

# LEXBIG BROWSER QUICK START GUIDE

*Version 1.0.1*



**NATIONAL<sup>®</sup>  
CANCER  
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Center for Bioinformatics

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# INTRODUCTION

## About LexBIG Support for caCORE

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Throughout the time that the caCORE 3.2 release is in production, the NCI Center for Biomedical Informatics and Information Technology (CBIT) is offering the same terminology data on two terminology servers. The production caCORE 3.2 relies on the DTS/DTSRPC and Metaphrase terminology infrastructure, but in parallel, a “quasi-production” version of caCORE 3.2 is also being made available for testing and evaluation by caCORE API users. The production and quasi-production instances of caCORE 3.2 support the same client-side API. The only difference is that the quasi-production service calls LexBIG—not DTS/DTSRPC and Metaphrase—to satisfy calls for terminology data.

Beginning with the release of caCORE after 3.2, CBIT anticipates deprecation of the DTS/DTSRPC and Metaphrase infrastructure and adoption of the LexBIG infrastructure on the production tier of caCORE. We therefore encourage all caCORE API users to (1) regression test the terminology-related functionality of all existing applications against the quasi-production version of caCORE, and (2) develop and QA new applications against the quasi-production service as well as the production caCORE. This will help us discover any problems with our LexBIG implementation before the decision is made to use LexBIG to support the production tier of caCORE.

## About the LexBIG Browser

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The LexBIG Browser tool is mainly intended for administrators of the LexBIG service. It was written by the Mayo Clinic using the native LexBIG API. Although the application's graphical user interface (GUI) provides much functionality that is used only by service administrators, it also provides other functionality that is useful for application developers. This Quick Start Guide focuses on the developer functionality.

Since the LexBIG Browser was written using the native LexBIG API and not the caCORE API, the Browser uses some conventions that are unfamiliar to caCORE API users:

- Terminologies are called *code systems*.
- Search criteria are called *restrictions*.
- The subset of a terminology that satisfies search criteria is called a *code set*.

These differences in terminology are the result of architectural differences between LexBIG and our current infrastructure. We encourage you to bear with the differences, because the LexBIG architecture offers much functionality and many performance benefits.

The LexBIG Browser enables you to determine—independent of the caCORE API—which data in a code system satisfy the search criteria that you want to use. If you write caCORE API code that you expect to return concepts from both the NCI Metathesaurus and the MGED Ontology, you can use the LexBIG Browser to generate a set of concepts from both code systems. You can then use this set of concepts to verify that your caCORE API calls and the programming logic in your application are producing the correct results.

Because the LexBIG Browser uses the native LexBIG API, you can use search techniques that find Boolean products of multiple code sets. You can also perform other operations that are not currently supported in caCORE 3.2, but which we plan to support in the next caCORE release.

During the 3.2 production cycle, you can use the LexBIG Browser to generate test sets and verify data returned by calls to the caCORE API. You can also experiment with the new LexBIG service capabilities that will be supported in subsequent caCORE releases.

# USING THE LEXBIG BROWSER

The LexBIG Browser provides a simple graphical user interface (GUI) for testing LexBIG API methods and quickly viewing the results. You can compare the results with the results of your application. This tool supports nearly all of the public methods defined by the LexBIG API.

**Note:** In addition to its testing capabilities, the LexBIG Browser supports administrative functions. Only users with specific permissions can perform those functions. If you are an administrator, see *Additional References* on page 16 for links to pertinent documentation.

## Contents of This Guide

This guide provides an overview of the LexBIG Browser interface and the features that can benefit application developers. It includes the following topics:

- *Launching the LexBIG Browser* on this page
- *About the Main Browser Interface* on page 4
- *Selecting Code Sets and Graphs for Queries* on page 6
- *Building Queries* on page 7
  - *Adding a Restriction for a Code Set* on page 8
  - *Setting Query Options for a Code Set* on page 10
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- *Shortcuts for Working with Graphs* on page 16
- *Additional References* on page 16

## Launching the LexBIG Browser

**Note:** This guide assumes that you have downloaded and installed the LexBIG Browser from GForge at <http://gforge.nci.nih.gov/?group-id=14>.

The LexBIG installation includes a *gui* folder, which includes an executable file for launching the Browser. *Table 1.1* lists the names of executable files for various operating systems.

| <b>Operating System</b> | <b>File Name</b>                    |
|-------------------------|-------------------------------------|
| Linux                   | Linux_64-lbGUI.sh or Linux-lbGUI.sh |
| Mac OS X                | OSX-lbGUI.command                   |
| Windows                 | Windows-lbGUI.bat                   |

*Table 1.1 Executable files listed by operating system*

## About the Main Browser Interface

The executable file launches a command-line window, followed by the Browser GUI interface shown in *Figure 1.1*.

