I - Tour of the Web Client

Introduction

The functionality described here in Part I of the user guide assumes that you have received the necessary prior authorizations to access a SHRINE network at your institution. The process for this authorization varies according to your institution and the network you are accessing.

For example, the Harvard SHRINE network uses a tool called the Data Steward to request and approve access to SHRINE. These and other details on the authorization process used specifically for the Harvard network are included in a separate guide, which may also be a useful example for other networks to reference when setting up their own SHRINE implementations.

User Interface

The user interface to the SHRINE web client is based on the web client developed for i2b2 and RPDR. The workbench seen upon login is divided into four modules: 1 Terms, 2 Query Tool, 3 Query Status, and 4 Previous Queries. The main menu is in the upper right (5).
1 - Terms Module
Choosing between the two tabs in the Terms module allows you to either browse (Navigate) or search (Find) the medical terms on which you choose to query.

Two tabs of the Terms module: Navigate Terms (left; see a–f below) and Find Terms (right; see g–i below). Only one tab is visible at a time in the web client.

a Navigate Terms tab – This is the default tab of the Terms module. Use the Expand (+) and Compress (-) buttons to browse through available patient characteristics in the SHRINE Ontology, which are organized into four main folders:

b Demographics
c Diagnoses
d Lab Tests
e Medications

Each folder contains multiple categories that are displayed in subfolders containing more specific terms by which you can refine your query. As you navigate through the folders and locate a term or category of terms that you would like to include in your query, you will drag that entry to the Query Tool module and drop it in a Group panel. See 2 Query Tool Module below for details.

f Modifiers
A term may also contain modifiers, which are subsets of that term that allow you to further narrow your query. Modifiers are indicated by a blue dot [○] in place of a folder icon. For example, as shown below, terms within Diagnoses might contain the following three modifiers:

- Admit Diagnosis
- Principal Diagnosis
- Secondary Diagnosis
The **Navigate Terms** tab of the Terms module, with the four main term categories collapsed (left) and with four levels of Diagnoses categories expanded (right). Modifiers (f) are also shown within the expanded categories.

**g Find Terms tab** – To search for specific characteristics on which to query, click the Find Terms tab on the Terms module. You can then search by either Names or Codes.

**h Search by Names**
1. Click the top pull-down list to select the logical search operator. Options include Contains, Exact, Left (starts with), or Right (ends with).
2. Enter your search string in the text field beside the operator pull-down list.
3. Click Find.
Note: the Category pull-down list under the text field can currently be left at Any Category because SHRINE is the only choice.

**i Search by Codes**
1. Use the “Select a Coding System” pull-down list to select the specific code type for which to search.
   Coding system options include:
   - Demographics (Marital)
   - Demographics (Sex)
   - Demographics (Language)
   - Demographics (Age)
   - Demographics (Race)
   - Lab Tests
   - Diagnoses (ICD9)
   - Medications (RxNorm)
2. Enter the search term in the text field above the list.
3. Click Find.
The *Find Terms* tab of the Terms module; *Search by Names* tab (left) and *Search by Codes* tab (right).

### Terms Module Icons
The three icons at the top-right corner of the Terms module, labeled j–l below, offer additional viewing options specific to the module.

#### j Show XML icon
- Click to show XML Message History. A popup window like the one below appears.
k **Show Options icon** – Click to open the dialog box shown below, where you can select from the following options for navigating and finding terms:

- Maximum Number of Children to Display – Default is 200
- Show Hidden Terms
- Show Synonymous Terms
- Enable Patient Counts
- Use Short Tooltips
- Show Concept Codes in Tooltips
- Disable Modifiers

The available options are the same for both the Navigating and Finding tabs, but each tab retains its own individual selections as you click from one to the other. If you go from Navigating to Finding and change options for Finding, the Navigating options will not automatically change along with them.

l **Resize Workspace icon** – Click to toggle between expanded and compressed (default) views of the module. When expanded, the Terms module will extend to the bottom of the web.
client window and the Previous Queries module will disappear. Clicking the icon a second time will return both modules to their default sizes.

2 - Query Tool Module
The Query Tool enables you to create complicated queries by using a simple user interface. Here we provide a brief overview of its fields and functions. For more details on how to construct a query, see Part II of this guide.

a Query Name – You will be asked to enter a name each time you click Run Query. You can also use the default name inserted by the tool, which is a string constructed from your term selections and the time at which you run the query. Once you begin running the query, you cannot change its name. The name will also be used to store your query parameters in the Previous Queries module (see 4 below).

