PART:{LP7681-2:Urine}
              SYN2PART:{LP7690-3:Urine sed})
          Specimen Guess Phrases (forced urinalysis):
              {Rule:urinalysis} -> (LP7681-2:URINE LP7690-
              3:URINE SED)
          Other Search Phrases:
              {Probe:NO or INTERNAL PART} -> +(HYALINE)
```

The "TRANS:" area can have these sections, each of which is displayed only when they have any contents:

1. "Ignored Words" - words that are too vague to be useful in the Lab Auto Mapper search. This also includes words for concepts that the Lab Auto Mapper currently ignores (like "panel" above).
2. "Time Detection Phrases" -- the translation from a probe that matches a LOINC Part that is a known Time.

3. "Part Detection Phrases" - the translation from a probe that matches a LOINC Part. (These are Parts that are not a Time, Method, or specimen (System).)
4. "Method Detection Phrases" -- the translation from a probe that matches a LOINC Method Part. Methods are expected only in the OBR description, and only when the OBR description is not the same as the OBX description.
5. "Specimen Detection Phrases" - the translation from a probe that matches a LOINC specimen (System) Part.
6. "Specimen Guess Phrases" - zero or more guesses as to what specimen was meant by the local term. Guesses are determined by rules for the common specimen types. (The rule name is displayed after the "Rule:".) If there are both "Specimen Detection Phrases" and "Specimen Guess Phrases", then only the "Specimen Detection Phrases" are used in the search.
7. "Other Search Phrases" - these are search phrases found in the preprocessed keywords that do not match any LOINC Part above.

The translation / matching process can match by:

1. LOINC Part name ("PART" above);
2. LOINC Part abbreviation ("ABRV2PART");
3. LOINC Part display name ("DISP2PART"); or
4. A LOINC Part name synonym ("SYN2PART").

Next in the report come the LOINCs that the processor has found as possible matches for the local term. At most, you see the number of LOINCs that you specified in the "Max Results" box. The LOINCs are ranked by the processor in an attempt to make the best match appear at the top of the list. As you can see from the report, this ranking is based on how completely the target words match the words that make up the LOINC term. On the first LOINC in the example, you can see that 4 words from the translated code description matched LOINC code 13514-5. The words that matched are surrounded by [] to make them obvious. You can also see on this line that the report states that "4 words matched out of 6 LOINC words".

A close inspection of that LOINC term will reveal that it actually contains more than 6 words. This is because the program takes certain liberties when counting words to help get the best results to the top. Mostly, the scoring routine will ignore words in the LOINC name that will rarely, if ever, show up in a description. This would include things like "Pt" from the time field and "Nar" from the scale field.

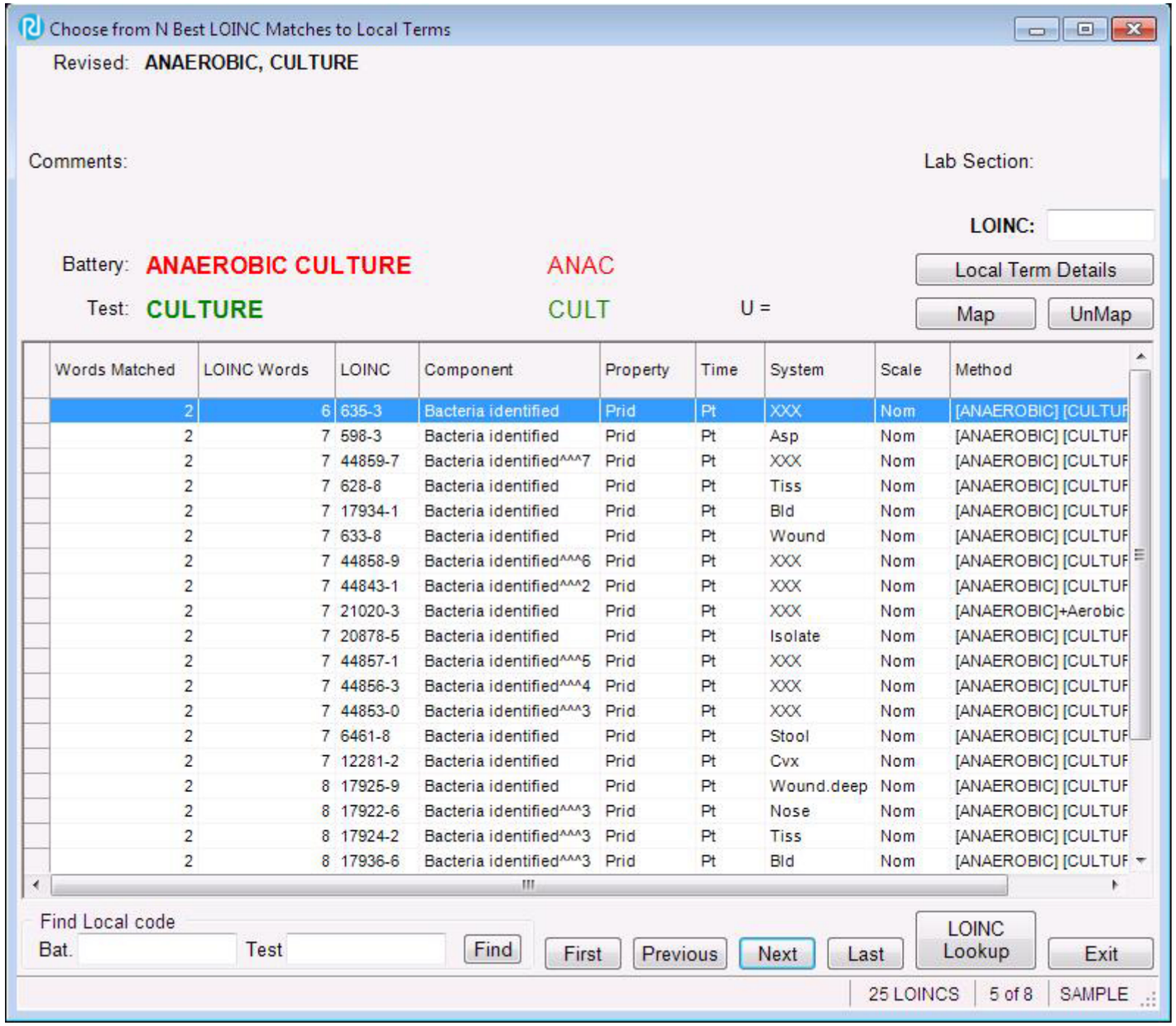
Map LOINC code to local term

The final step of the Lab Auto Mapper process is to actually map a LOINC code to your local term. You do this from the screen shown in the figure below. As you can see, this screen contains many of the same elements of the report just described. The difference is that you can interact with this screen and map a LOINC to your local term.

The top part of the screen displays the current local term and its translated descriptions. On the right of the screen are the units ("U =") and lab section for this term. You can also see the LOINC code currently mapped to this term (shown in the "LOINC" textbox).

The center grid contains the LOINC codes found during the analysis of the Local Term File. The number of LOINC codes in the grid will be less than or equal to the "Max Results" value. The number of LOINCs in the grid is displayed in the status bar at the bottom of the screen.

The grid initially displays LOINCs with the best match first, then the next best, and so on. However, the grid provides you the ability to sort the records any way you wish. Simply click the column header that you want to sort on. The first click will sort the records ascending on that column. A second click on that column header will reverse the sort order. You can also rearrange columns by clicking and dragging a column header. Column widths can be adjusted by dragging the column dividers.



To map a LOINC code to the local term, simply locate the correct code in the grid and double-click on it. You will then see the LOINC number appear in the upper right hand side of the screen. You can also click on the "Map" button above the grid on the right side of the screen.

The "First", "Previous", "Next", and "Last" buttons at the bottom center of the screen are used to navigate the Local Term File. Your current position within the Local Term File is displayed in the status bar at the bottom of the screen.

You can move directly to a specific term by entering the code or codes in the text boxes located in the bottom left-hand side of the screen and then clicking the "Find" button. You don't have to enter both the battery and test code, but if you don't, you can't be sure that you'll be positioned at the correct local term.

You may view and edit the details of the local term by pressing the "Local Details" button.

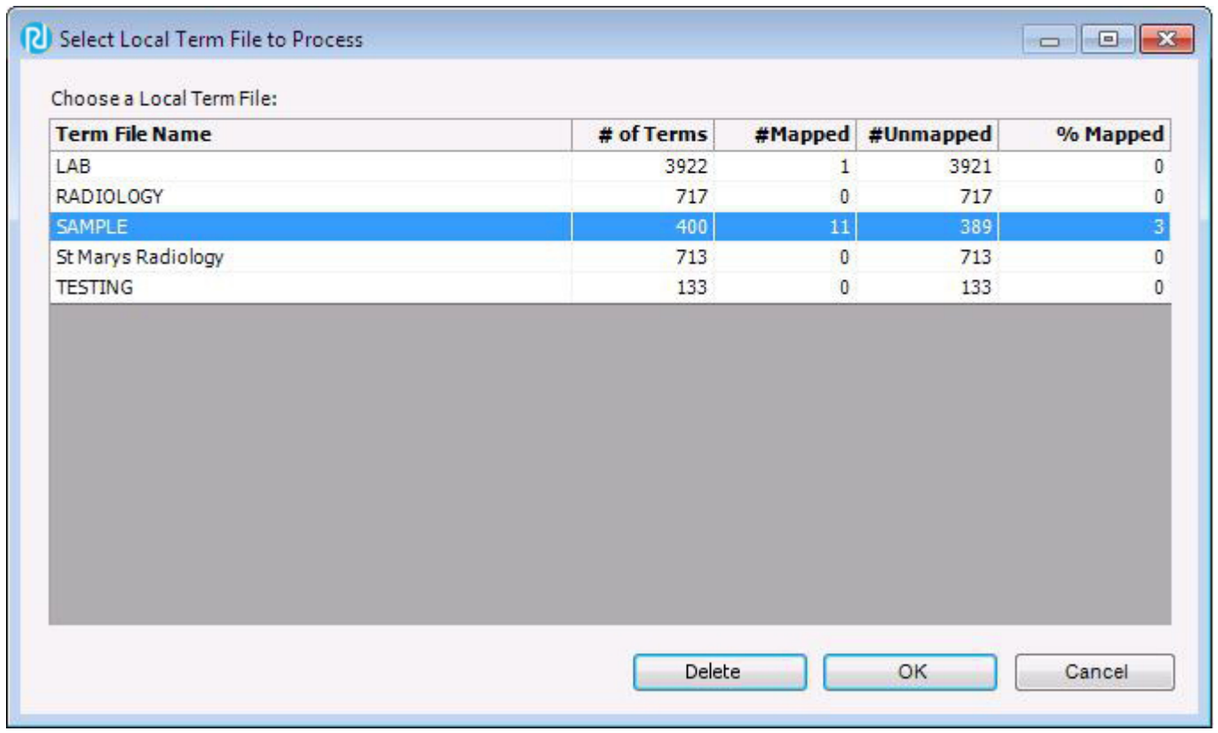
You may view the details of a LOINC number by clicking the "LOINC Lookup" button or by clicking the right mouse button on a LOINC term.

Selecting/Deleting a Local Term File to Process

Because some users organize their local terms into multiple sets, the RELMA program provides a way for them to switch between the various sets they have created. On either the welcome or mapping screen, the user may choose the File > Change Local Term File option and bring up the screen shown in the figure below.

You may also delete a local term file by selecting the appropriate row and clicking the delete button at the button of the form.

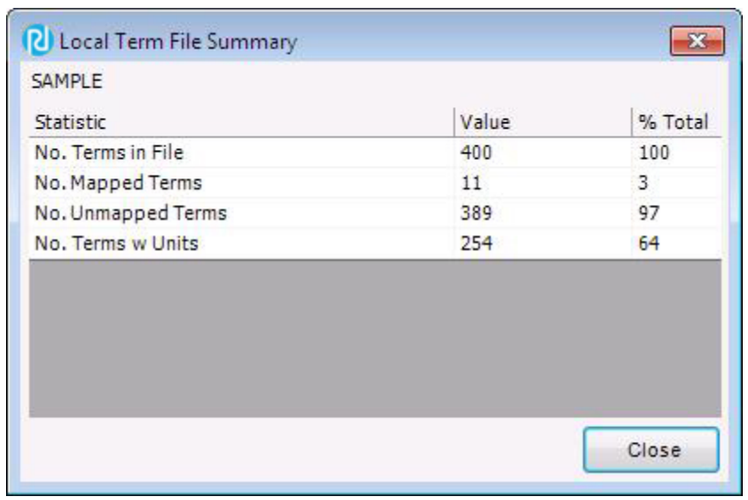
Note: *You will not be able to delete the provided SAMPLE file.*



To select a different Local Term File than the one currently loaded, simply click on the name of the Local Term File provided in the choice list and click the OK button. This will return you to the previous screen and you will begin working with the new Local Term File of local terms.

Viewing a Local Term File Summary

Just as Rome was not built in a day, complete local term files are rarely mapped in one session of RELMA. Some users reported it would be helpful to have a simple snapshot of their local term files so they could keep track of how many terms in the set had been mapped. Others reported it would be nice to see how many terms in their local term file were still unmapped. Merging the two ideas, the "View Local Term File Summary" menu option provides users with some very simple information about their local term files.

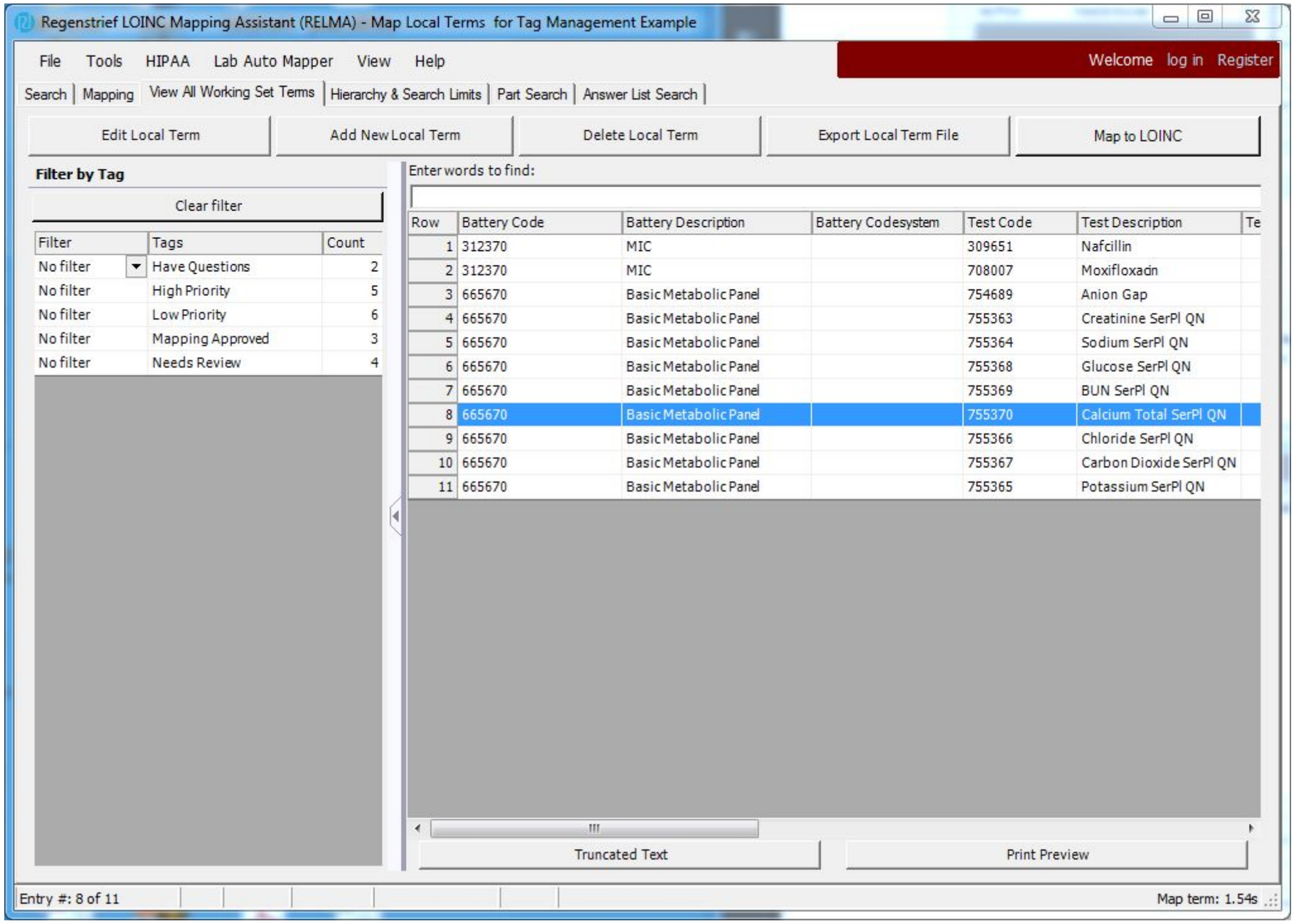


The summary form displays the total number of terms in the local term file, the number of terms currently mapped, the number of terms that are still unmapped and the number of terms that have a value in the Units field. Users may print this information out using the "Print" button provided on the form.

Note: *The Regenstrief Institute welcomes suggestions of other local term file summary information which could be displayed on this form. Please send your suggestions to loinc@loinc.org .*

Viewing/Adding/Editing Terms in a Local Term File

Selecting File > View/Add/Edit Terms in Local Term File from the menu activates the "View All Working Set Terms" tab as shown in the figure below. The local terms from the current Local Term File are displayed in a spreadsheet-style grid.