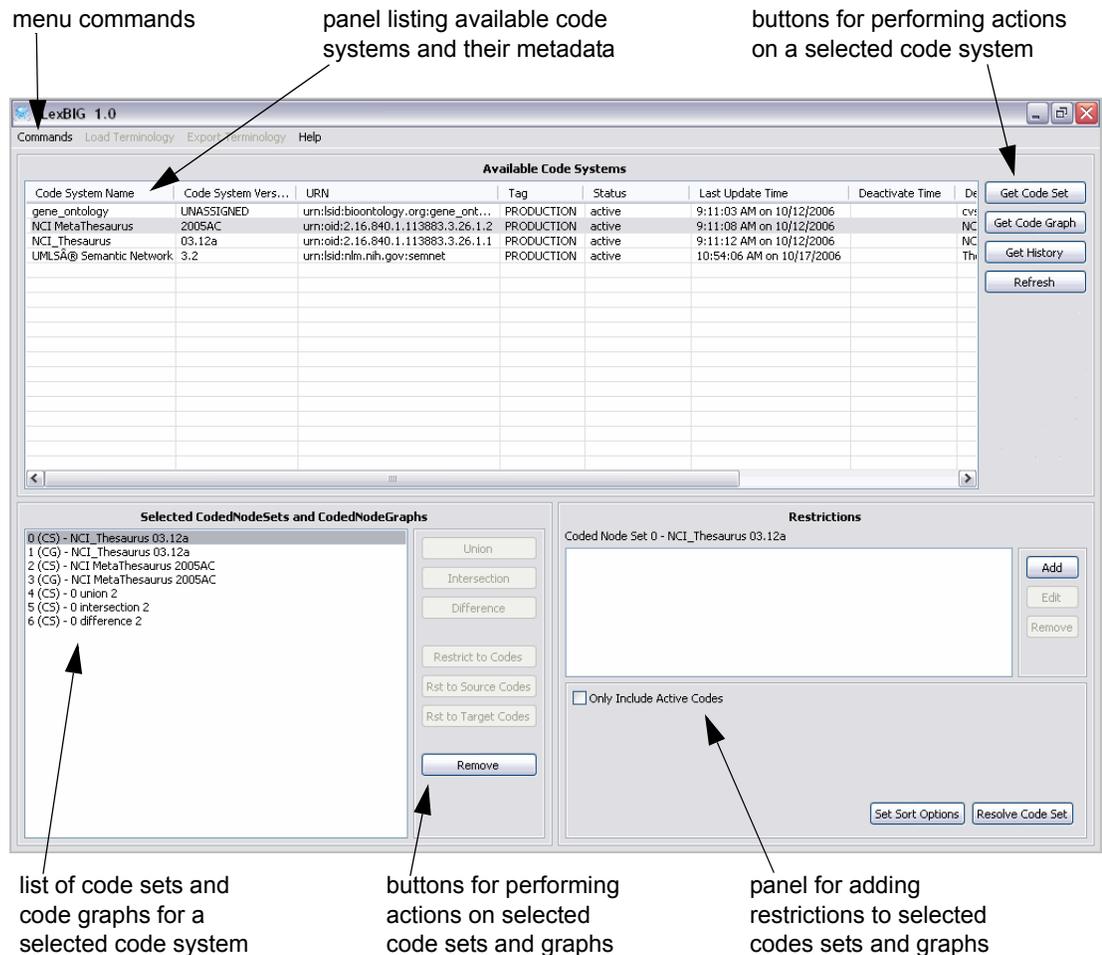


Figure 1.1 Main LexBIG Browser interface

## Interface Terminology

### *code system*

Equivalent to a vocabulary in the DTSRPC.

### *code set*

A result set that can be restricted by properties.

### *code graph*

A result set that can be restricted by roles or associations.

### *restriction*

The property, role, or association that you want to use as a search term or for which you want to restrict a result set.

## Interface Components

Table 1.2 lists and describes each main interface component.

| <b>Component</b>   | <b>Description</b>   |
|--|--|
| Available Code Systems<br>(upper panel)                          | Shows all of the available code systems and their metadata. Most of the functions in the upper panel are used by administrators. As a developer, you can use this panel for the following tasks: <ul style="list-style-type: none"> <li>To select a code system so that you can perform specific actions on related code sets and code graphs in the lower panels</li> <li>To use specific menu commands discussed in the next section, <i>Menu Commands</i>.</li> </ul> |
| Selected CodedNodeSets and CodedNodeGraphs<br>(lower left panel) | Enables you to perform the following tasks: <ul style="list-style-type: none"> <li>Create queries on selected code sets and code graphs</li> <li>Add selected sets and graphs to the Restrictions panel.</li> </ul>  |
| Restrictions   | Enables you to add, edit, and remove restrictions for selected code sets and code graphs.  |