Harvard users: Note the difference between Query Name, which applies to an individual query instance, and Query Topic (e below), which is a label describing the broader subject of inquiry that is your purpose for using SHRINE.

b Group columns/panels (Group 1, Group 2, etc.) – This is where you will drag and drop terms from the Terms module to add them to your query. Query groups represent a set of patients defined by the terms within them and by any constraints applied to the terms. Terms within a group operate as OR logic, while terms in separate groups operate as AND logic. Right-click a term to delete it from your query or to set a specific value.

c Constraints – Dates and Occurrences – Immediately below the Group label, you can click the Dates button to specify a date range for the terms in that Group, or the Occurs > 0x button to specify the number of times the term must appear for the same patient. Note: not all terms accept all constraints.

d Exclude – Another button right below the Group label is the Exclude button. Click this to exclude records matching the group’s terms from your query. The green box reading “one or more of these” will change to a red box that reads “none of these.”

e – g Harvard users:

e Query Topic pull-down list – Before you can run a query, you must select a preapproved general Query Topic to which this specific query relates. (For a detailed description of the approval process for Harvard SHRINE, see Section 2 of the separate Harvard SHRINE guide, on the Data Steward Application.)

f Info button – When a Query Topic is selected, click Info to view the description of that topic. This will correspond to whatever was provided to the Data Steward in your request for Query Topic approval.

g Request New Topic button – Clicking this button opens the Data Steward application in a new window. To run a query that does not conform to any of your approved Topics in the pull-down list, you first must request and receive approval for a new Topic. The Data Steward administrator monitors query activities. If you select query terms that do not apply logically to your topic, the administrator can suspend your access to SHRINE, and a review of your activities will be required.

h Run Query button – When you complete construction of your query using the terms, constraints, and options available, click Run Query to start the query process. You can run additional queries by retaining the existing terms in the Query Tool fields, and then adding new criteria to the query.

i Clear / New Query button – Clears all Query Tool fields and starts a new query. To remove an individual query term, right-click on the term.
j Print Query button – Opens a printable view of your query and its results. When the new window opens displaying the query information, press Ctrl+P (on a PC) or Command+P (on a Mac) to invoke your web browser’s Print dialog, and proceed as usual.

i New Group button – Click to add additional groups of terms to your query.

j Group page controls – If you add new groups to the three default groups displayed in the tool, they may exceed the space in the window you have open. If so, use the page controls to navigate to your additional groups.

Query Tool Module Icons
The three icons at the top-right corner of the Query Tool module offer additional viewing options specific to the module:

m Show XML icon – Click to show XML Message History. A popup window like the one below appears.
Show Options icon – Click to select the Maximum Time to Wait for XML Response (in seconds). This is the length of time the system will wait for query results. If your query does not process completely within this length of time, it returns only those results that completed processing, which may only be for a subset of the institutions being queried. If no institution’s data completed processing, the query does not return any results.

Resize Workspace icon – Click to toggle between expanded and compressed views of the module. When expanded, the Query Tool module will extend to the bottom of the web client window and the Query Status module will disappear. Clicking the icon a second time will return both to their default sizes.

3 - Query Status Module
The results of your query appear in the Query Status module. Information provided includes:

- Query name
- Time stamp
- Aggregated query results from each participating hospital
- Elapsed execution time
If your query returned between zero and 10 patients, your results display as “10 patients or fewer.”

When you log out of SHRINE, your query results are saved in the Previous Queries module for future reference. You can also use the saved query as a shortcut to perform it again in future sessions, as described immediately below.

4 - Previous Queries Module

As described immediately above, when results from a successful query are returned in the Query Status module, an entry also appears in the Previous Queries module next to an expandable folder icon [ ].

In addition to query name and time stamp (a and b carried over from Query Status module), the entry also contains:

c Date stamp [mm-dd-yyyy]
d Username [xxnn]

To View the Results of a Previous Query

1. Click the plus sign [+ ] of the expandable folder icon. A second folder icon appears [ ].
2. Click the plus sign [+ ] of the second folder icon. A patient count icon appears [ ], followed by text reading: “Patient Count from <name of institution> - <number> ±3 patients” (or “Fewer than 10 patients”)

To Run a Previous Query Again

Drag and drop the icon of a Previous Query to any Group pane of the Query Tool. This populates the term(s) in the Group pane(s) in precisely the same manner as in the original query. Now, as with any query, select an Approved Query Topic, click the Run Query button, and click OK in the Run Query dialog.