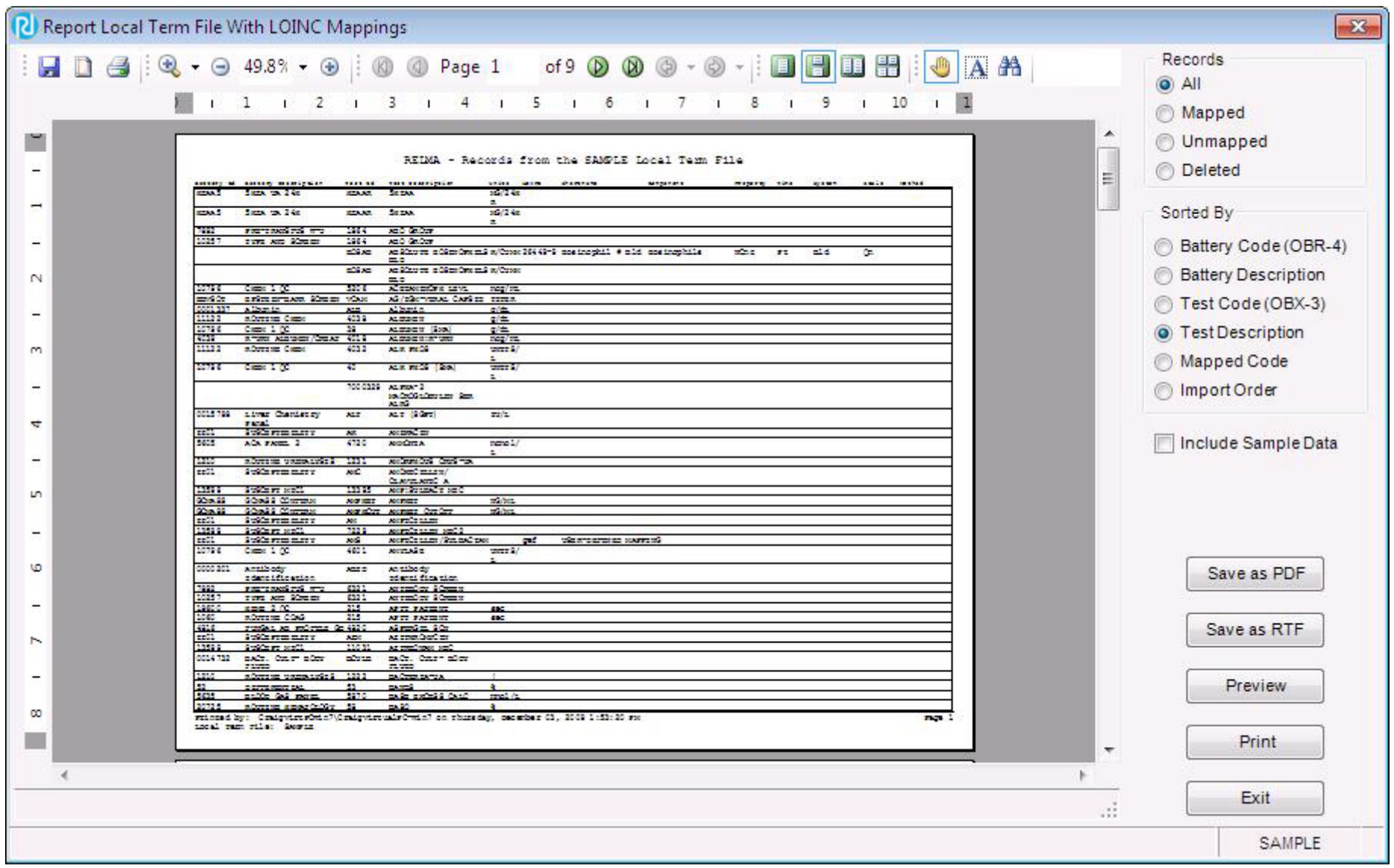
You cannot directly edit your local terms from the grid, but you can edit terms by double clicking a row in the grid. Alternately, you can select a term in the grid and click the "Edit Term in Local Term File" button at the top of the screen. You can delete local terms by selecting a term and clicking the "Delete Term from Local Term File" button. Choosing the "Add New Term to Local Term File" button at the top of the screen will initialize a dialog box and allow you to define a new term.

Note: *Manually editing the Local Term File of local terms should be done with caution. The RELMA program checks the data you are entering in a limited capacity, and it does not check for the addition of duplicate records or errors in data entry.*

If you know the proper LOINC number, you can map your local terms directly from the grid. Just select one or more rows in the grid and click the "Map to LOINC" above the grid. You then be prompted to enter the LOINC number and an optional mapping comment. You can also use this technique to un-map one or more local terms. To un-map a local term, just leave the LOINC # box blank when requested and click the OK button.

Reporting Local Terms and Their LOINC Mappings

The File > Report Local Terms and Their LOINC Mappings menu option is used to print a report of your local terms. Selecting this menu option will activate the screen shown below. The window will be empty when it opens. Push the Preview button in order to view your report.



From here you can Preview or Print a report of the local terms in the current Local Term File by clicking on the corresponding buttons. You can also save the formatted report in either RTF or PDF formats.

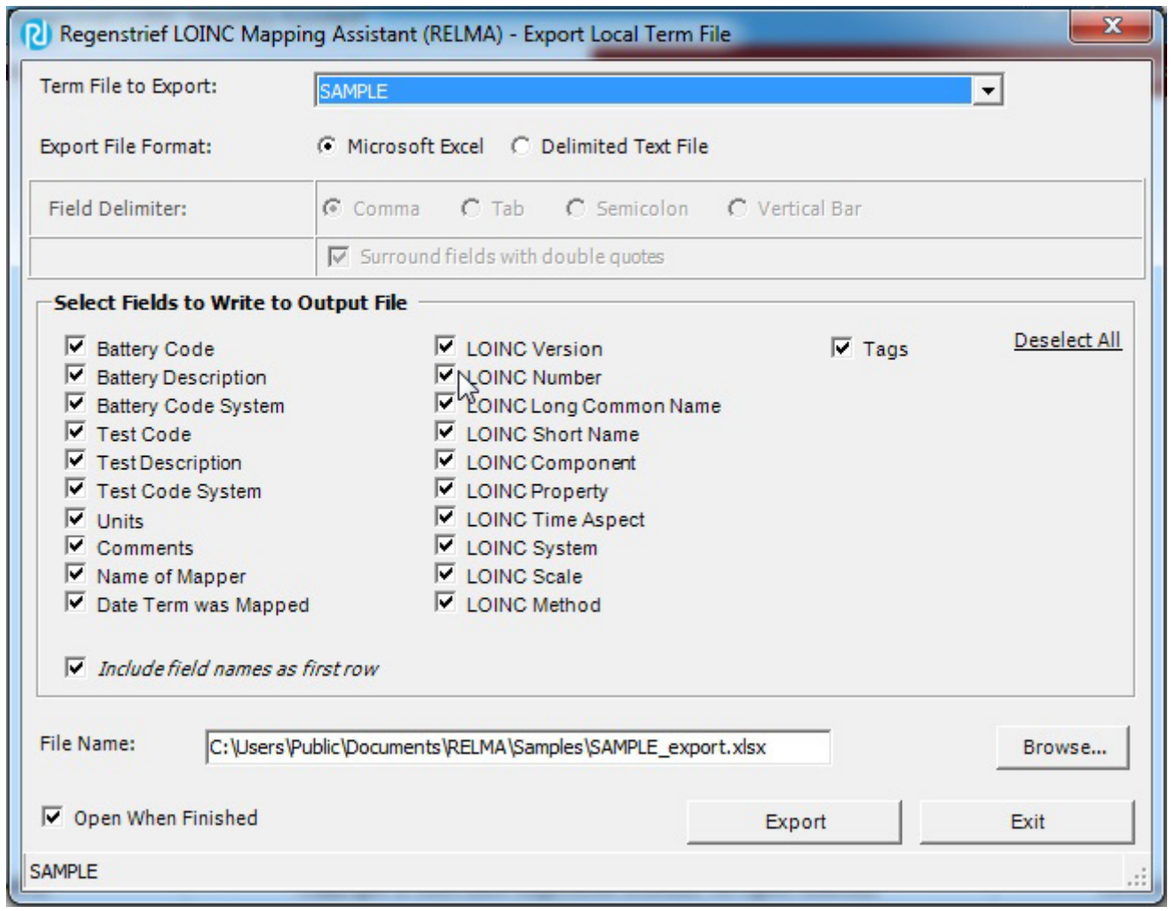
Note: *If you save the report to a file, we recommend that you use the PDF format. The RTF support is incomplete and some formatting elements may not be saved.*

The radio buttons in the "Records" group give you the ability to limit the records in the report to a subset of the entire Local Term File. Click the radio button that is most appropriate.

The radio buttons in the "Sorted By" group control the presentation of the selected terms in the report. You can choose to sort by the Battery Code, Battery Description, Test Code, Test Description, LOINC code or the original order of the terms at the time they were imported from a delimited file. All sorts are in ascending order only.

Exporting Local Terms and their LOINC Mappings

With this function you can export the contents of a Local Term File of local terms to a delimited text file or a Microsoft Excel spreadhseet. When you select this option, the dialog shown in the figure below appears.



"Term File to Export" is asking you to supply the name of the Local Term File that you wish to export. We have assumed above that the SAMPLE Local Term File is being exported.

The Export File Format allows you the option of exporting the Local Term File to a Microsoft Excel document or a delimited text file.

When the Export File Format option is set to delimited text file, you are presented with the option to set the field delimiter and the option to surround fields with double quotes. We suggest that you do not surround the fields with double quotes unless they prove to be useful in importing into some other program.

Next, you are given a series of checkboxes for the fields to be exported. By default, all fields are selected. Note, that a separate checkbox is included for the option of including the fields names as first row.

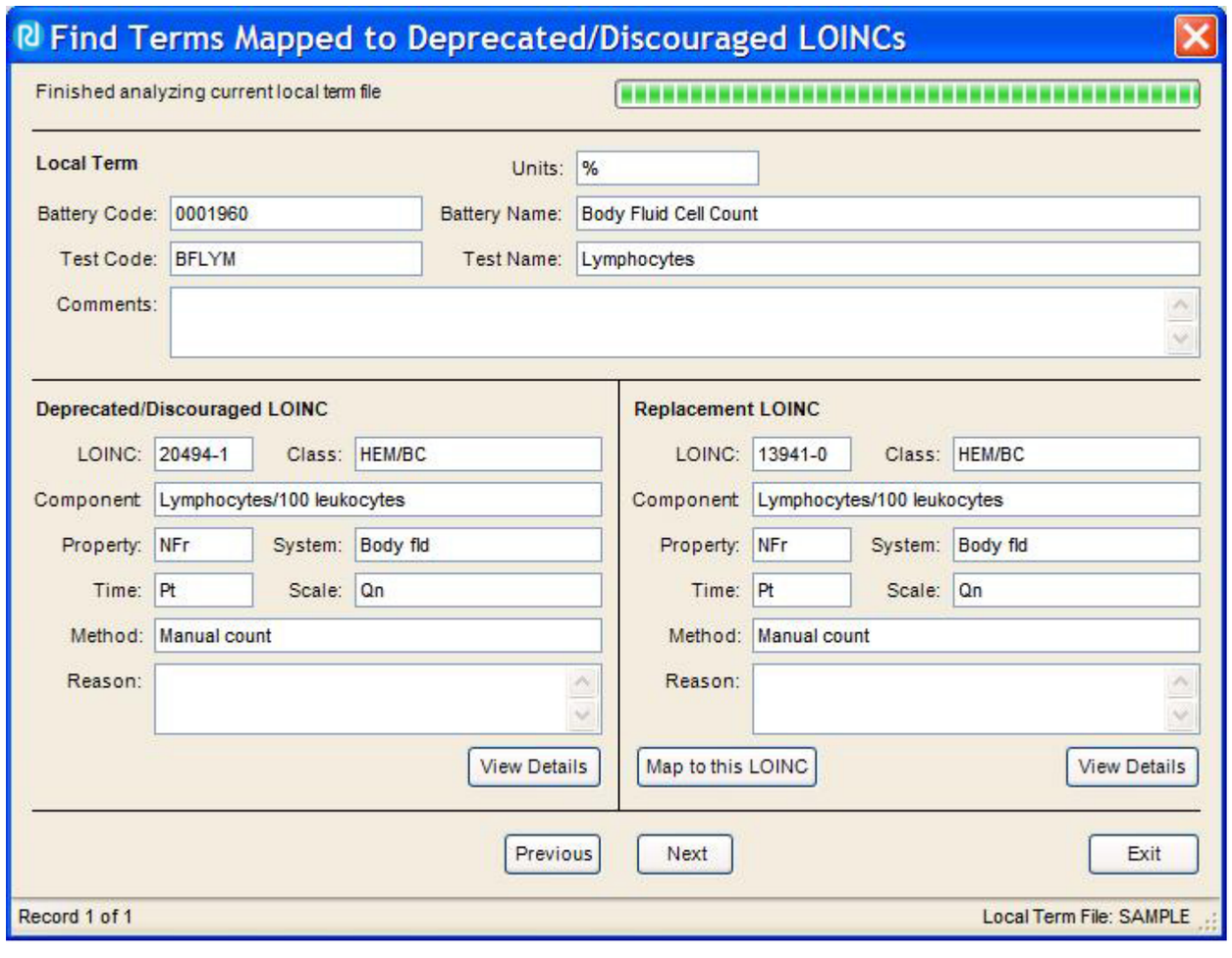
The File Name field is automatically populated with a suggested file name. This is constructed based upon the Local Term File name, the Export File Format, and the Field Delimiter. You may edit the file name directly in the associated text box or you may change the file name by selecting the Browse button.

If you wish to immediately open the file after export, check the Open When Finished checkbox to the left of the Export button.

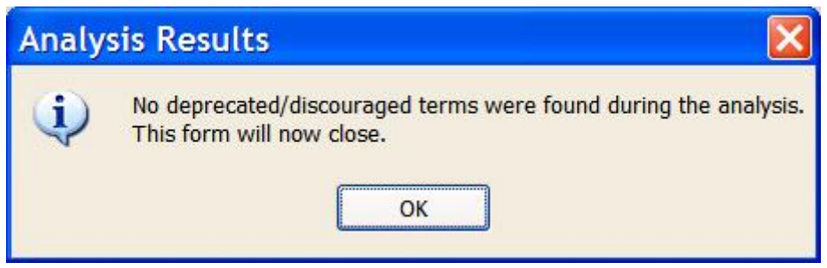
Finally, click the Export button to write the data. The form's cursor is set to a waiting cursor while the Local Term File is exported. Upon completion. You may exit the form or perform another export.

Finding Local Terms Mapped to Deprecated/Discouraged LOINCs

Because LOINC codes are deprecated and/or discouraged over time, it is important for the user to discover deprecated/discouraged LOINC mappings within their Local Term Files and take steps to remap local terms to updated and different LOINC concepts. RELMA introduced a tool to assist in this endeavor in version 3.8. The tool scans a Local Term File of local terms and displays those local terms which have been mapped to deprecated or discouraged LOINCs. The tool then provides information about the deprecated/discouraged LOINC along with a suggested new LOINC to which the user may remap the local term. The figure below is a screenshot of the analysis tool.

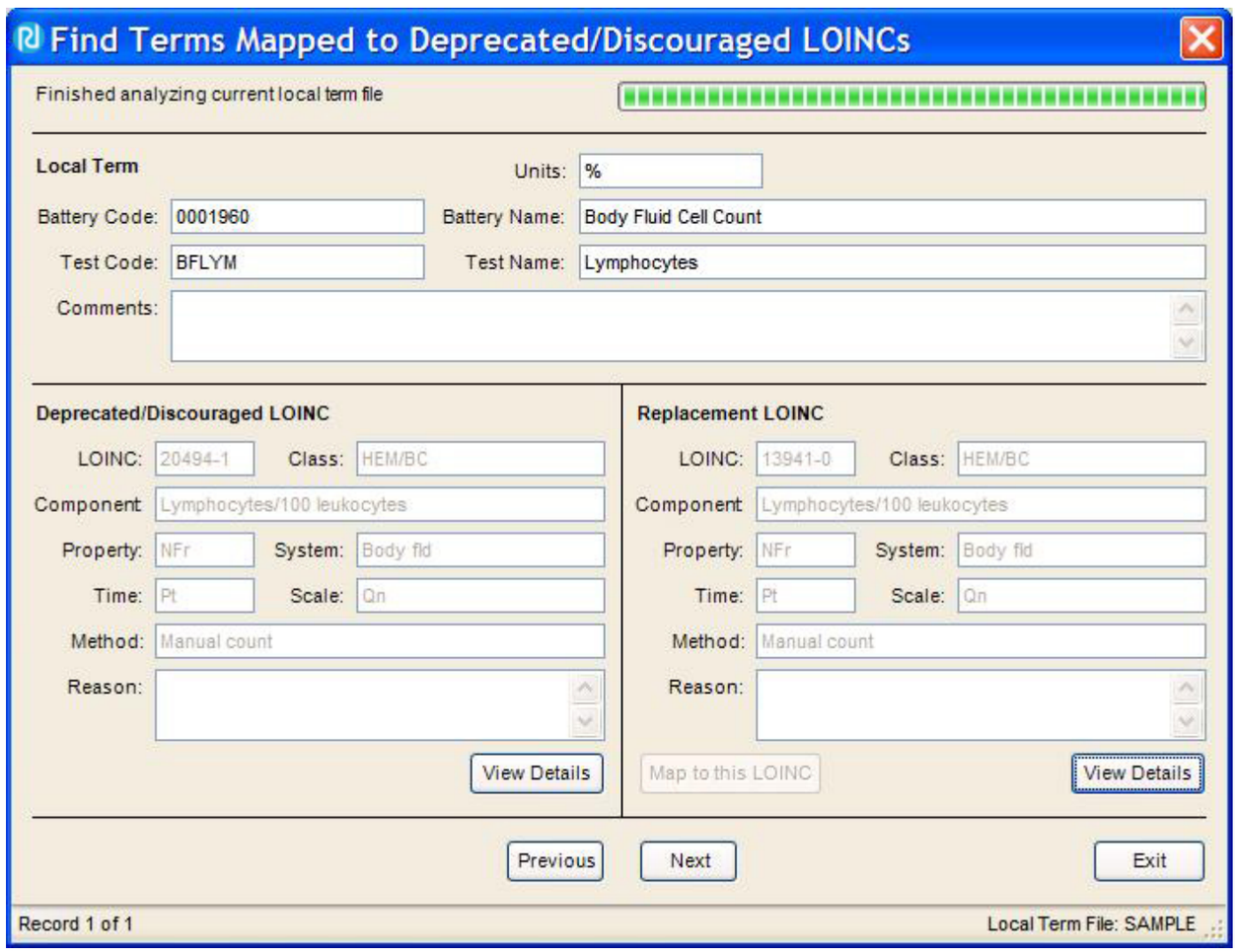


If the tool scans your Local Term File, but does not find any local term to deprecated LOINC mappings, the following message will appear on your screen:



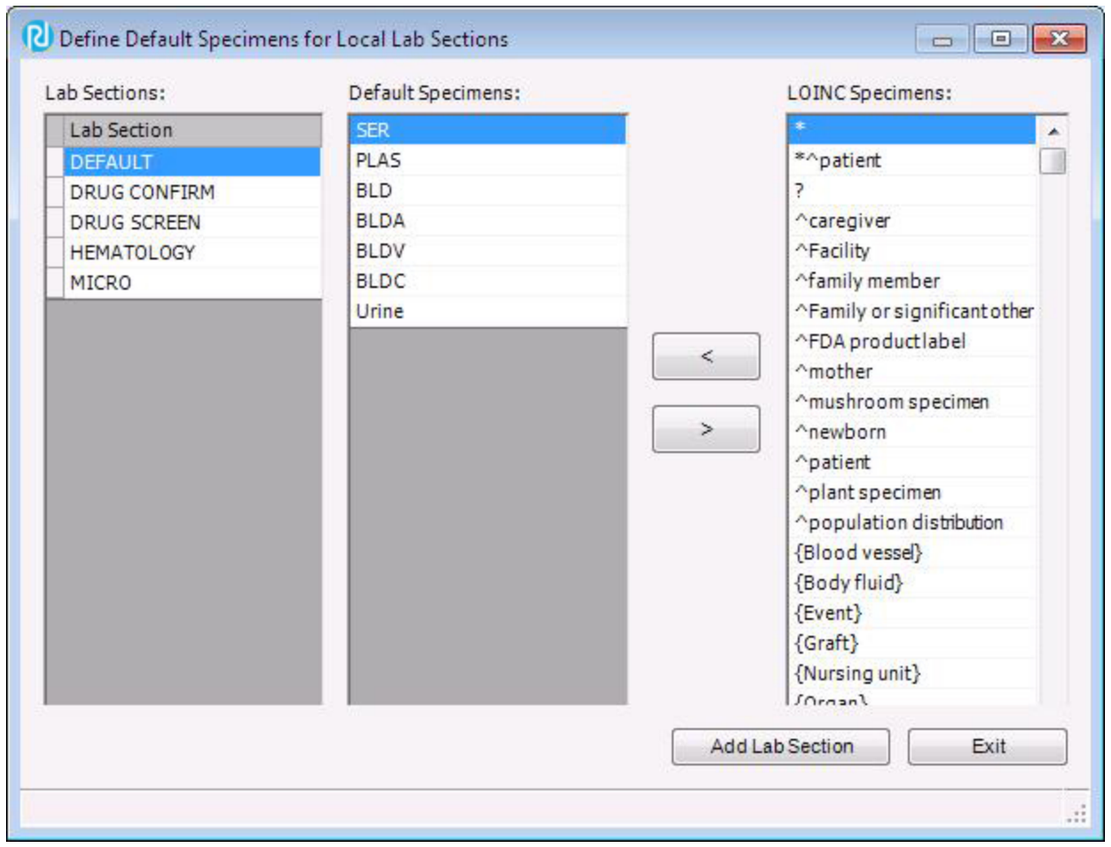
Clicking the OK button will close the tool and return you to the previous screen.