Table 1.2 Main LexBIG Browser interface components (all panels)

## Menu Commands

*LexBIG menu commands* Table 1.3 lists and describes the menu commands available on the upper panel. These commands are useful for application developers.

| <b>Command</b> | <b>Description</b>   |
|----------------|--|
| Commands menu  |  |
| View Log File  | Opens the LexBIG Log window, which shows selected options: LexGUI errors, LexGrid logging, LexGrid loading messages, and SQL statements. Click the <b>Configure</b> button to set options. |
| Exit           | Closes the GUI and the command line window.  |
| Help > About   | Currently shows an e-mail address for questions and bug reports; a Help page is not yet available.   |

Table 1.3 LexBIG menu commands

## Selecting Code Sets and Graphs for Queries

The top four buttons on the right side of the upper panel are used for working with data. Select a code system in the upper panel, then use the four buttons listed in *Table 1.4* to create queries, view history information for thesaurus data, or refresh the available code systems.

| <b>Button Name</b> | <b>Description</b>  |
|--------------------|---|
| Get Code Set       | Adds the selected code system to the lower left panel as a code set. Each set is preceded by a number and the prefix CS. The list numbers start at zero. (See <i>Figure 1.2</i> on page 7.)   |
| Get Code Graph     | Adds the selected code system to the lower left panel as a code graph. The graph is preceded by a number and the prefix CG. The list numbers start at zero. (See <i>Figure 1.2</i> on page 7.)  |
| Get History        | <p>Opens a History Viewer window that enables you to view the history for a selected code system. The window includes the following tabs:</p> <ul style="list-style-type: none"> <li>• <b>Baselines:</b> Displays baseline metadata by date range, from earliest to latest; also displays the Release URN.</li> <li>• <b>Descendants/Ancestors/Creation:</b> Displays descendants, ancestors, creation version, and change versions for a specified concept.</li> <li>• <b>Edit Actions:</b> Displays edit histories for specified concepts.</li> </ul> <p><b>Note:</b> Currently, you can view history information only for the NCI Thesaurus.</p> |
| Refresh            | Refreshes the available terminologies and their metadata. Use this feature when you are viewing a LexBIG environment that is being modified by another process.   |

*Table 1.4 Buttons in upper panel*

The rest of this guide focuses on the two lower panels of the LexBIG Browser.

## Building Queries

Code sets or code graphs that you select in the upper panel appear in the list box of the lower left panel, as shown in [Figure 1.2](#). The availability of the buttons on the right depends on what you select on the left.

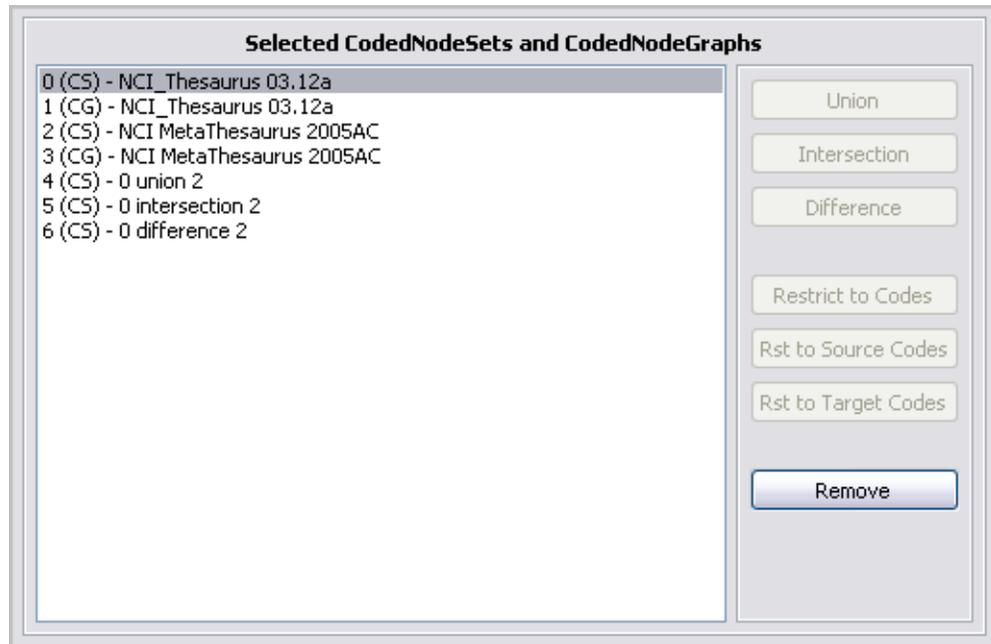


Figure 1.2 Lower left panel with selected code sets and code graphs

Table 1.5 describes the buttons on the right of the panel and explains how your selections affect their availability.