Previous Queries Module Icons

The four icons at the top-right corner of the Previous Queries module offer additional viewing options specific to the module:

e Show XML icon – Click to show XML Message History.
f Refresh icon – Click to refresh your previous queries list

g Show Options icon – Click to specify the Maximum Number of Queries to Display (default is 20) and select how to Sort Queries (Name or Create Date, Ascending or Descending).

h Resize Workspace icon – Click to toggle between expanded and compressed views of the module. When expanded, the Previous Queries module will extend to the top of the web client window and the Terms module module will disappear. Clicking the icon a second time will return both to their default sizes.
5 - Main Menu

The main SHRINE menu is located in the top-right corner of the web browser window. Options include:

• **Find Patients** – The default web client page containing the four modules.
• **Message Log** – A development tool used by technical staff to track system functions.
• **Help** – The link to this guide.
• **Logout** – Exit SHRINE.
II - How to Construct a SHRINE Query

1 - Hierarchy of Terms

Patient queries are composed using medical terms defined in the SHRINE Core Ontology. Because the Core Ontology contains a vast number of terms, including >13,000 diagnoses and >4,500 medications, hierarchical relationships are used to organize the terms into categories. These term categories are represented by folders, which you can navigate in a familiar way via the Terms module of the web client. Expand [-] folders to reveal increasingly specific term category subfolders and, ultimately, discrete terms (represented by document icons).

2 - Query Groups and Boolean Search Operators

As you locate each term you wish to search for, add it to your query by dragging and dropping its icon to a Group panel in the Query Tool module. Boolean logic is applied as follows:

- **OR** – Place two or more terms in the same Group if the patients in your query are only required to match one or another of the terms, but not all of them.

- **AND** – If you have two or more terms that patients must match both/all of to be counted in your query, place each required term in its own separate Group.

- **NOT** – To make your query specifically include patients who do not match a selected term(s), drag that term(s) to a separate Group panel and click Exclude (at the top of the panel, under the Group label).

Note: AND logic is applied before OR logic. For example, if you drag a diagnosis of Asthma to Group 1 and then drag demographic terms of 10-17 years old and 0-9 years old to Group 2 (i.e., 10-17 years old OR 0-9 years old), the query first processes diagnosis of asthma AND demographics of 10-17 years old; it then processes diagnosis of asthma AND demographics of 0-9 years old. The two results sets then are added together to return the final query results.

3 - Term Specificity

In addition to discrete terms, you can also use term categories (folders or subfolders) as query terms. However, dragging a folder to the Query Tool module is equivalent to dragging every discrete term within that folder (and/or its subfolders), which may be too broad and take the query too long to process. Therefore, the maximum number of discrete terms allowed in a folder to be selected for querying is 120. If it contains more, you must expand it and select something more specific.

4 - Term Values

To set a specific value by which to query a term, right-click the term in the Query Tool group and select Set Value. The Choose value of <term> dialog box appears. Use this dialog to set specific values by which to query. Value options vary depending on the term you select. Some terms have no value limiters. Click OK if you would like to set the query value to something other than its default, or click Cancel to accept the default value.

Note: Although this dialogue box sometimes also displays an option to change the units of a term when you set its value, this feature is not currently supported. SHRINE will only calculate results in the default units provided.

5 - Observation Constraints

Immediately under its Group label, you can limit the terms in a given group by the following criteria:

- **Dates** – Click and specify a date range in which you want the term to appear in a patient record.

- **Occurs > 0x** – Click and specify a number of individual times the term should occur for a patient. The default, “Occurs > 0x,” means the term will appear at least once and possibly more. To have a term appear at least twice, set this to “Occurs > 1x,” and so on.

Note: Not all terms accept constraints. For example, a demographic gender term of Female does not accept a date range constraint.
6 - Order of Term Selection

SHRINE runs your query in the order that you select and place terms in the Group panels. Tips for optimizing your query include the following:

- **Select the most limiting terms first.**
  Demographic data is broader in scope than diagnoses or lab values. Therefore, if you select your diagnoses or lab value terms first and then select your demographic terms, SHRINE returns your query results more quickly.

- **Add diagnoses and/or medication terms before lab test terms.**
  Queries that include lab values require a longer processing time than diagnoses or medications. Consider including either diagnoses or medication terms in your first groups before adding a lab test term to your query.

In other words, to make your query most efficient, make your selections in the following order:

1. Diagnoses and/or Medications
2. Labs – Lab values require a longer processing time than diagnoses or medications but are more limiting than demographics
3. Demographics