To remap a local code to the suggested LOINC, simply click the "Map to this LOINC" button. After you click this button, both LOINC terms will be suddenly grayed out, visually confirming the successful completion of the remapping.



Defining Default Specimens for Local Lab Sections

Lab Sections are an optional way to organize and classify groups of terms. If your place of business currently practices this method of organization, you may wish to transfer the classification into the RELMA program to make it easier to map LOINC terms to your local terms. Furthermore, individual lab sections can be assigned to associated LOINC systems to aid in searching for LOINC terms within the RELMA Program.



After choosing the Tools > Define Default Specimens for Local Lab Sections from the menu, you should see a screen similar to the one in the figure above. The figure shows that Hematology is the Lab Section selected with its associated LOINC System of BLD (blood) next to it.

To define a new Lab Section, click on the button labeled Add Lab Section. A new row will appear in the list to the far left labeled "Lab Sections:" and contain the word NEW. Replace the word NEW with the name of the desired Lab Section and press the Enter key.

To delete a Lab Section, highlight the Lab Section you wish to delete, right-click the mouse button, and choose 'Delete Lab Section'. When prompted, click the Yes button and the Lab Section will be permanently removed.

To assign a default LOINC Specimen to a Lab Section, highlight the Specimen name in the far right list labeled "LOINC SPECIMENS". Now press the button with the left arrow (less-than sign) and the system name should appear in the middle column. This completes the assignment.

To remove an assigned LOINC Specimen from a Lab Section, highlight the system name in the middle column. Now press the button with the right arrow (greater-than sign) and the Specimen should be

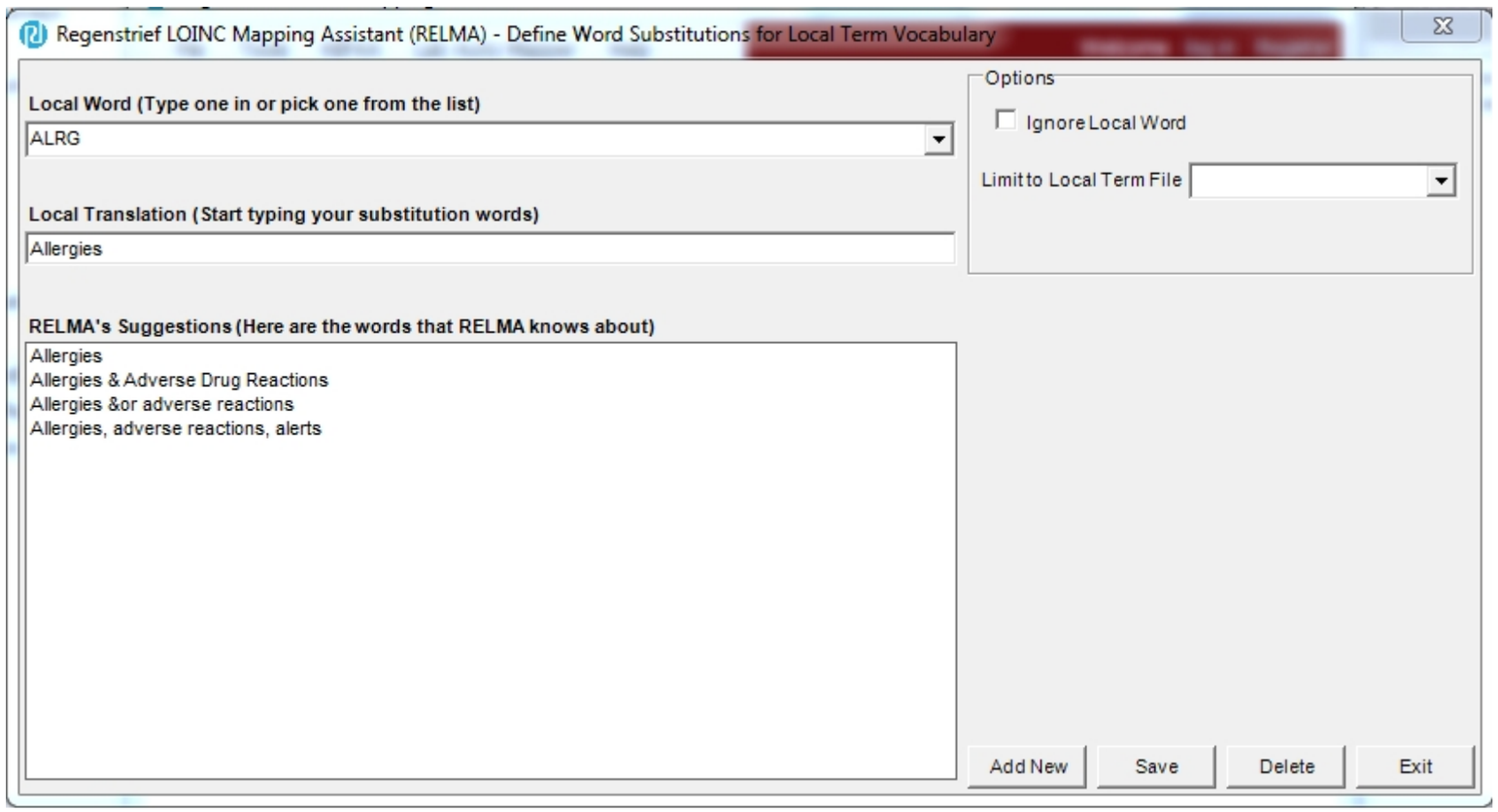
removed from the middle column. This completes the removal process.

Note: *Assigned LOINC Specimen will appear in the Default Specimen text box on the mapping screen. When used in searching for LOINC terms, they will eliminate results that do not contain the same value in the System field in the LOINC database.*

Defining Word Substitutions for Local Term File

The Tools > Define Word Substitutions for Local Term File menu option allows you to create a personalized dictionary of local words. Word translations are useful when you have a word in a local term name or description that is not the same as a related word in the LOINC database. For example, suppose you use the term ANT to mean ANTIBODY in your Local Term File of local terms. When you run the RELMA mapping option, ANT might be a local word in many of your terms, but LOINC won't recognize it because LOINC doesn't use ANT as an abbreviation for ANTIBODY. Therefore, you may wish to substitute ANTIBODY any time the local description in your Local Term File contains the word ANT.

If you choose the Tools > Define Word Substitutions for Local Term File menu option, you will see a screen similar to that shown in the figure below.



The combo box in the top left corner contains a list of words currently in your local file that have translations. The first time you use this feature, the words in the list are examples provided by Regenstrief Institute. To begin the process of translation, choose a local word from the combo box. In the example above, the user has selected the local word ALRG to translate. You can add new words/abbreviations to the Local Word box by clicking the Add New button. Type your new word into the Local Word box.

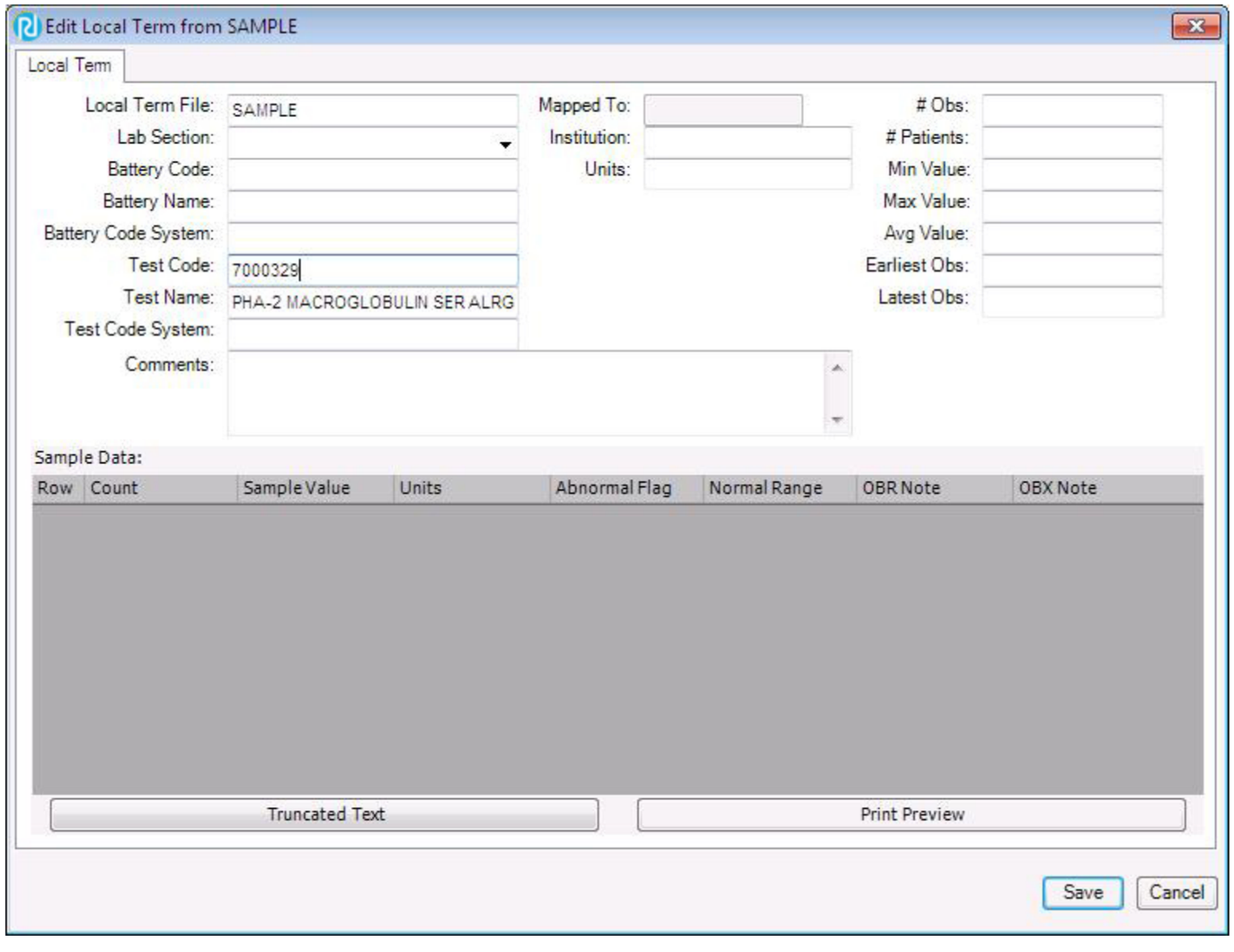
Below the Local Word combo box is a LOINC Translation text box into which you may type your translation. As you type a translation, a list box below is populated with words. We recommend that you choose one of these words as your local word translation. After selecting a word from the list, you can choose to save the translation by pressing the "Save" button along the bottom right part of the screen.

Sometimes it is helpful to ignore certain local words during searching. You may wish to check the "Ignore Local Word" box in the upper right corner of the screen. If you enable this box, each time the RELMA program sees your local word it will ignore it and pretend it does not exist.

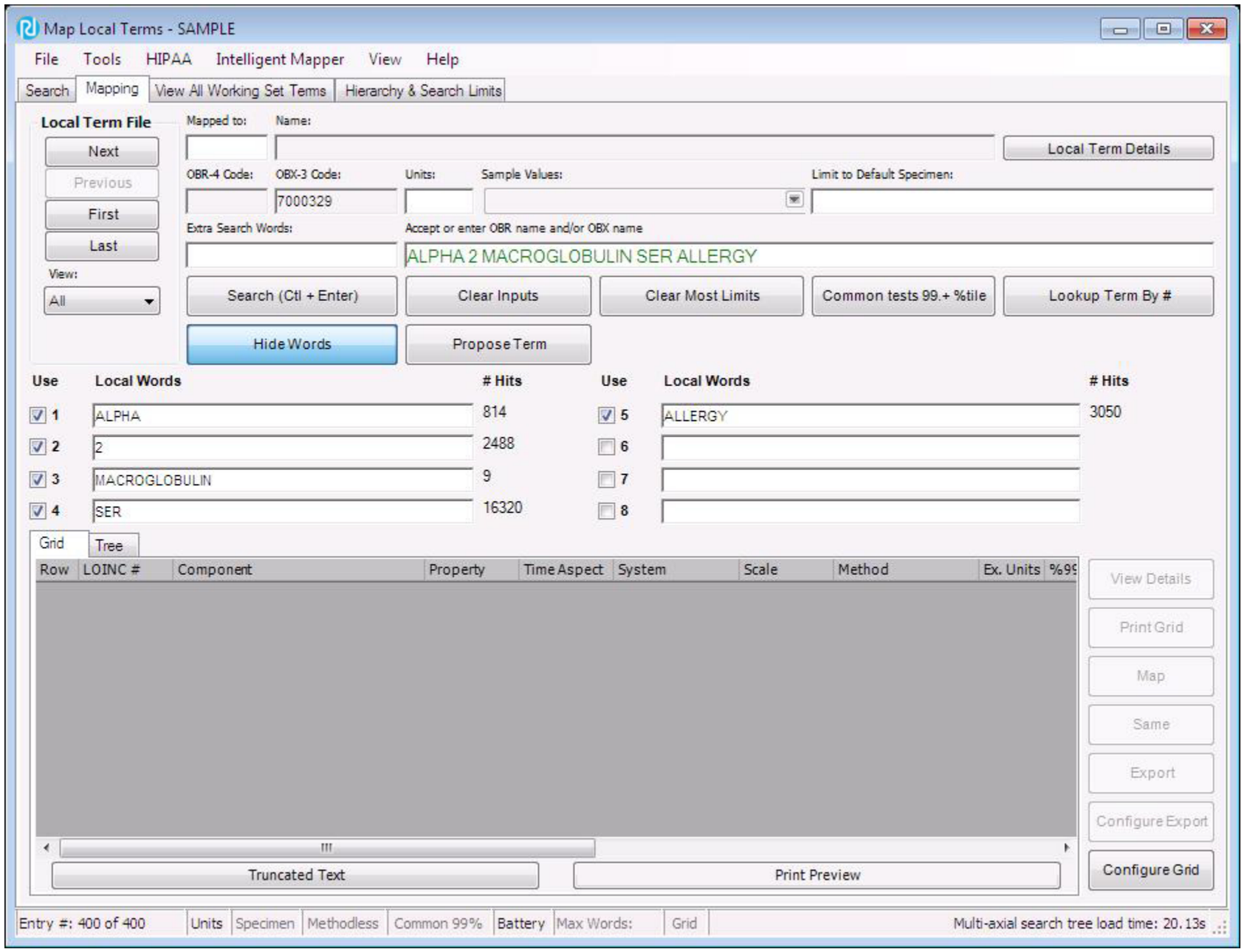
You may also choose to limit your translation of a local word to a particular Local Term File if you have multiple sets defined. To limit a local word in this manner, choose the particular Local Term File from the combo box in the center right section of the screen in the figure above. When you search using local terms from that Local Term File in the future, your translation will occur. If you search using any other Local Term File, the translation will be ignored.

Any translations you create or edit are stored in the VocabularyMap table in your LMOF database. This information is used by the program for searching as shown in the figure below.

The next time you run the mapping program, the words (or abbreviations) that you have entered to the substitution table will be replaced with their associated expanded words. The following example shows how this might work.



Look at the Test Name box in the figure above. It says, "ALPHA-2-MACROGLOBULIN SER ALRG". Now look at the words from the local term description in the figure below.



Notice how the word "ALRG" in the local description has been translated to ALLERGY. Had this substitution not been done, the word would have been ALRG, an unknown word to RELMA, and the search would have yielded 0 results. However, a successful search is possible because the user created a record that contained an "alrg-allergy" pair for use as substitute words. (You do not need to worry about upper or lower case for the substitute words. The RELMA program takes care of that for you).

Edit a SubstituteWord

If you wish to edit a substitute word and its associated expanded word: 1) select the substitute word from the combo box on the left side of the screen, 2) make whatever changes are necessary, and 3) click the Save button. The revised pair of words will be saved.

Delete a SubstituteWord

If you find that you need to remove a substitute word from the table, select the offending word from the combo box and press the Delete button. You will need to confirm the deletion before the program will actually remove the word from the file.

Tag Management

The Tag Management system in RELMA is designed to help the user organize their local terms based upon a user-defined tag.
Analogous to tags in Evernote©.