| Button Name       | Description and Availability  |
|-------------------|---|
| Union             | Enabled when two code sets or two code graphs are selected; creates a virtual code set or code graph representing the <i>Boolean union</i> of the two items. Restrictions applied to either item remain in effect.        |
| Intersection      | Enabled when two code sets or two code graphs are selected; creates a virtual code set or code graph representing the <i>Boolean intersection</i> of the two items. Restrictions applied to either item remain in effect. |
| Difference        | Enabled when two code sets or two code graphs are selected; creates a virtual code set or code graph representing the <i>Boolean difference</i> of the two items. Restrictions applied to either item remain in effect.   |
| Restrict to Codes | Enabled if both a code set and a code graph are selected; creates a virtual code graph that is restricted to concept codes belonging to the selected code set.  |

Table 1.5 Buttons for building queries

| Button Name         | Description and Availability (Continued)  |
|---------------------|---|
| Rst to Source Codes | Enabled if both a code set and a code graph are selected; creates a virtual code graph that is restricted to source codes belonging to the selected code set. |
| Rst to Target Codes | Enabled if both a code set and a code graph are selected; creates a virtual code graph that is restricted to target codes belonging to the selected code set. |
| Remove              | Enabled if one code set or code graph is selected; removes the selected item.   |

Table 1.5 Buttons for building queries (Continued)

## Adding a Restriction for a Code Set

When you select a code set in the lower left panel, the name of the selected set appears in the Restrictions panel on the right, as shown in [Figure 1.3](#). Use the upper half of the panel to apply restrictions, and use the lower half to set query options and resolve queries.

For more information on setting query options, see [Setting Query Options for a Code Set](#) on page 10.

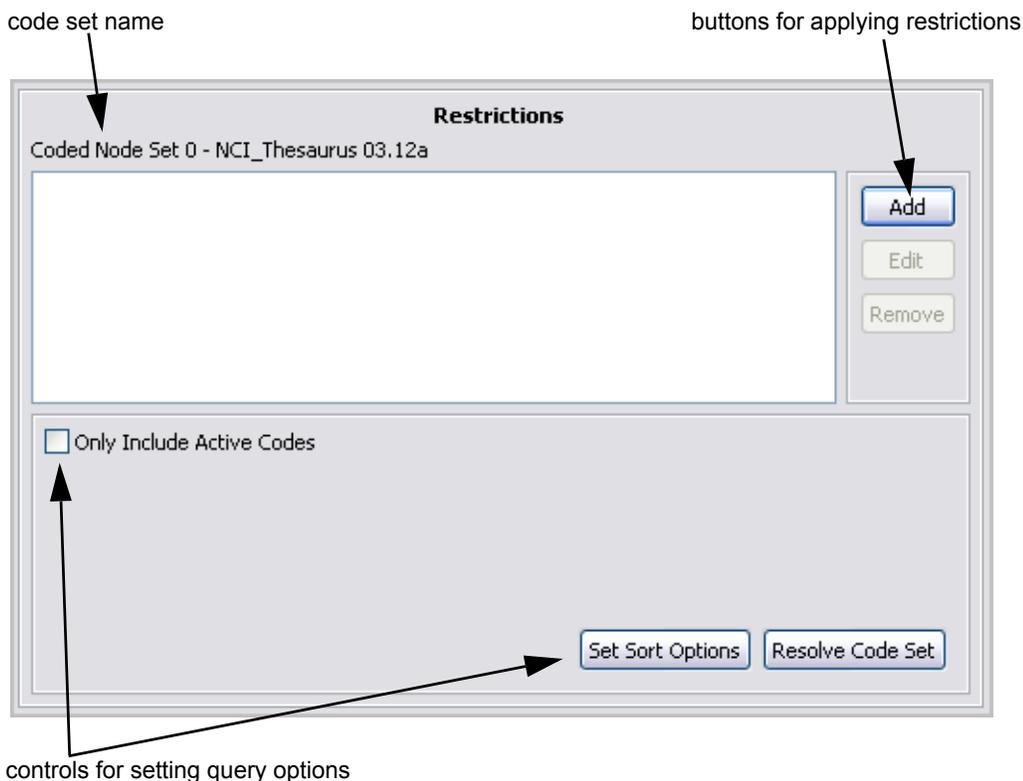


Figure 1.3 Restrictions panel showing selected code set

To add a restriction, follow these steps:

1. Click the **Add** button.
2. In the Configure Restriction window (shown in [Figure 1.4](#)), select restriction options: restriction type, text pattern, and algorithm.
 