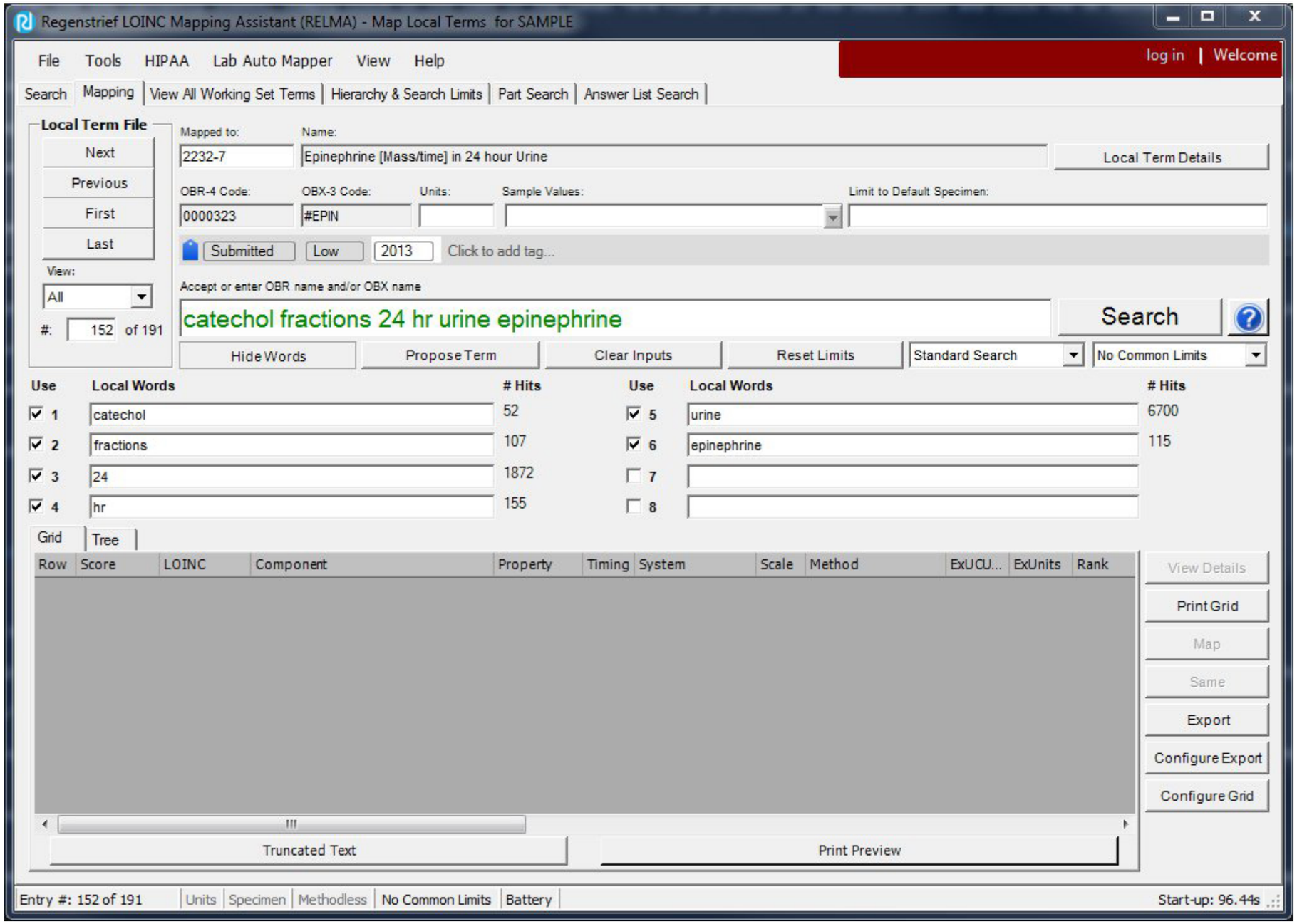
For instance, you may wish to organize your local terms by priority:

- High
- Medium
- Low

Or, you could simply add a tag of "Submitted" to annotate that this record has been submitted as a LOINC request.

By using a tag system, you have the flexibility to define how you wish to group and organize your work.

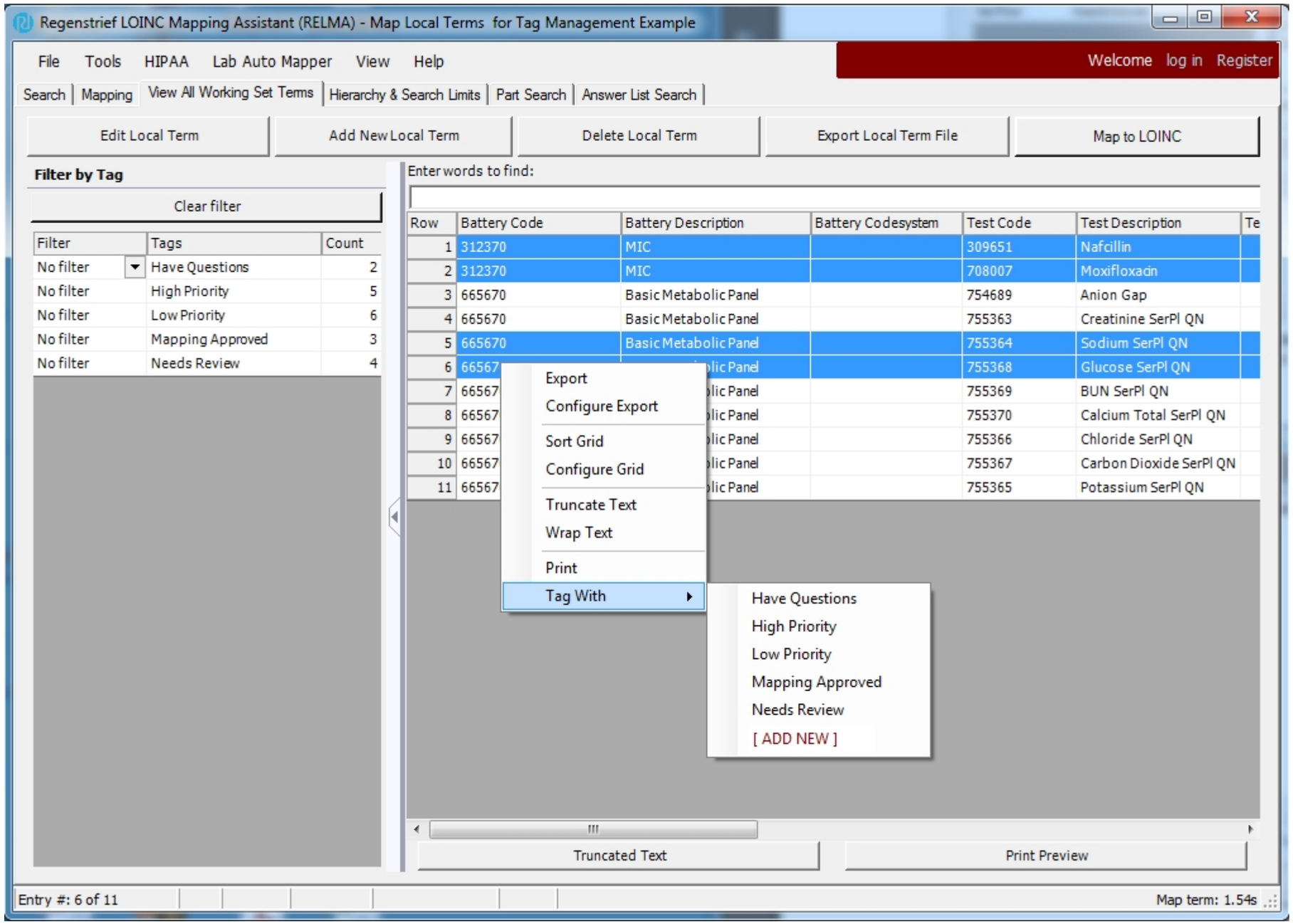
Adding a Tag to a Local Term



1. Open the **Mapping Screen** and Select the **Mapping** tab.
2. On the form, locate and select **Click to add tag.**
3. Enter the appropriate text and press Enter

   Note: *When tags exist, an autocomplete list will help you select pre-existing tags.*

Adding a Tag to Multiple Local Terms

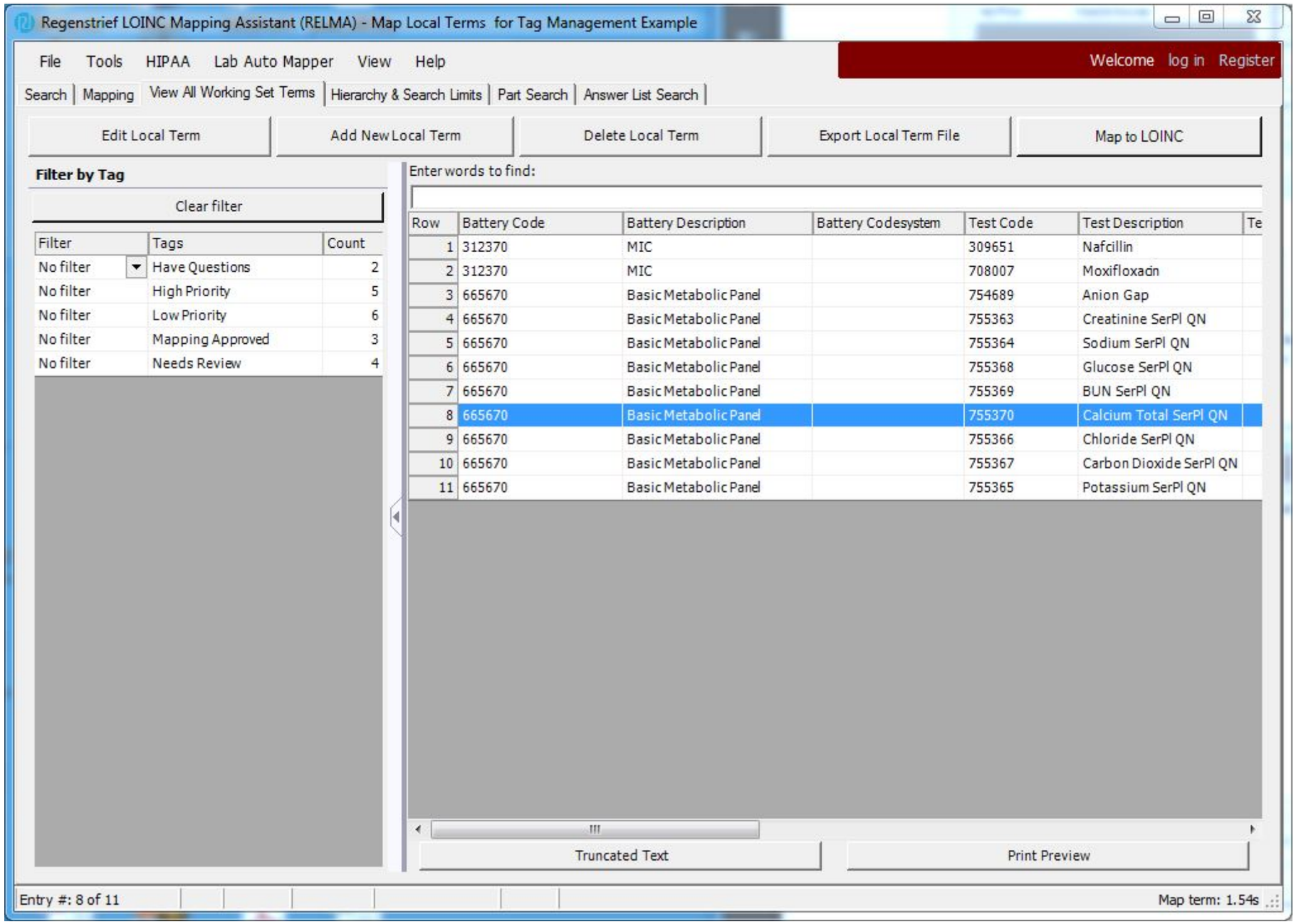


1. Open the **Mapping Screen** and Select the **View All Working Set Terms** tab.
2. Select one or many records contained by the grid.
3. Right-click and hover over "Tag With"
4. Select a pre-existing tag or enter a new tag using the "[Add New]" text box.

Removing a Tag from a Local Term

1. Open the **Mapping Screen** and select the **Mapping** Tab
2. Move your mouse over the tag to be deleted
3. Locate and click the **X** to remove the tag

Searching for Local Terms by Tag(s)



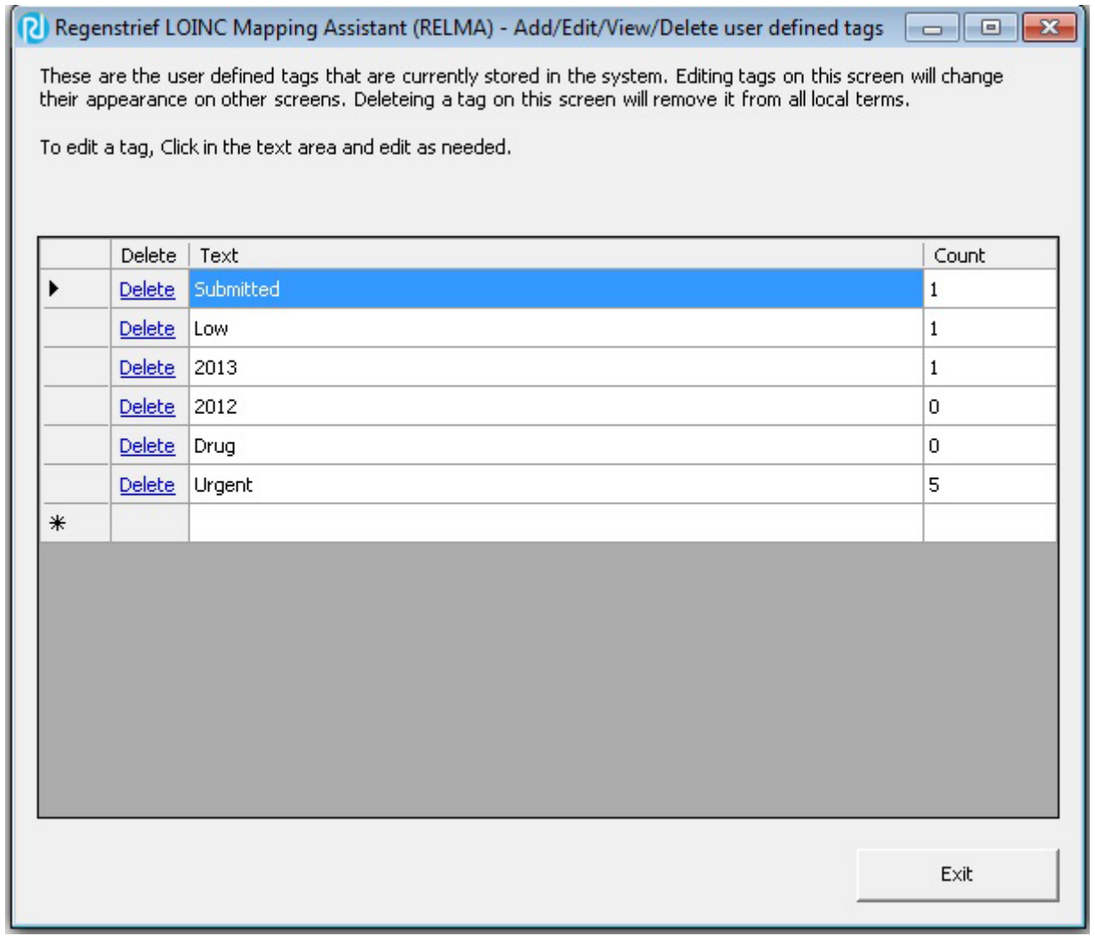
The tagging feature of RELMA lets you quickly and easily filter the codes in your local working set to just the codes that you are interested in. RELMA provides three options for filtering a tag.

- "No filter" - means that the tag will not be included in the filtering process
- "Must be" - means that only local terms that have this tag will be displayed

- "Must not be" - means that only local terms that DO NOT have this tag will be diplayed

Tag filters are logically ANDed together. Only the Local Terms that contain the specific combination of "Must be" and "Must not be" tags will be shown. If you get in a situation where no local codes are shown, just click the "Clear Filter" button to set everything back to "No filter" and all of your local codes will be displayed.

Managing Tags



To open the form, select **Tools** and **View/Add/Edit/Delete User Defined Tags** from the top menu.

Adding a Tag

Note: *This method will not assign the new tag to any Local Term.*

1. Select the last row and enter the desired text

Deleting a Tag

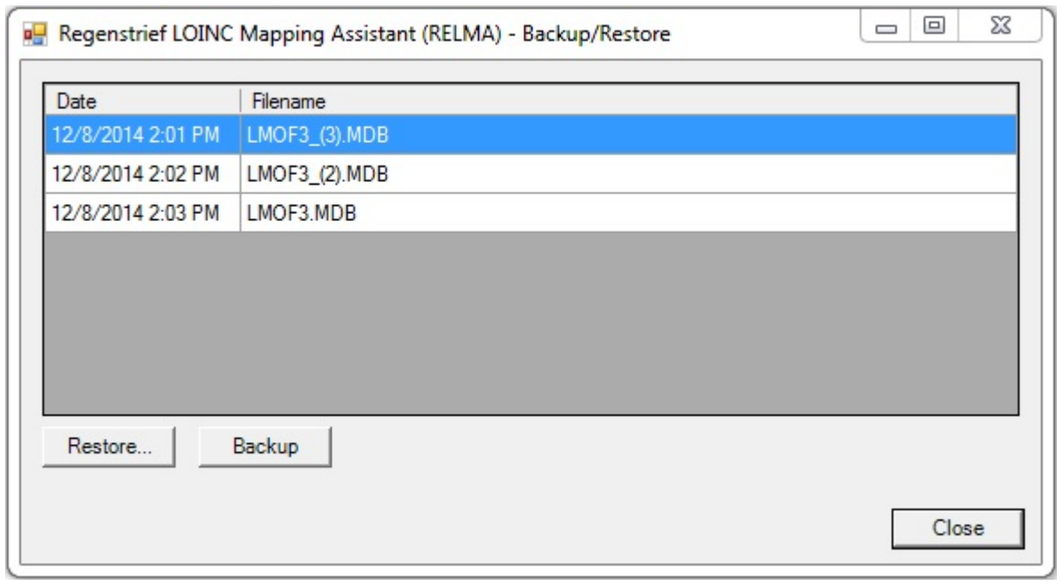
Warning: Deleting tag(s) from this form will remove it from each Local Term it is assigned.

- Select the **[Delete]** link for the associated row
- Select the left most column on the desired row and press **[Delete]** on your keyboard

Editing a Tag

1. Select the text column of the record you wish to edit
2. Replace the text
3. Press **[TAB]** on your keyboard or exit the form

Backup/Restore the Local Terms Database



To open, select **File - Backup/Restore Local Terms Database** from the main menu.

This form provides two features

- **Backup**

  By pressing the **Backup** button a copy of the current local term database will be made.

- **Restore**

  By pressing the **Restore** button a copy of the current local term database will be made and the selected row in the grid will be restored. Note that the restoration process requires a restart of RELMA.

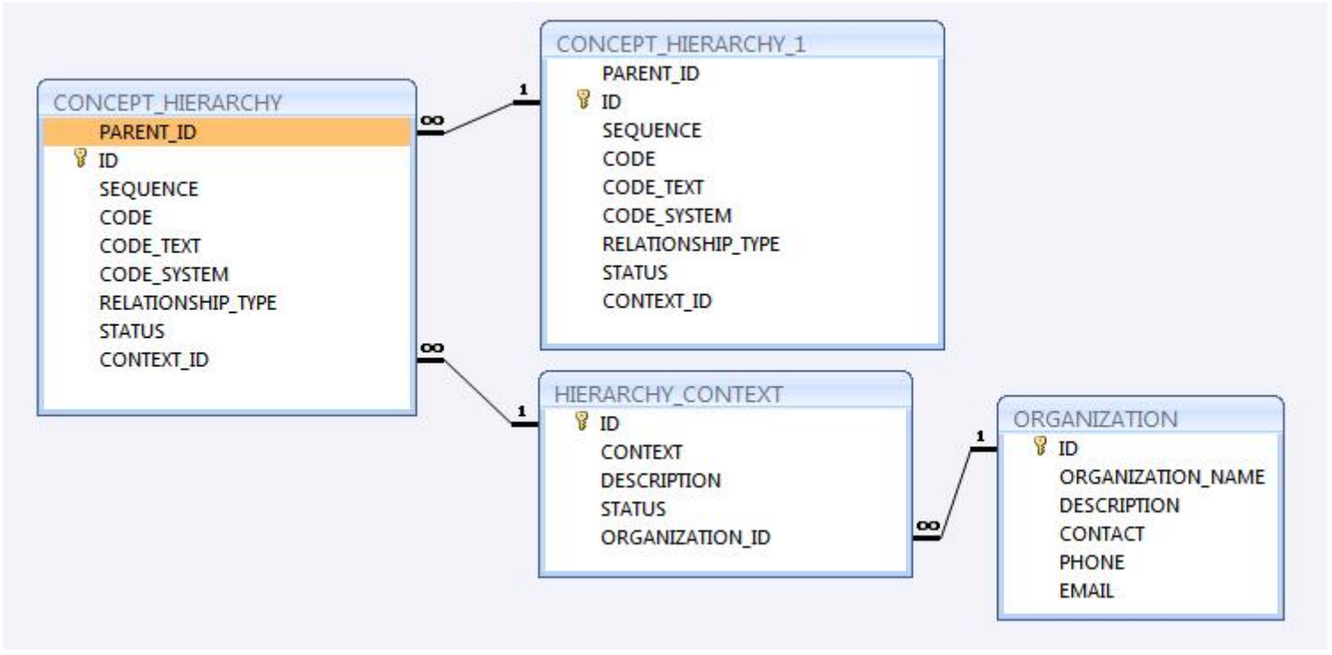
Note: *The number of backups maintained by RELMA can be set in the Local Terms Backup tab of User Preferences*

Context Specific Hierarchies

A simple Microsoft Access schema has been created to allow users to define their own hierarchies of codes. A template database for this schema is included with RELMA and is entitled CONTEXT_SPECIFIC_HIERARCHY_TEMPLATE.mdb. These hierarchies are designed to be shared among users. For convenience, we have provided the ability to display these hierarchies in the RELMA program. These user generated hierarchies do not have to be constructed from LOINC codes and may contain codes from other coding systems. Conceivably, a single hierarchy could contain codes from multiple coding systems.

Design

The figure below displays the Access schema that is used for sharing the hierarchies. The main structure of the schema is the CONCEPT_HIERARCHY table. This table contains a recursive reference back to itself that is used to define a parent / child relationship between the records. The PARENT_ID and ID fields are of data type GUID. (NOTE - the MSAccess data type used for these identifiers is actually an "autonumber" with the field size set to "Replication ID". For convenience, they are called GUIDs in this document.) Using GUIDs for these fields ensures that all IDs will be unique and users of the hierarchies will not have to worry about duplicate IDs. The root of a hierarchy is defined as a record with a null PARENT_ID field.



Each hierarchy is associated with a CONTEXT. The CONTEXT describes the purpose of the hierarchy and provides a link back to the controlling organization. The ORGANIZATION table is included as a place to store basic meta-data about the creator of the hierarchy.

Table Definitions

- CONCEPT_HIERARCHY
  This table holds one or more hierarchies. The hierarchies are defined by the PARENT_ID, ID and SEQUENCE fields of the table. The root node of a hierarchy is defined as a node where PARENT_ID is null.

FIELD	DATA TYPE	DESCRIPTION	REQUIRED
PARENT_ID	GUID	Foreign key to the ID column of this table. These fields, along with the ID and SEQUENCE fields form the hierarchy.	N

ID	GUID	Unique identifier for the node. It is defined as a GUID to avoid conflicts with hierarchies developed by others.	Y
SEQUENCE	Number	Controls the ordering of the nodes within a single PARENT_ID.	Y
CODE	Text	The code. The CE.1 in HL7 parlance.	Y
CODE_TEXT	Text	The human readable text associated with the code. The CE.2 in HL7 parlance.	Y
CODE_SYSTEM	Text	The coding system to which the code belongs.	Y
RELATIONSHIP_TYPE	TEXT	Identifies the type of relationship represented by this record. Currently only supports 'is a' (pointer from child to parent in the hierarchy).	N
STATUS	Text	Indicates the status of this node in the tree. See the table below for a list of values and their meanings.	Y
CONTEXT_ID	Number	Foreign key to the HIERARCHY_CONTEXT table.	Y

- HIERARCHY_CONTEXT
  The CONTEXT describes the purpose of the hierarchy and provides a link back to the controlling organization.

FIELD	DATA TYPE	DESCRIPTION	REQUIRED
ID	GUID	Primary key.	Y
CONTEXT	text	A name for the context.	Y
DESCRIPTION	Text	Long descriptive text that explains the purpose and rational for this context.	Y
STATUS	Text	One of the status codes shown in the table below.	Y
ORGANIZATION_ID	GUID	Foreign key to the ORGANIZATION table. This links the hierarchy to the organization that created it.	Y

- Status Codes

STATUS	DESCRIPTION
ACTIVE	entry is currently in use
DEPRECATED	entry will be retired and should no longer be used for new data
RETIRED	entry is no longer in use
REVIEW	test entry for design review
SUPERCEDED	entry has been replaced with a different entry

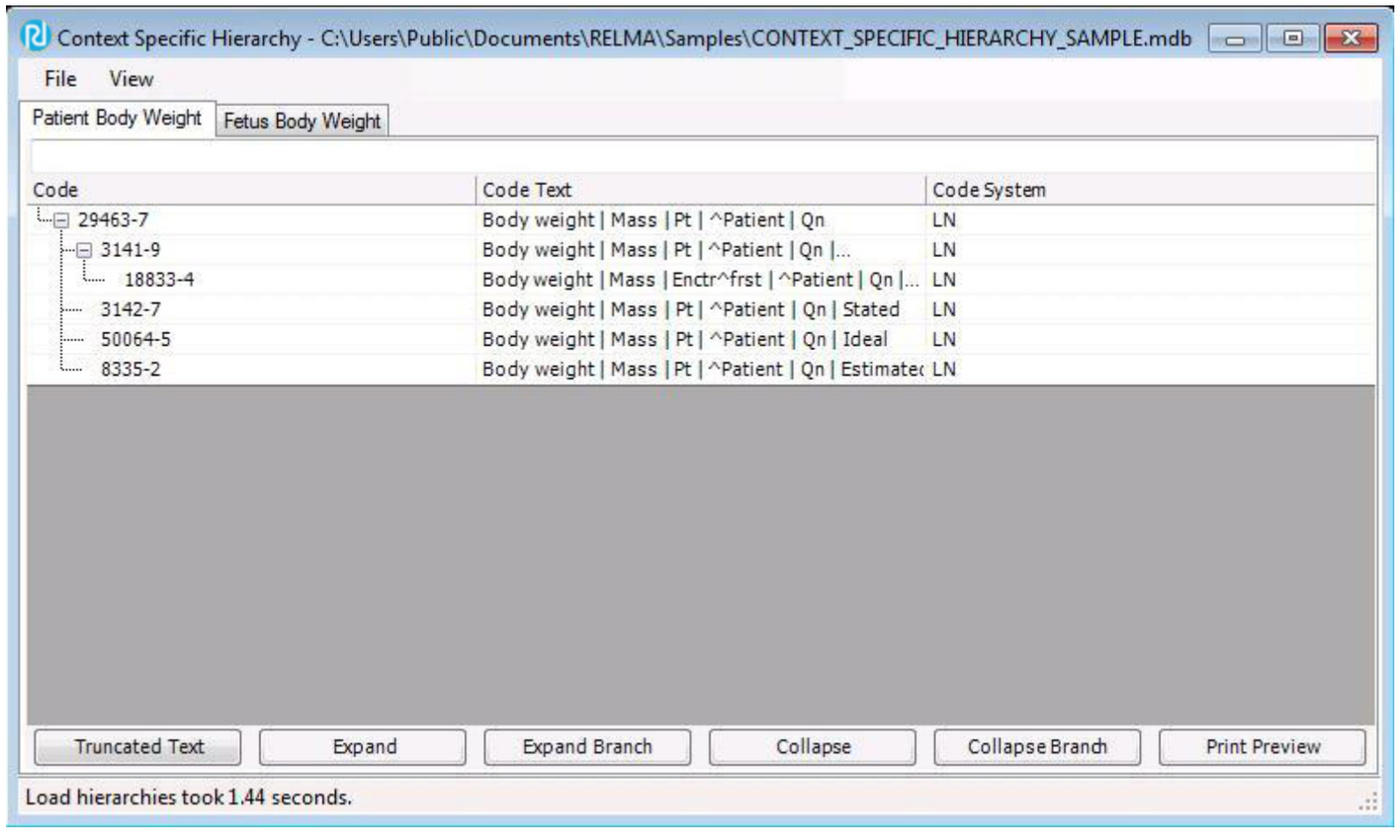
- Relationship types

TYPE	DESCRIPTION
IS_A	This code represents an object of the same semantic type as its parent.

NULL	A NULL in this field implies?

- ORGANIZATION
  This table stores basic meta-data about the creator of the hierarchy.

FIELD	DATA TYPE	DESCRIPTION	REQUIRED
ID	GUID	Primary key.	Y
ORGANIZATION_NAME	TEXT	The formal name for the organization.	Y
DESCRIPTION	TEXT	Long descriptive text that provides identifying details about the organization.	Y
CONTACT	TEXT	Name of the person responsible for this hierarchy.	
PHONE	TEXT	Phone number of the person responsible for this hierarchy.	
EMAIL	TEXT	Email address of the person responsible for this hierarchy.	



A menu option with a caption of "Context Specific Hierarchies.." appears on the RELMA's main and mapping menus. When the user chooses this menu option, they are presented with a "File dialog"

box which will allow them to browse for and select a file containing the hierarchy that they wish to view. A sample database entitled CONTEXT_SPECIFIC_HIERARCHY_SAMPLE.mdb is included with RELMA in the directory in which you installed. (At this time we will only support Access 2003 file format. We do not support the new .accdb format files.)

Since it is critical that RELMA have access to specific tables and fields, RELMA will perform a thorough evaluation of the tables and fields in each file. If RELMA cannot find a required table or field, the program will signal an error and then re-display the file dialog box allowing the user to make a new selection.

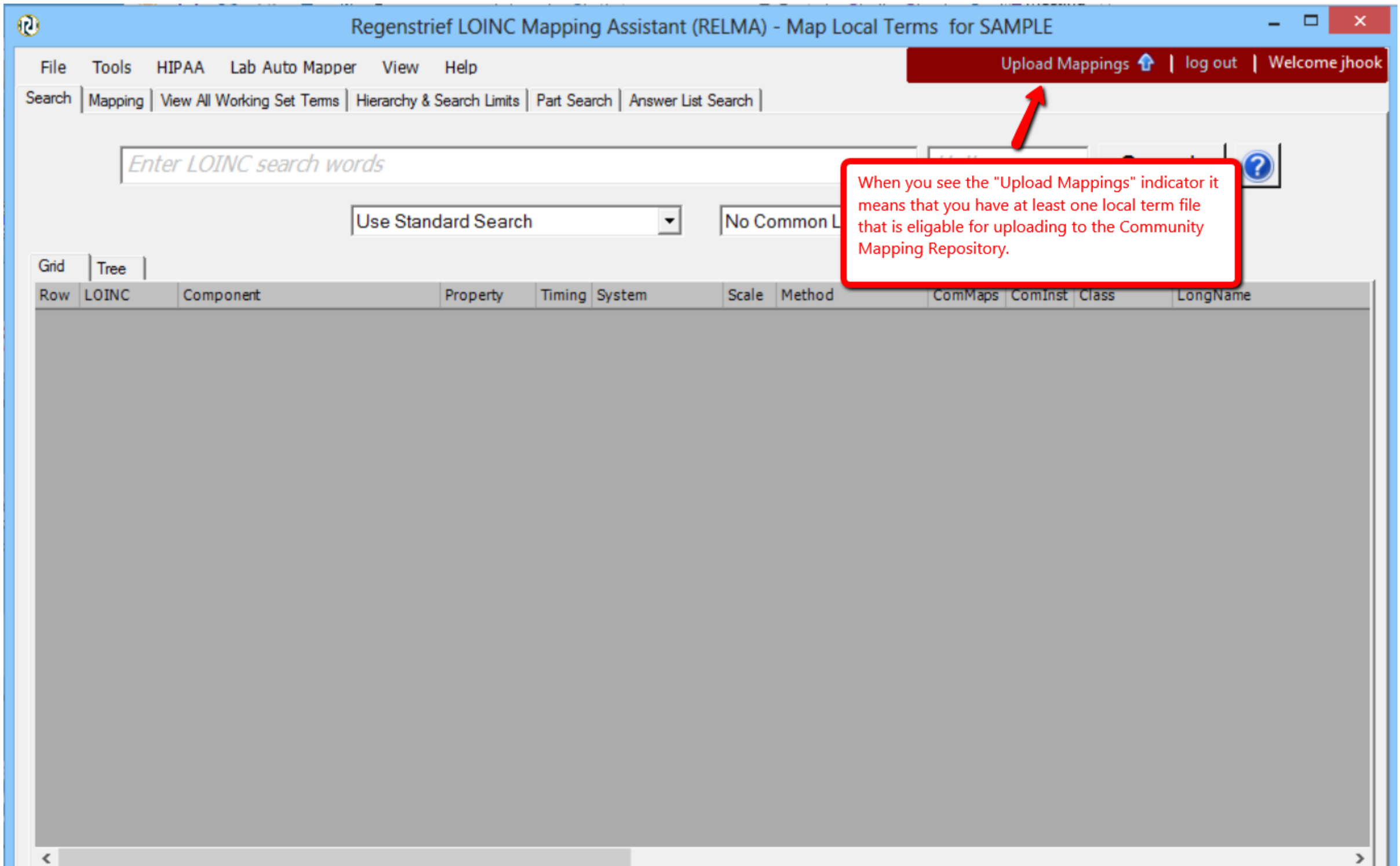
The schema defined above is capable of storing multiple hierarchies in a single .MDB file. The "Context Specific Hierarchy" form in the figure above displays each hierarchy in a separate TAB on the form. The caption on the tab displays the contents HIERARCHY_CONTEXT.CONTEXT field that is linked to the root node of the hierarchy.

The RELMA program displays the hierarchies and provides the same abilities to print, export, copy and paste, etc. for these hierarchies as it does with all the other hierarchies currently displayed in the tool. RELMA does not use these trees in any way for conducting searches or doing mapping. They are strictly displayed for convenient viewing.

Community Mapping Repository

The Community Mapping Repository is a database of local code mappings that your fellow mappers have contributed. If you are a member of the Community Mapping project, you can examine these mappings to assist you with your own mapping efforts. To assist other mappers, it is hoped that you will be willing to share your own mappings when you are ready.

RELMA continuously tracks the number of mappings you have made. When you reach the minimum number mappings required for the Community Mapping project you will see the "Upload Mappings" indicator displayed in the notification area in the upper right hand corner of both the mapping and the search screen. When you see this indicator it means that you have one or more Local Term files that you can send to the repository.



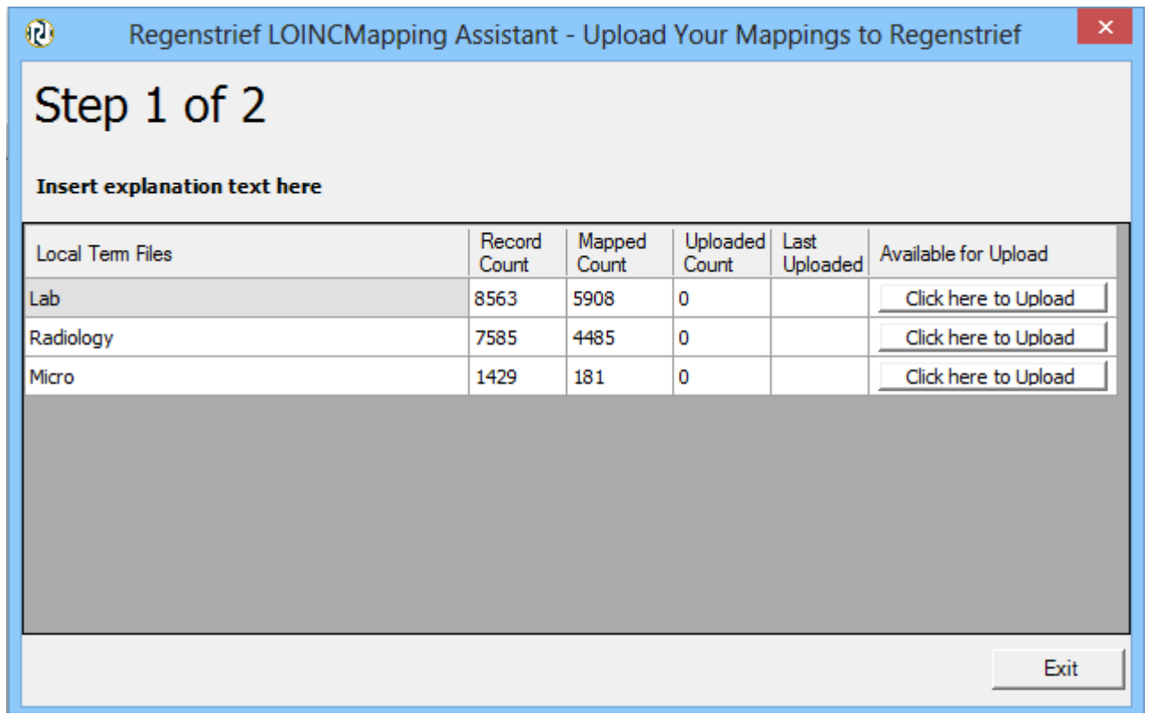
Uploadingyour mappings- step 1

The Local Term Files currently loaded in your current LMOF file are listed in the grid of the "Upload Your Mappings to Regenstrief" screen. The files with the “Click here to Upload” button displayed meet the minimum requirements for uploading to the Regenstrief Community Mapping Repository.