**Note:** English is the only available language
3. (Optional) Check the **Preferred Only** box to use the preferred term and restrict the size of the result set.
4. Click **OK** to add the restriction.

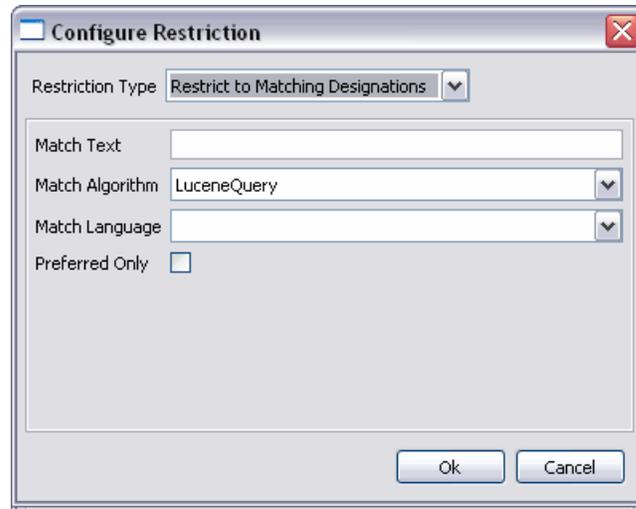


Figure 1.4 Configure Restriction window

Added restrictions appear in the upper half of the panel, as shown in [Figure 1.5](#). When you select a restriction, the **Edit** and **Remove** buttons are enabled.

- Click the **Edit** button to change an existing restriction.
- Click the **Remove** button to remove an existing restriction.

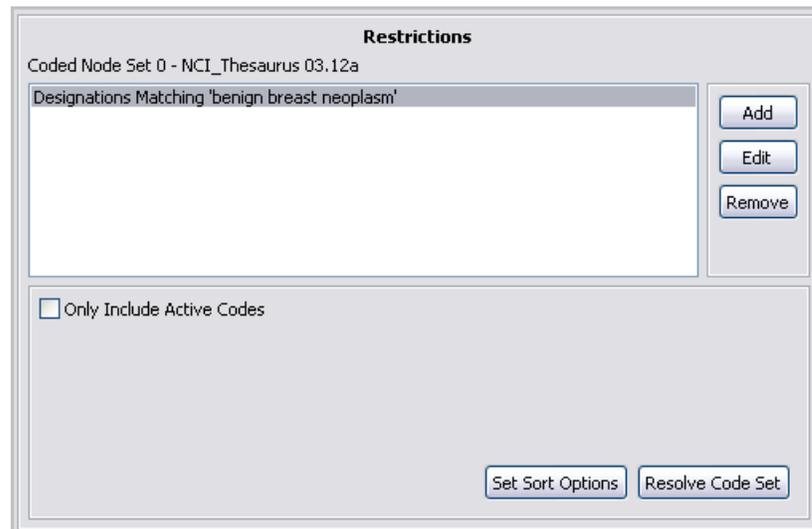


Figure 1.5 Added restriction for a code set

## Setting Query Options for a Code Set

After adding a restriction, follow these steps to set query options and resolve the query:

1. (Optional) To exclude inactive codes, check the **Only Include Active Codes** check box.
2. (Optional) Click the **Set Sort Options** button to open the Set Sort Options window, shown in [Figure 1.6](#).

To select options and establish a sort order, follow these steps:

- a. In the Available Sort Options area, select an algorithm from the drop-down list.
- b. Select the **Ascending** or **Descending** option.
- c. Click the **Add** button. The sort option appears in the Current Sort Order field.
- d. Repeat steps (a) through (c) to add more algorithms. To re-order the list, click the **Move Up** or **Move Down** buttons.
- e. Click **OK**.

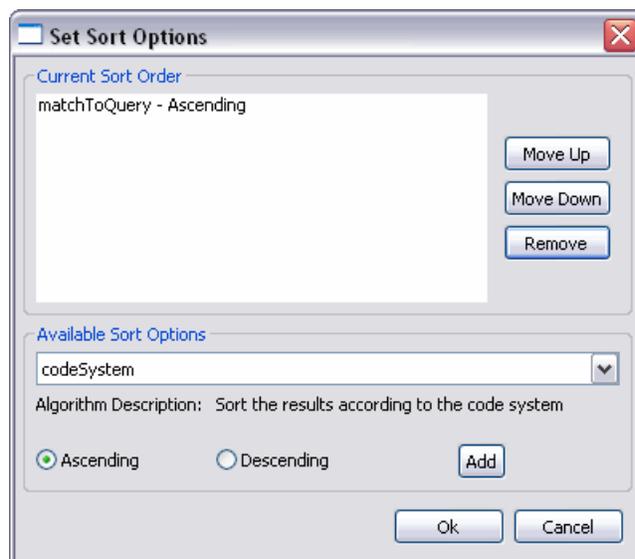


Figure 1.6 Set Sort Options window

3. Click the **Resolve Code Set** button to execute the query.
4. In the Result Browser window, click an item in the left pane.
  - Metadata for the selected item appears in the upper right pane.
  - A graph for the selected item appears in the lower right pane.