The “Record Count” column indicates the total number of local codes in the Local Term File. The “Mapped Count” column indicates the number of local codes in your file that have been mapped to a LOINC code. Note - only local codes that are mapped to a LOINC code will be uploaded to the repository.

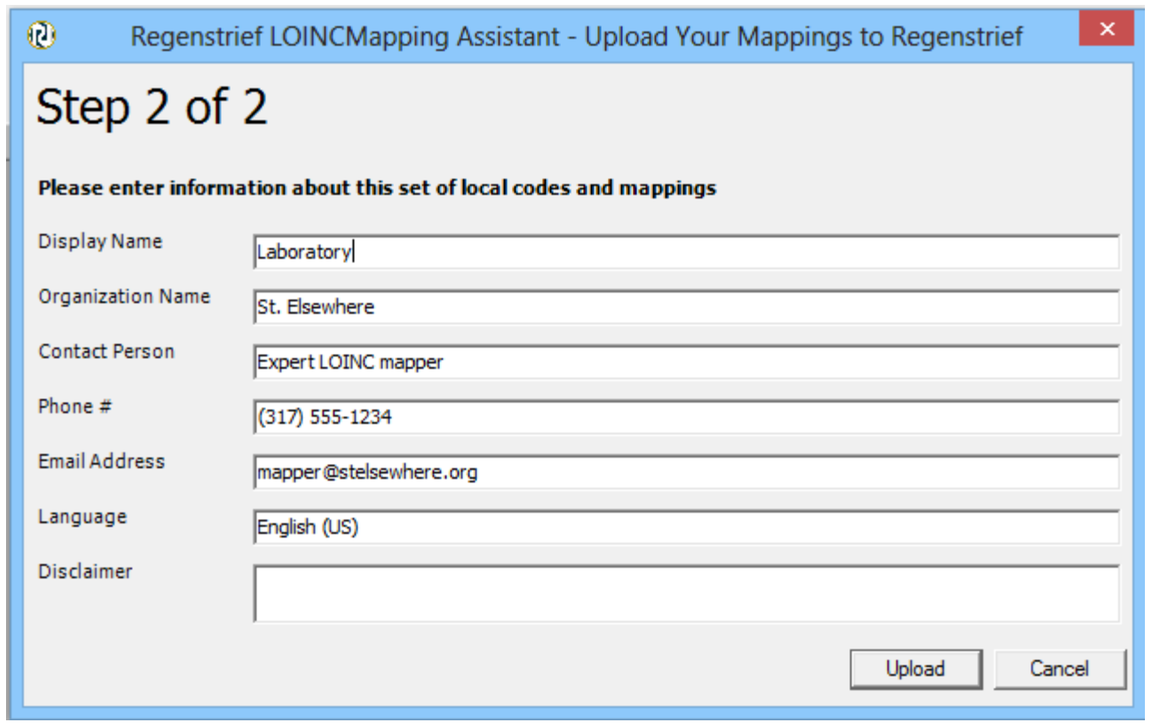
The “Uploaded Count” column indicates how many local codes from your Local Term file have already been uploaded to the Community repository. If the local term file has never been uploaded this column will display 0. If the Local Term file has been previously uploaded, the “Last Uploaded” column will show the date of the last upload. Once a Local Term file has been uploaded, there is no need to upload it again until you make a significant number of additional mappings or corrections that you would like to see reflected in the repository.

To upload a Local Term File simply click the “Click here to Upload” button. On the subsequent screen, enter the information that you to wish to have publicly displayed with your mappings. Pay particular attention to the contact information as the person listed may receive email or phone calls regarding these mappings.



Uploadingyour mappings- step 2

Along with your local codes, RELMA will displays your contact information to other LOINC mappers. The second step of the upload process is where you define this contact information. All of the fields on this screen are required except for the "Disclaimer" field.


Regenstrief LOINCMapping Assistant - Upload Your Mappings to Regenstrief
Step 2 of 2
Please enter information about this set of local codes and mappings
Display Name
Laboratory
Organization Name
St. Elsewhere
Contact Person
Expert LOINC mapper
Phone #
(317) 555-1234
Email Address
mapper@stelsewhere.org
Language
English (US)
Disclaimer
Upload
Cancel

Appendix A: LOINC Submissions using RELMA

Regenstrief balances the desire to respond quickly to new term submissions with the review processes necessary for a high quality standard. We can only be quick if the requesters provide clear and comprehensive information about the terms they are submitting. For detailed instructions on what information to include in a LOINC submission, please see Appendix D of the LOINC Users' Guide. You can download the LOINC Users' Guide here.

We think the easiest way to create most submissions is use the tools in RELMA. Just look for the "Propose Term" button on the mapping screen or "Propose a new LOINC" choice from the File menu and you'll be on your way. However, we do accept submssions in Microsoft Excel format. If you choose to create your submission using Microsoft Excel, you must use the template file provided on the LOINC web site When constructing the submission, please follow the instructions provided with the spreadsheet. The spreadsheet and instructions can be found here.

Creating a Submission Using RELMA

The RELMA program can aid you in creating submissions by allowing you to create, manage and store submission terms in a way that is similar to how the program creates, manages and stores local Term Files. With RELMA, you can create terms for submission over time and submit groups of terms in batches. The program will track when the term was created and the date when you submitted the term. The program will help you organize the terms that you create and it will automate the process of creating the individual submission files that are sent to Regenstrief for processing.

Because there are two kinds of requests for additions (requests for an entirely new kind of measurement and requests for variations on observations that are already in the database), there are two methods for creating them. The first method is to start from scratch, typing or choosing from a list each part of the requested term. The second method is to start with an existing LOINC term and modify one (or more) part of that term to create a unique variation not found anywhere else in the LOINC database. We recommend the second method because it will save you time (you won't have to choose each constituent part of the requested term by hand) and it will expedite the process by providing additional information beyond the first six parts of the requested term.

Starting from a Blank Slate

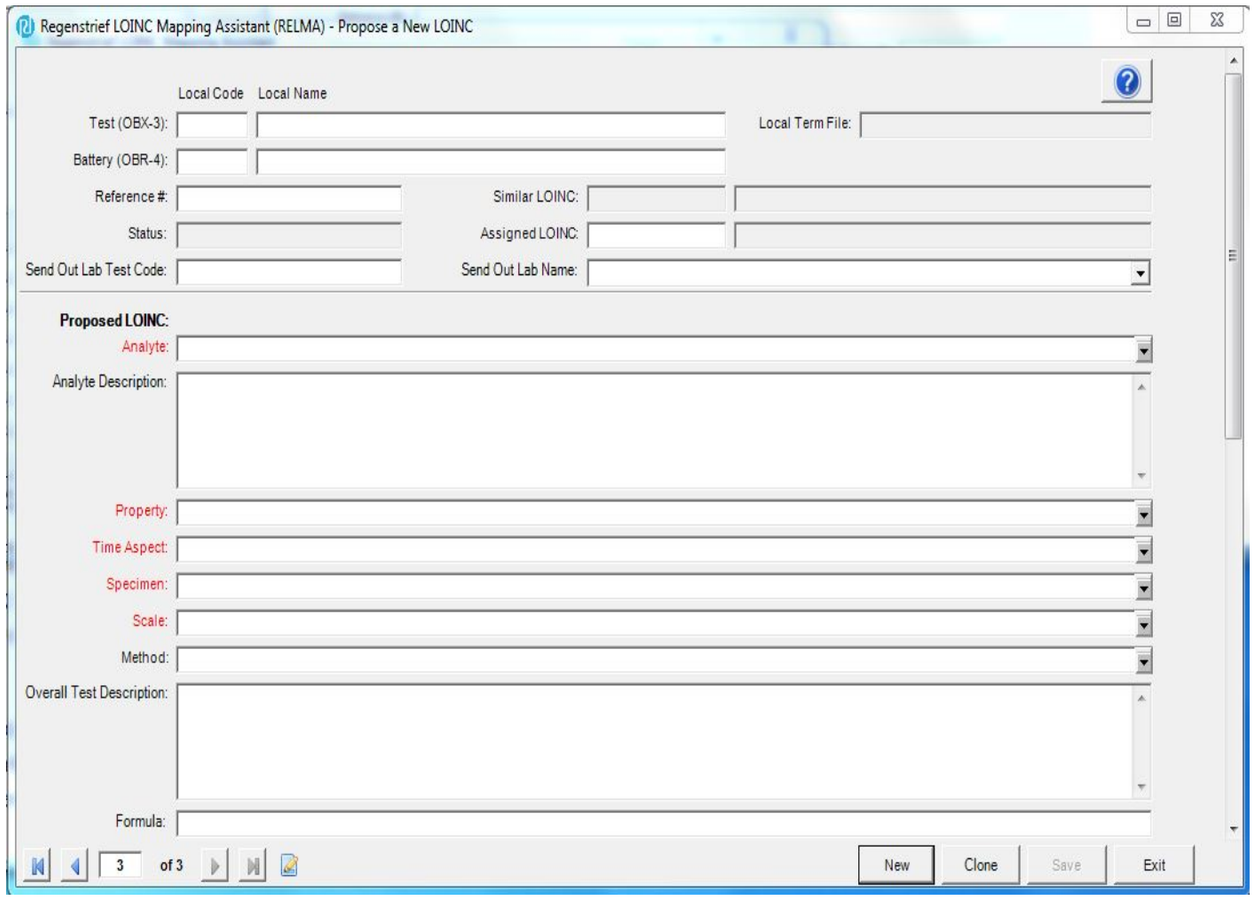
To start from scratch, choose "Propose a new LOINC" from the File menu on the welcome screen. If you are viewing the mapping screen, you can either choose the same menu option from the File menu or click on the "Propose Term" button located above the results grid when the results grid is empty (i.e. there are no LOINC records in the grid).

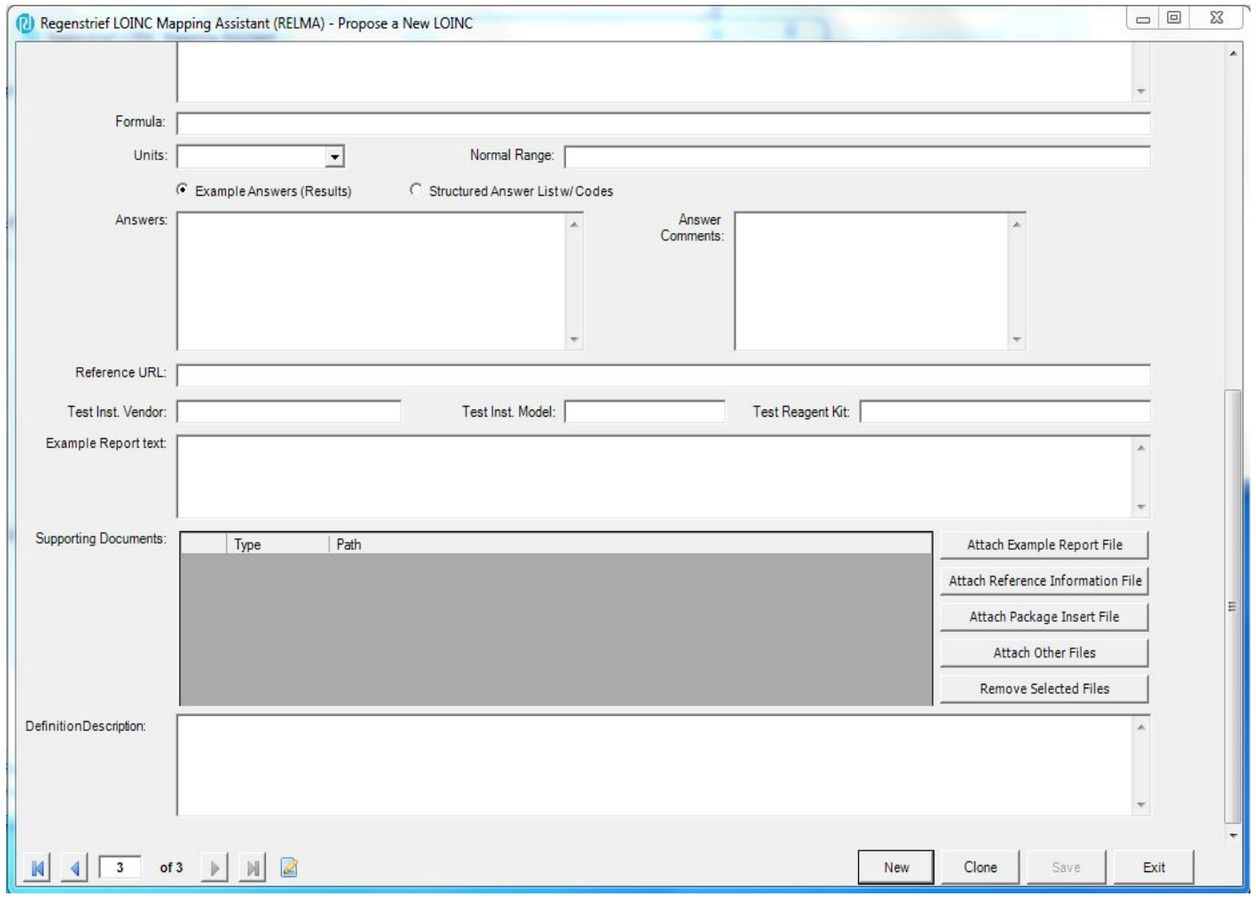
Starting from an Existing LOINC

To modify an existing LOINC term, you must begin from the mapping screen. After you execute a search, highlight one of the LOINC terms displayed in the results grid. Now you may choose the "Propose a LOINC based on selected term" option from the File menu, click on the "Propose Term" button OR you may right-click your mouse and choose the "Propose a LOINC based on selected term" option from the dropdown menu. See the "Proposing a LOINC using an existing LOINC" section below for more details.

After performing one of the methods described above, you should see a form very similar to the one in the figure below.

Overview of the Propose LOINC Form





After the form displayed in the figure above is loaded, you should edit the parts so they equal the values you wish to exist in the proposed term. Once you have finished creating the proposed LOINC, click the "Save" button. This will save the proposed term to your local computer and make it available for submission later.

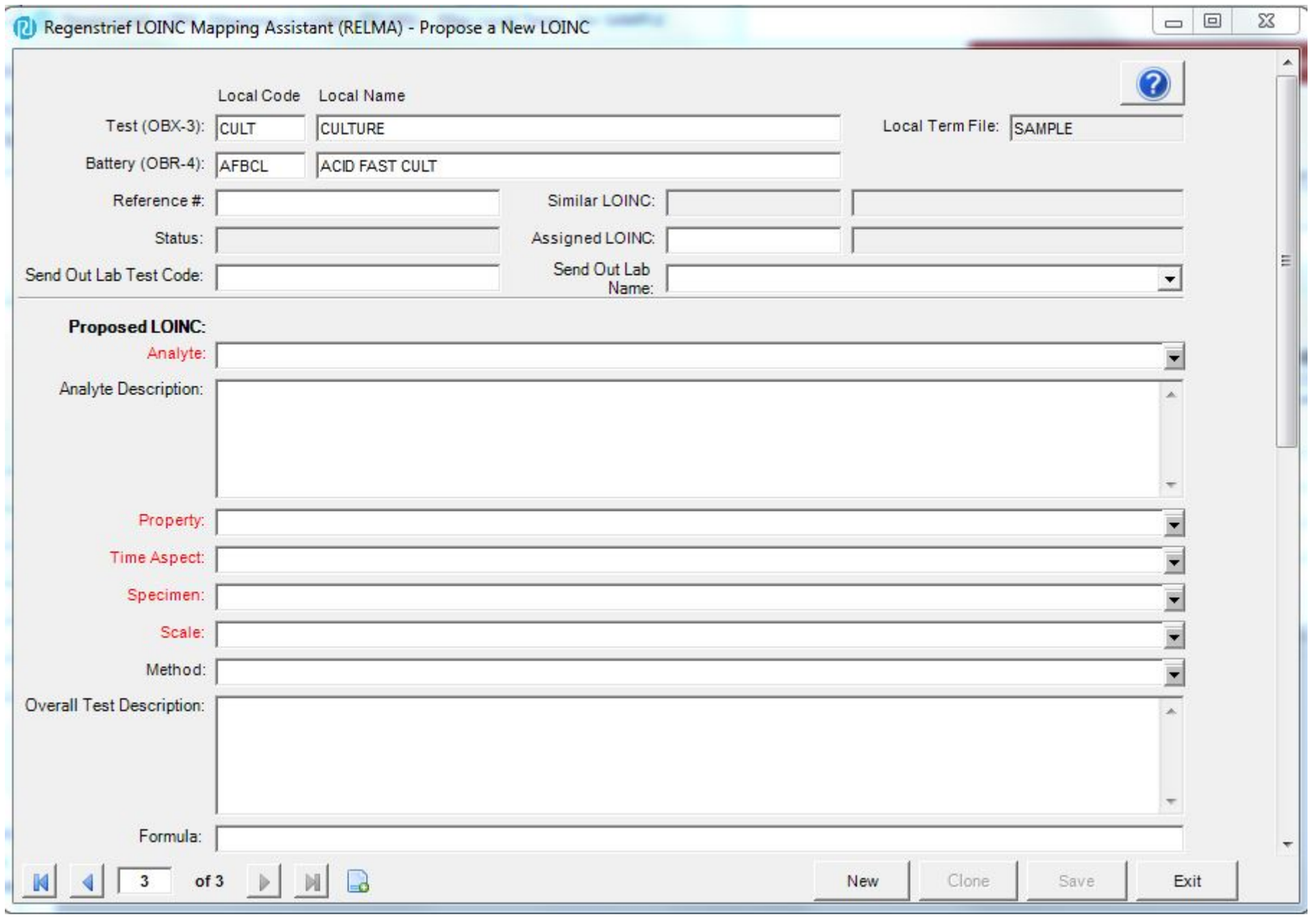
Note: *The fields highlighted in red are required for all proposed LOINCs as specified in the table above. A requested term cannot be saved for submission unless it contains data in each of the required fields.*

To enter another proposed LOINC, click the "New" button. To view other requested terms you have previously created, click the left and right arrow buttons located in the bottom left corner of the form. To close the form, click on the "Exit" button located in the bottom right corner of the form.

Details of the Propose LOINC Form

The following sections describe individual areas of the Propose LOINC form. Each section provides an explanation of the area in question and instructions on how to enter data in that part of the form.

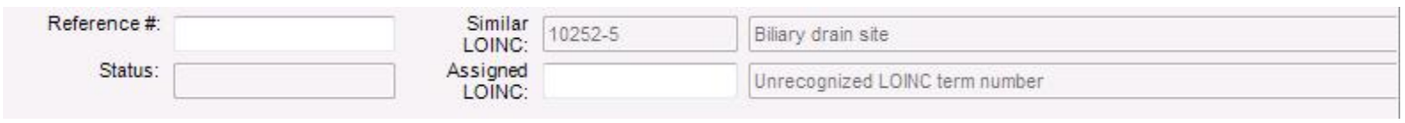
The Local Details Section



The local code section displays the details of a term within a Local Term File that served as the model for the requested term. In the figure above, the user was unable to find a valid LOINC to map the local code of CULT (Culture) in the "SAMPLE" Local Term File, so the user chose to request such a term. When the form opened, the local code information was copied onto the Propose LOINC form, and it will be transmitted along with the proposed LOINC when the user submits the term. Please make sure that when local code data is present it relates to the requested term. The local code information helps the Regenstrief Institute better understand the need for your requested term.

Note: *The local code section may contain data if the user opens the Propose LOINC form while viewing the mapping screen and a local code from the current Local Term File is displayed on the screen.*

The Similar LOINC Section



The similar LOINC section contains the LOINC number and the shortname of the LOINC term that is the closest match to the proposed LOINC. Because the LOINC database strives to contain a unique collection of concepts, it is important that each proposed LOINC be unique from any existing LOINC term. By providing a similar LOINC, you assist the Regenstrief Institute to ensure the addition you are requesting is unique.

Like the local code section, the similar LOINC section cannot be edited. The section is populated from information on the mapping screen at the time the requested term is created. To make sure this data is copied, make sure an existing LOINC code is highlighted in the results grid before choosing to propose a LOINC. This is shown below in the "Propose a LOINC using an existing LOINC" section.

The Reference Number

In the figure above, to the right of the similar LOINC information you will notice a box labeled "Reference #". In this box you can provide a unique reference identification number for each requested term that you create. These reference numbers will be transmitted along with the proposed LOINCs they reference. The staff at the Institute can then use these numbers in correspondence with you regarding specific terms in your submission, and these numbers will be returned with your requested LOINCs after the submission process has been completed.

The Status Field

Displayed in the figure above is the status field. This field displays information telling the user the term has been submitted and on what date the term was last submitted. It is possible to submit terms multiple times, but this is not recommended.

Note: *Once submitted, a term cannot be edited. If you edit a previously submitted term, a new term will be created. This may seem confusing, but this behavior ensures that if a proposed LOINC is submitted twice it can easily be identified as a duplicate of a previously submitted term.*

The Assigned LOINC Field

Also highlighted in the figure above is the assigned LOINC field. After submitting terms to Regenstrief, a user typically receives his or her submission file back with comments, edits and assigned LOINC numbers. These assigned LOINC numbers are usually new terms created based on the user's submitted terms. This field allows the user to record these assigned LOINC numbers after the submission file is returned.

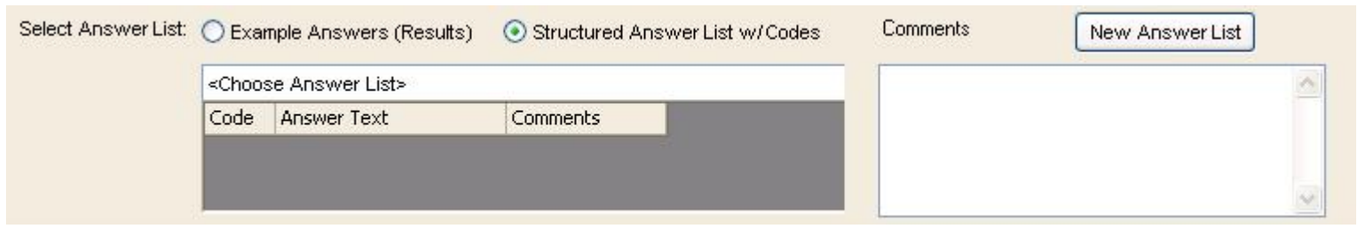
Once a user has entered an assigned LOINC number, RELMA will attempt to lookup the shortname for that term. If the shortname can be found, it will be displayed in the field to the right of the assigned LOINC number. It is not uncommon for the program to have difficulty in finding the shortname as users often submit terms throughout the year whereas the LOINC database is updated and released only a few times a year.

Example Answers and Answer Lists

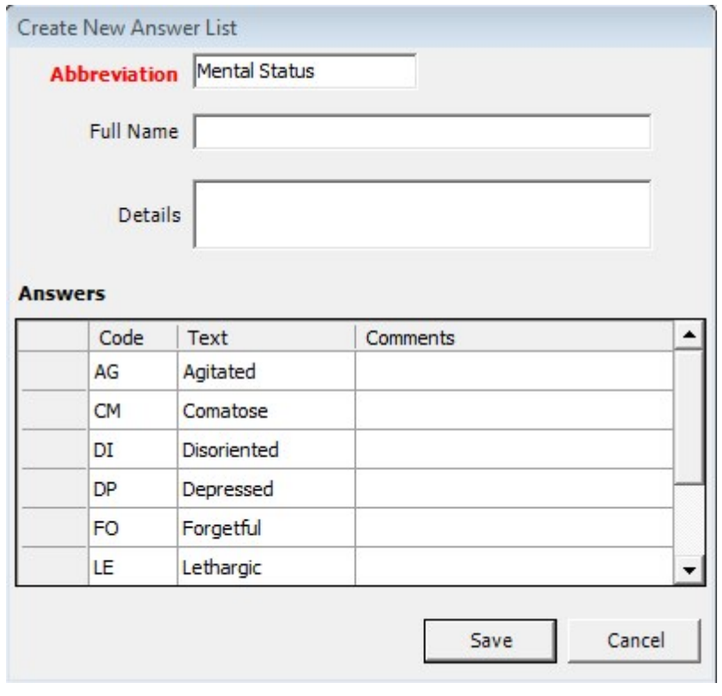
Because additional information helps the staff at Regenstrief better understand the nature of your requests, providing example answers or sample results provides the context and output of your requested test(s). You may include anything from a short description like in the figure above or a long block of text from an HL7 message. Any and all information you can provide will be helpful to those who evaluate your requests.

Note: *When including HL7 messages as sample results, please be sure to remove patient identifying information.*

Sometimes your tests will have answers that come from answer lists defined in your information systems. Providing the answer for these lists is just as helpful as including HL7 messages as sample results. The form provides a mechanism by which you can define answer lists. To define a list, first click on the round circle labeled "Answer List" shown in the figure below.



This will change the form so it displays a dropdown textbox with a list of available answer lists. Also displayed is a button labeled "New Answer List". Clicking this button will display the form shown in the figure below.



Enter the information for the new answer list then click the "Save/Exit" button. This will return you to the "Propose LOINC" form and the newly defined answer list should be selected for the requested term.

Normal Range

With any test, Normal Range is critical when establishing a baseline. By providing this critical evidence, it can highlight use cases requiring a new LOINC term.

Example Report

When examples of reports (please remove any Private Health Information) can be provided, it provides valuable details of results as well as tests and panels.

Reference Infomation/URL

The process for approving submissions includes detailed investigation and analysis. By providing applicable reference information assists in the process and reduces miscommunication.

Test instrument information/URL

When known, please provide information about the instrument vendor, the instrument used to run the test and/or reagent kit used to perform this test (if applicable)

- "Test Inst. Vendor" - Enter the manufacturer of the instrument/test kit you use to conduct this test.
- "Test Inst. Model" - Enter the model name of the test instrument you use to conduct this test.
- "Test Reagent Kit" - Enter the name of the test kit you use to perform this test. If the test kit does not depend upon the analysis instrument, enter the vender of the test kit rather than of the instrument in the first question.

The Parts of a Proposed LOINC Term

Each LOINC is composed of multiple parts. To propose an addition to the LOINC database, you must specify the parts that compose the new term. The left column labeled "LOINC Part" contains spaces for entering data for the various parts of a LOINC term. A description and examples of these parts are provided by placing the mouse above of the textbox (the rectangular box with an arrow pointing downward on the far right side). Additional description and discussion is provided in the LOINC Users' Guide.

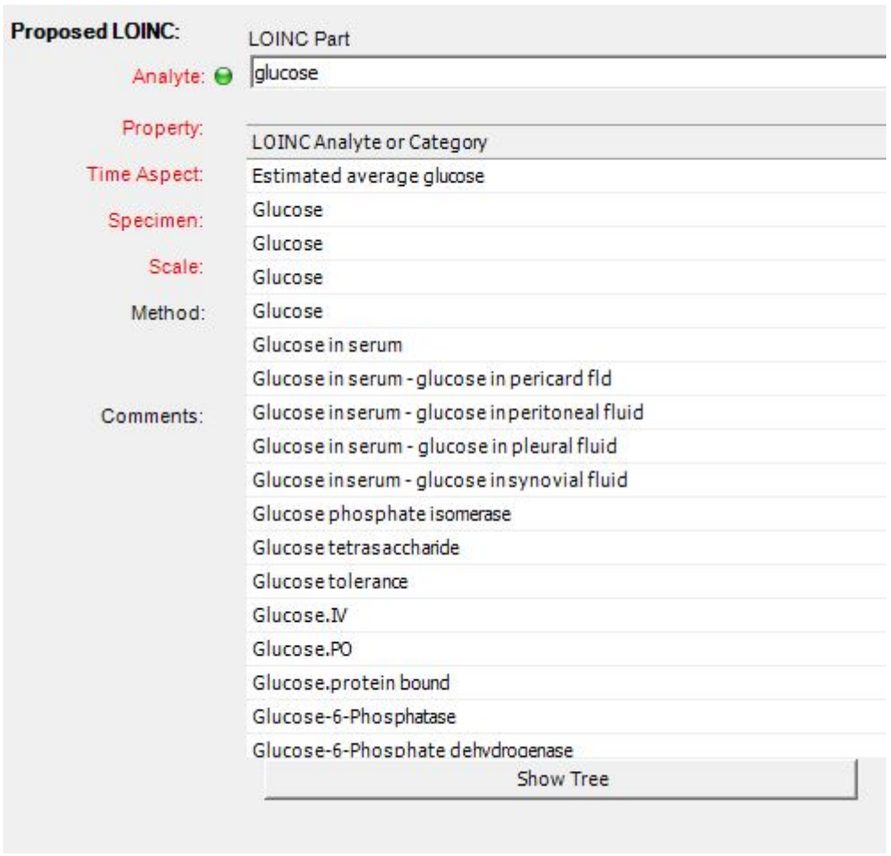
Note: *You must enter text into the parts labeled in red. These are required as specified in the table above.*

These textboxes appear to be standard Windows dropdown controls, and indeed they behave very similarly to dropdown controls. However, many of these textbox controls contain LOINC hierarchies, so their behavior is slightly different than the standard controls used in RELMA and other Windows applications.

You can switch between textboxes using the TAB key like you do in other Windows applications, but pressing the RETURN (ENTER) button causes a slightly different behavior. Instead of moving to the next textbox, pressing the return (enter) key takes the text you entered in the box and conducts a search for that text. If the text is found, a list of words and phrases containing the text entered is displayed on the screen. This is accomplished by the control "dropping down" or "dropping up" on the screen as shown in the figure below.

Once the control has "dropped down" or "dropped up" you can click using the left mouse button on one of the search results. Clicking in this manner will select one of the search results, and the selected item's LOINC value will be copied into the textbox where you entered your text. **You can also click on items in the list or hierarchy without performing a search.** The item's LOINC value may differ from the value displayed in the "dropped down" or "dropped up" portion of the textbox control. This behavior is caused by the use of abbreviations and synonyms in the LOINC database.

Note: *To search for blood in the system tree, the user could have typed either "bld" or "blood". The system textbox control does not return the exact same set of search results for both strings, but it does return the string "Blood" for each search. Synonyms may not always work, so users may have to try more than one search to find the exact string they wish to use as a part for the requested term they are creating.*



Providing Comments

Providing comments is not required but highly recommended. Comments allow the staff at Regenstrief who process submissions to understand why your organization is requesting the term(s) submitted. Comments are especially important when you are requesting new parts (new properties, new systems, etc) because the staff at Regenstrief needs to understand the definition of the new parts and ensure that they are not synonyms of existing parts. If the staff does not understand your request, your submission may take longer as they search for definitions and enter into a dialogue with you to better understand the nature of your request. Please help us process your terms in the most efficient way possible by providing comments.

Attachments and Supplemental Content

- The following attachment types are suggested when proposing a LOINC
    - Example Answers
    - Reference Information
    - Package Inserts
    - Other

      Note: *A missing file will prevent the form from being saved. When this occurs, simply remove the existing record and re-add with the correct path.*

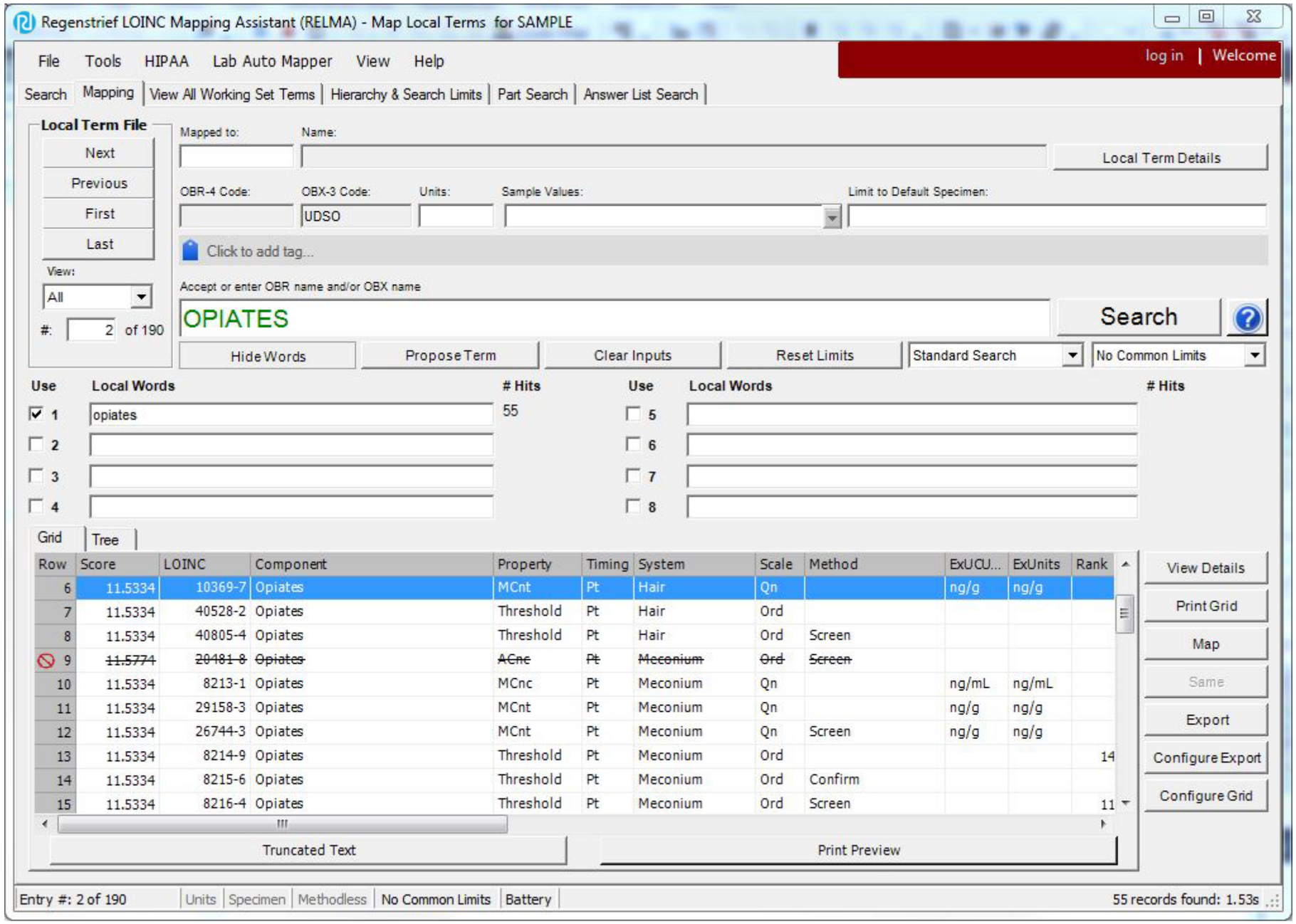
Proposing a LOINC using an Existing LOINC

To propose a new LOINC term using an existing LOINC as a base from which you may start editing, open the mapping screen. From the mapping screen, conduct a search to find the LOINC that is the closest match to the term you wish to request. Highlight the closest match term by clicking once with the left mouse button and then click the "Propose Term" button, or use the "Propose a LOINC based on selected term" File menu action (or select "Propose a LOINC based on selected term" from the right-click menu). An example is shown below.