Figure 1.7 shows the Result Browser window with a list of returned concepts. When you select a concept code on the left, the upper right pane shows a full description of the concept. The lower right pane shows a graph view of neighboring concepts.

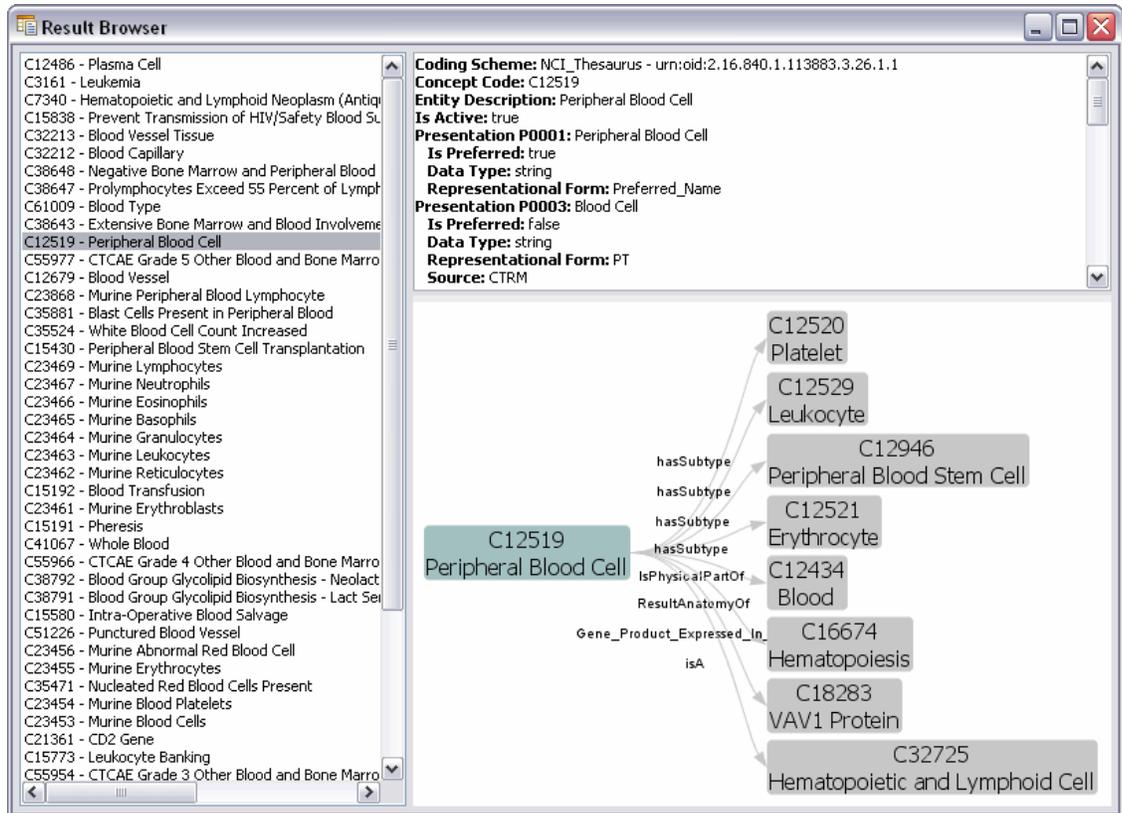


Figure 1.7 Result Browser window for code set

- To close the Result Browser window, use the convention for your operating system.

For example, if you are using Windows, click the **Close** button .

## Adding a Restriction for a Code Graph

When you select a code graph in the lower left panel, the name of the selected graph appears in the Restrictions panel on the right, as shown in [Figure 1.8](#). Use the upper half of the panel to apply restrictions.

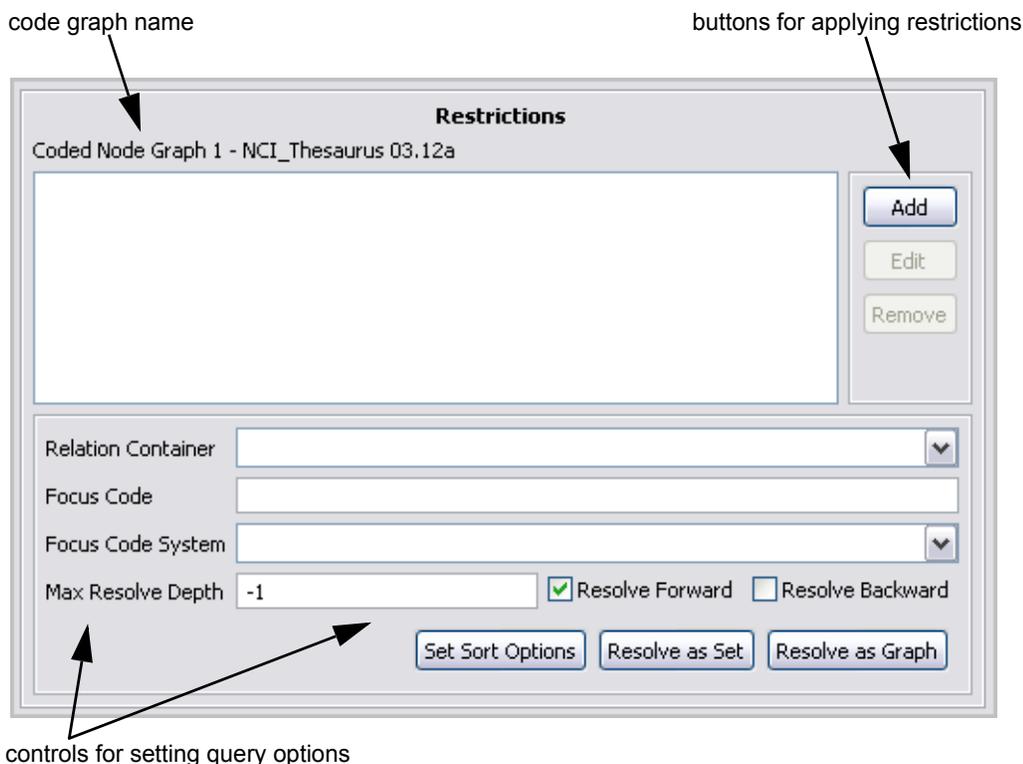


Figure 1.8 Restrictions panel showing selected code graph

To add a restriction, follow these steps:

1. Click the **Add** button.
2. In the Configure LexBIG window, select restriction options: restriction type, association names, and association qualifiers.



Figure 1.9 Configure LexBIG window

3. Click **OK** to add the restriction.

Added restrictions appear in the upper half of the panel. When you select a restriction, the **Edit** and **Remove** buttons are enabled.

- Click the **Edit** button to change an existing restriction.
- Click the **Remove** button to remove an existing restriction.

*Figure 1.10* shows the panel with an added restriction.

*Figure 1.10* Added restriction for a code graph

## Setting Query Options for a Code Graph

When you select a code graph, the lower half of the Restrictions panel provides an expanded set of options, as shown in *Figure 1.10* on page 13. These options enable you to set additional variables for resolving a code graph.

Follow these steps to set query options and resolve the query:

1. Set options as described in *Table 1.6*.

| <b>Option</b>      | <b>Description</b>   |
|--------------------|--|
| Relation Container | (Optional) Shows the name of the CodingScheme Relations container to be queried. Select an option from the drop-down list.<br><b>Note:</b> EVS currently uses only one relation container per vocabulary. The ability to split relationships into types might be used in the future. |
| Focus Code         | (Optional) Provides the code used as a starting point for resolving graph relations. This value may be required for some queries, depending on the requested associations.   |

*Table 1.6* Query options for a graph set

| <b>Option</b>     | <b>Description (Continued)</b>  |
|-------------------|---|
| Focus Code System | (Optional) Shows the names of available code systems that contain the focus code. Select a name from the drop-down list.<br><b>Note:</b> Relationships can be defined between concepts in different code systems. EVS does not currently do this. |
| Max Resolve Depth | Sets the depth (number of levels) at which the graph should be resolved. The default value of -1 does not limit the depth.  |
| Resolve Forward   | Populates codes downstream from the focus node, based on the directionality defined by each association. Check the box to turn on this option.  |
| Resolve Backward  | Populates codes upstream from the focus node, based on the directionality defined by each association. Check the box to turn on this option.  |

Table 1.6 Query options for a graph set (Continued)

2. (Optional) Click the **Set Sort Options** button to open the Set Sort Options window, shown in [Figure 1.6](#) on page 10. To select options and establish a sort order, follow these steps:
  - a. In the Available Sort Options area, select an algorithm from the drop-down list.
  - b. Select the **Ascending** or **Descending** option.
  - c. Click the **Add** button. The sort option appears in the Current Sort Order field.
  - d. Repeat steps (a) through (c) to add more algorithms. To re-order the list, click the **Move Up** or **Move Down** buttons.
  - e. Click **OK**.
3. Click the **Resolve as Set** button to resolve and display the query as a coded node set; or  
Click the **Resolve as Graph** button to resolve and display the graph results.
4. In the Result Browser window, click an item in the left pane.
  - Metadata for the selected item appears in the upper right pane.
  - A graph for the selected item appears in the lower right pane.