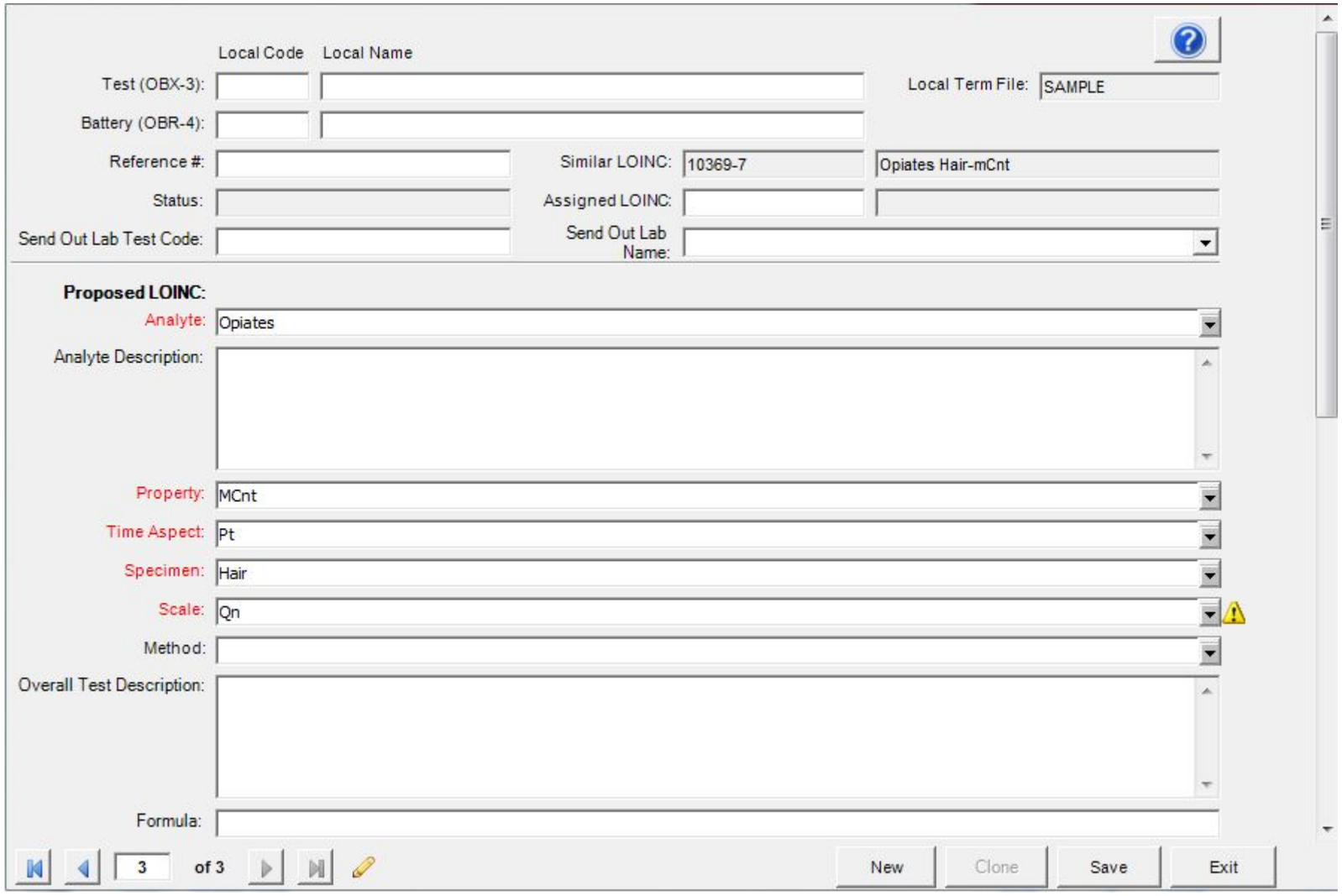
Step 1 - Conduct search on mapping screen

Step 2 - Highlight LOINC term that best matches the term you wish to propose

Step 3 - Click the "Propose Term" button to request a term



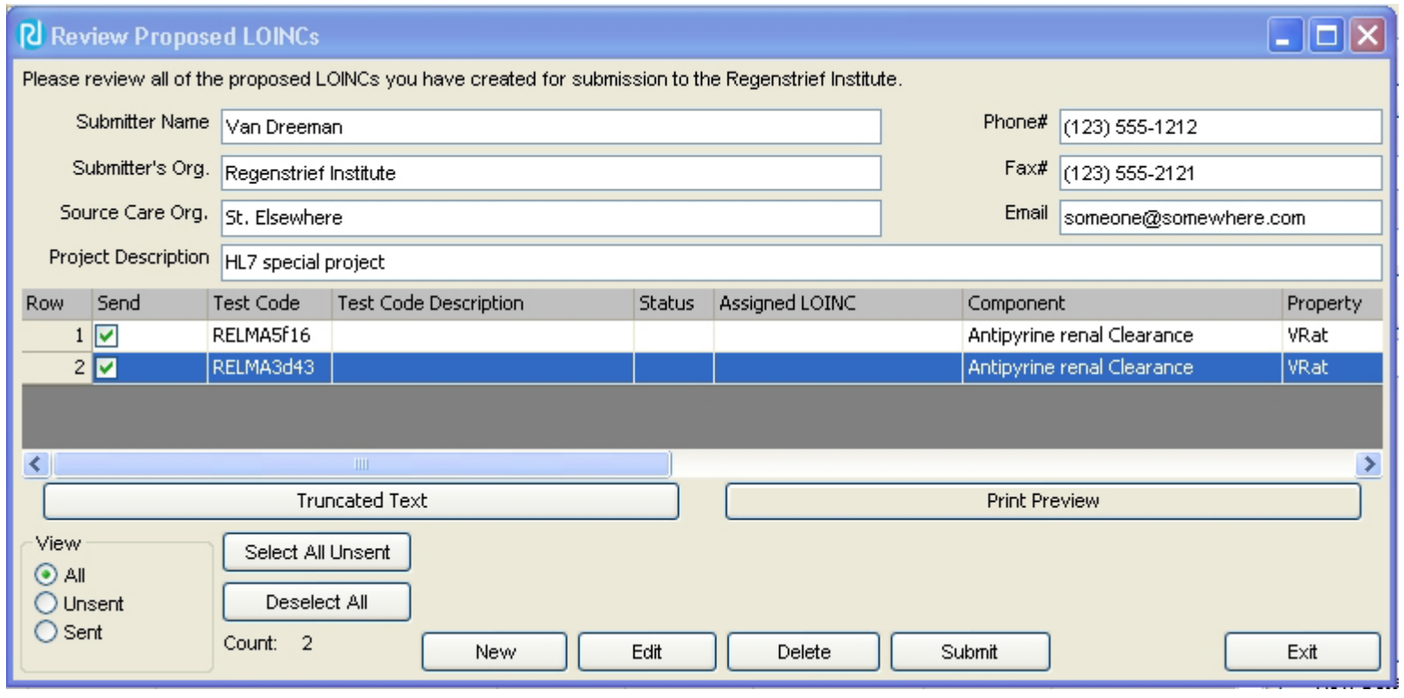
In the example above, the user has conducted a search to map his local term to a LOINC code and did not find an applicable LOINC. The user selects the nearest match in the results grid then presses the Propose LOINC button. The user next sees the Propose LOINC form shown in the figure below.



After pressing the "Propose Term" button, the Propose LOINC form opens and the information from the mapping screen is copied into the various sections of the form. The user may then edit the part or parts of the existing term in order to create the unique concept he or she wishes to propose.

Reviewing Proposed LOINCs

Once you have entered one or more proposed LOINCs using the methods described above, you may wish to review the terms you've created and prepare them for submission. Choosing the "Review and Submit Proposed LOINCs..." from the File menu on either the welcome or mapping screen will bring up a form similar to the one shown in the figure below.



- Before you can submit your proposed LOINCs, it is required that you provide your name, organization name, and contact information (phone, fax and email) so that a staff member at Regenstrief may contact you regarding your submission if necessary. Once provided on the form, this information will be saved and loaded each time you run the RELMA program, so it is recommended that you enter this information the first time you view the form.
- Loaded into the grid in the center of the form are key pieces of the requested terms you have created using the methods described in the previous sections of this users' manual. The column labeled "Send" contains a checkbox that you can use to select groups of proposed LOINCs you desire to submit to Regenstrief. The column labeled "Test Code" represents a local code from your system that this proposed LOINC is based on. Some codes will have the prefix "RELMA". These codes were generated by the RELMA program when no local code information was available (i.e. you started the requested term from scratch or did not have a Local Term File term showing on the mapping screen). The next set of columns in the grid represents the six parts of your proposed LOINC. These fields should help you identify and distinguish between the many terms you might create. The final fields in the grid help you distinguish between those codes you have previously submitted and those you have not yet submitted. Of course, you can filter the grid to display only non-submitted or only submitted terms by choosing a different value for the "View" box in the bottom left-hand corner of the form.
- To create a new proposed LOINC from scratch, click on the "New" button. To edit a requested term, highlight the term in the grid by clicking on it with the left mouse button then click on the "Edit" button. You can permanently delete one or more proposed LOINCs by first highlighting them using the mouse then clicking the "Delete" button. Clicking on the "Print" button allows you to print the items currently displayed in the grid. See instructions below when using the "Submit" button. The "Exit" button closes the form and returns you to either the welcome or mapping screen.
- To delete a an entry simply highlight the row by clicking the far left column on the grid. Then click the "Delete" button at the bottom of the screen. Multiple rows can be selected using the Windows standard SHIFT and CTL keys.

Submitting a Submission File Using RELMA

To submit terms created and reviewed using the methods described in the previous sections of this appendix, follow the steps outlined below.

1. Select the terms you wish to submit by checking the Send column.
   - To select all terms previously unsent, you may click on the "Select All" button below the grid.
   - To deselect all terms, you may click on the "Deselect All" button below the grid.

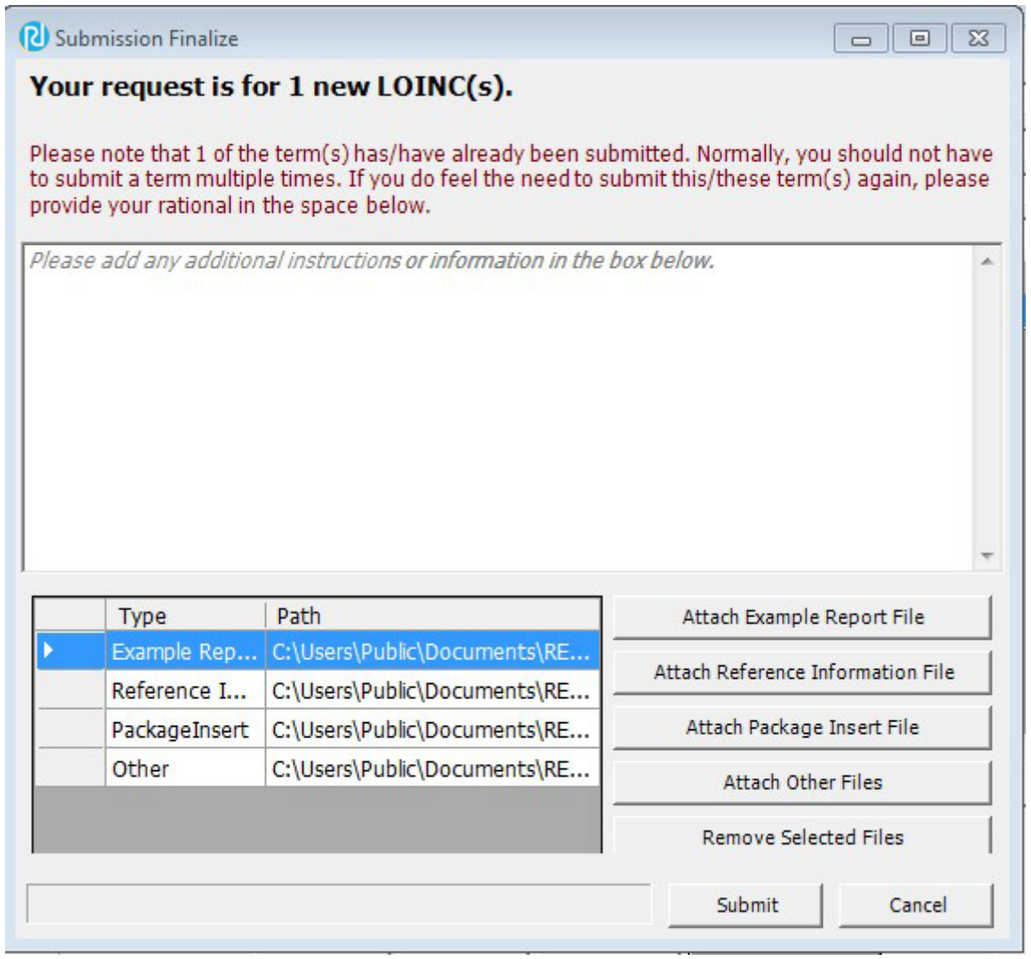
   Note: *Terms previously sent will have a status of "SENT". Be careful when selecting terms because while you are allowed to submit the same term more than once this practice is not*

recommended. Sending large batches that contain previously requested terms may slow down the submission process.

2. Click the "Submit" button.
3. Finalizing a Submission

This step allows you to provide any additional notes as it pertains to the submission as a whole, review the attachments for all proposed LOINCs and add any additional attachments for the submission.

Note: *On this form, any attachments that are removed and are associated with a proposed LOINC, cannot be re-added to the proposed LOINC on this form. If you wish to ensure that the attachment remains associated with a given proposed LOINC, return to the Propose a LOINC form and edit the attachments accordingly. Otherwise, any attachments added on this form will be associated to the submission and not a specific proposed LOINC.*



- A short summary of the number of Proposed LOINCs is included at the top.
- Should any of the Proposed LOINCs have been previously submitted to Regenstrief Institute, Inc., a warning will be provided indicated that this is not typical.
- Provide any supplemental notes as it pertains to the submission as a whole.
- Add any attachments that pertain to the submission as a whole.
- Click the "Submit" button

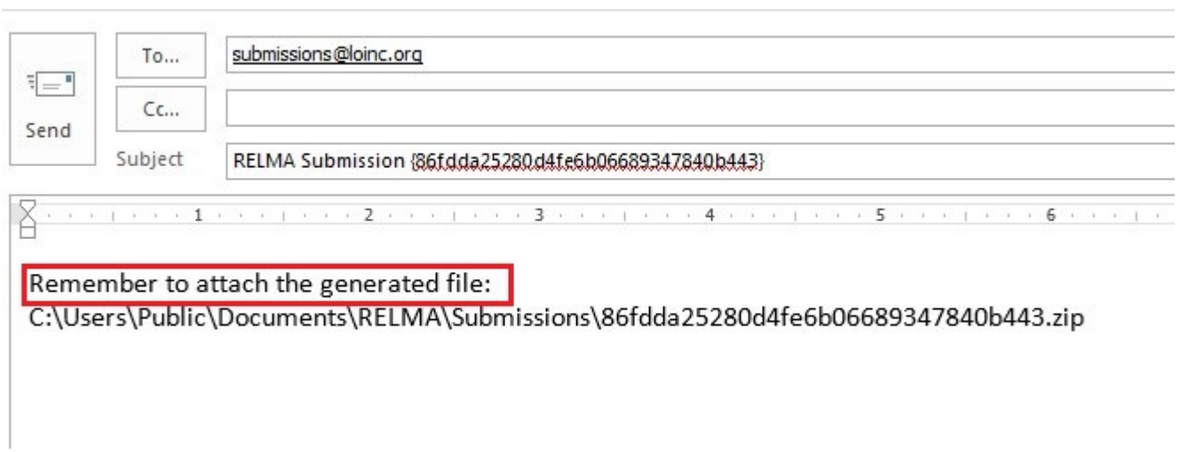
Note: *When sending your submission through FTP, RELMA does not trasmit your loinc.org password.*

- RELMA will now package all selected proposed LOINCs, including any associated attachments, and create an archive submission file.
  Note: *This may take a few moments if you have a high number of terms to submit or have large attachments included.*
- Supported methods for sending submissions: FTP, EMAIL.

  See User Preferences Section for more details.

- **Sending submission using EMAIL? Go to step 4.**
- **Sending submission using FTP (default)? Go to step 5.**

4. Sending Submission using EMAIL



   - A dialog box will appear notifying you that your default email client will be opened.
   - The email should be pre-addressed to submissions@loinc.org
   - The subject should be pre-filled with "RELMA Submission {unique id}"

     Note: *The unique id is a system generated GUID that allows Regenstrief to associate an email with a submisssion file.*
   - Since Windows does not allow for automatic attaching of files to an email, a note is included in the message body indicating the path of the generated archive file. Using the provided path, attach the file to the email message.

     Note: *It is essential that this file be attached prior to sending the email.*
   - Send the EMAIL.

5. FTP Confirmation

   A confirmation will be displayed showing that your submission was succesfully sent.

   Note: *If you do not receive this confirmation or experience problems during the submission process, visit our FAQ web page for more details.*

   Note: *You may receive communication from Regenstrief with requests for further information if required.*

Export full panel structure to Excel

The "Export full panel structure to Excel" option in the right-click actions exports the full structure of the panel(s) selected to Excel file.

You can export the full panel structure including the FORM, LOINC and ANSWERS to Excel by choosing the "Export full panel structure to Excel" right-click action. You can also select multiple panels for export by dragging the mouse over the display.

Note: *Only records that are panels will be exported to Excel. Records that are panels are denoted by the existence of a hyperlink within the LForms column of the search grid. Should a mixture of records that are panels be selected with a set of non-panel type records, a warning message will be displayed noting that only the panel type records will be exported.*

Appendix B: HL7 Attachments

The HIPAA Attachments display in the RELMA program is a tool for users to browse the LOINC terms used in attachments. From the main attachments viewer, four sub-sections are available: *Documents with implementation guide* (previously called "STRUCTURED"), *Documents without implementation guide* (previously called "UNSTRUCTURED"), *Valid attachment requests*, and *Request Modifier Codes*.

The *Documents with implementation guide* tab presents the attachment types for which clinically-relevant HL7 implementation guides that use the U.S. Realm Header have been developed. In the LOINC database, these terms have a value of "IG Exists" (previously "STRUCTURED") in the HL7_ATTACHMENT_STRUCTURE field.

The dropdown menu on the upper left hand side selects the specific implementation guide of interest. On the left side of the screen, for each implementation guide, the set of allowed LOINC document codes in that document type are listed under the Attachment Name. For each attachment document type, the most generic LOINC code (i.e. the one that is approved for use as an attachment request) is indicated with a star icon. When a document code is selected, the set of allowed section and entry-level codes for that implementation guide are shown on the right side of the display under CDA Recommended Sections and Entries.

You can view the details of a LOINC code by double-clicking any of the rows that show a LOINC number. Alternately, you can use the "View Details" right-click actions to display the currently highlighted panels.

Note: the LOINC terms listed under CDA Recommended Sections and Entries are not to be used in requesting a document. They do however elucidate the potential contents of the response.

The *Documents without implementation guide* tab lists all of the LOINC codes that are approved by the HL7 Attachments WG for use in requesting as an unstructured attachment. These codes represent documents that may be needed by payers but for which an implementation guide that explicitly enumerates the expected contents has not yet been developed. In the LOINC database, these terms have a value of "No IG Exists" (previously "UNSTRUCTURED") in the HL7_ATTACHMENT_STRUCTURE field.

The *Valid attachment requests* tab contains the complete set of LOINC codes that can be used by payers as attachment requests. This set consists of a) the "top level" (i.e. preferred) document codes from clinically-relevant HL7 implementation guides that use the U.S. Realm Header, and b) the document codes without implementation guides that have been approved by the HL7 Attachment WG.

The *Request Modifier Codes* tab lists all the LOINC codes that can be used as request modifiers. For more information, see the HL7 Attachment Specification.