Figure 1.11 shows the Result Browser window with a list of returned concepts. When you select a concept code on the left, the upper right pane shows a full description of the concept. The lower right pane shows a graph view of neighboring concepts.

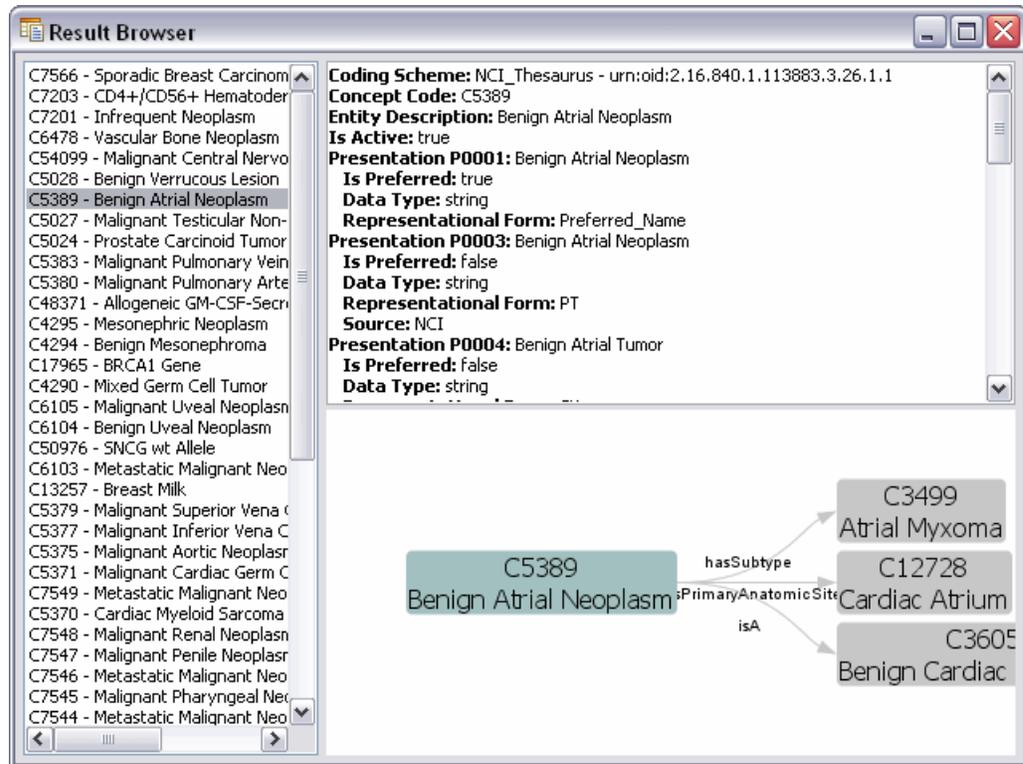


Figure 1.11 Result Browser window for code graph

- To close the Result Browser window, use the convention for your operating system.

For example, if you are using Windows, click the **Close** button .

## Shortcuts for Working with Graphs

When viewing query results in the Result Browser, the bottom right pane displays a graph (see *Figure 1.11* on page 15). Graphs are adjustable and dynamic. They respond to mouse clicks, dragging, and mouse/keyboard shortcut combinations.

*Table 1.7* lists shortcuts for working with graphs.

| <b>Shortcut</b>                            | <b>What it does</b>                      |
|--|--|
| Click and drag within the lower right pane | Moves the image around within the pane.  |
| Right-click and move mouse up              | Zooms out.                               |
| Right-click and move mouse down            | Zooms in.                                |
| Right-click in the white space             | Resizes the view to fit within the pane. |
| CTRL + + (plus sign)                       | Lengthens the graph connection lines.    |
| CTRL + - (minus sign)                      | Shortens the graph connection lines.     |
| Ctrl + [Number]                            | Changes the orientation of the graph.    |

*Table 1.7 Keyboard shortcuts for working with graphs*

## Additional References

For more information on the LexGRID Vocabulary Services for caBIG™, see the following references:

- *Programmer Reference: LexBIG (Developer's Technical Guide)*, v1.0.1
- *Administrator Reference: LexBIG (Installation and Administration Guide)*, v1.0.1

You can download copies of these references from GForge at [https://gforge.nci.nih.gov/frs/?group\\_id=14](https://gforge.nci.nih.gov/frs/?group_id=14).