Mi2b2 User Guide
Release 2.1

Mi2b2 User Guide

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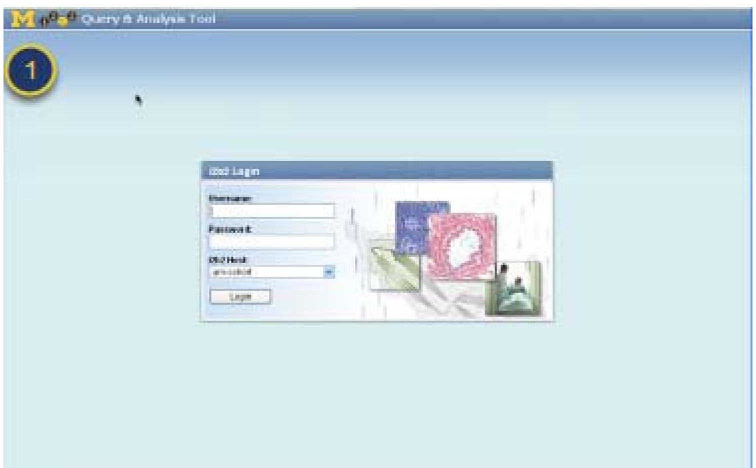
Mi2b2 – Login & Attestation

Mi2b2 (Informatics for Integrating Biology and the Bedside) is an informatics tool designed to simplify the process of using existing, de-identified, clinical data for preliminary research cohort discovery. The **Mi2b2** web client provides "**drag-and-drop**" selection of query criteria and generation of aggregate patient counts based on submitted queries.

The **Mi2b2** web client is compatible with multiple platforms (Windows & Mac) and browsers (Firefox, Internet Explorer, Safari). Firefox is recommended as the preferred browser, particularly if you typically access Mi2b2 on different platforms.

Using the Mi2b2 Web Client



Mi2b2 is accessed using the designated URL: https://i2b2.med.umich.edu

Successful access to the URL will display the **Mi2b2 Login** screen (above).

Mi2b2 Login

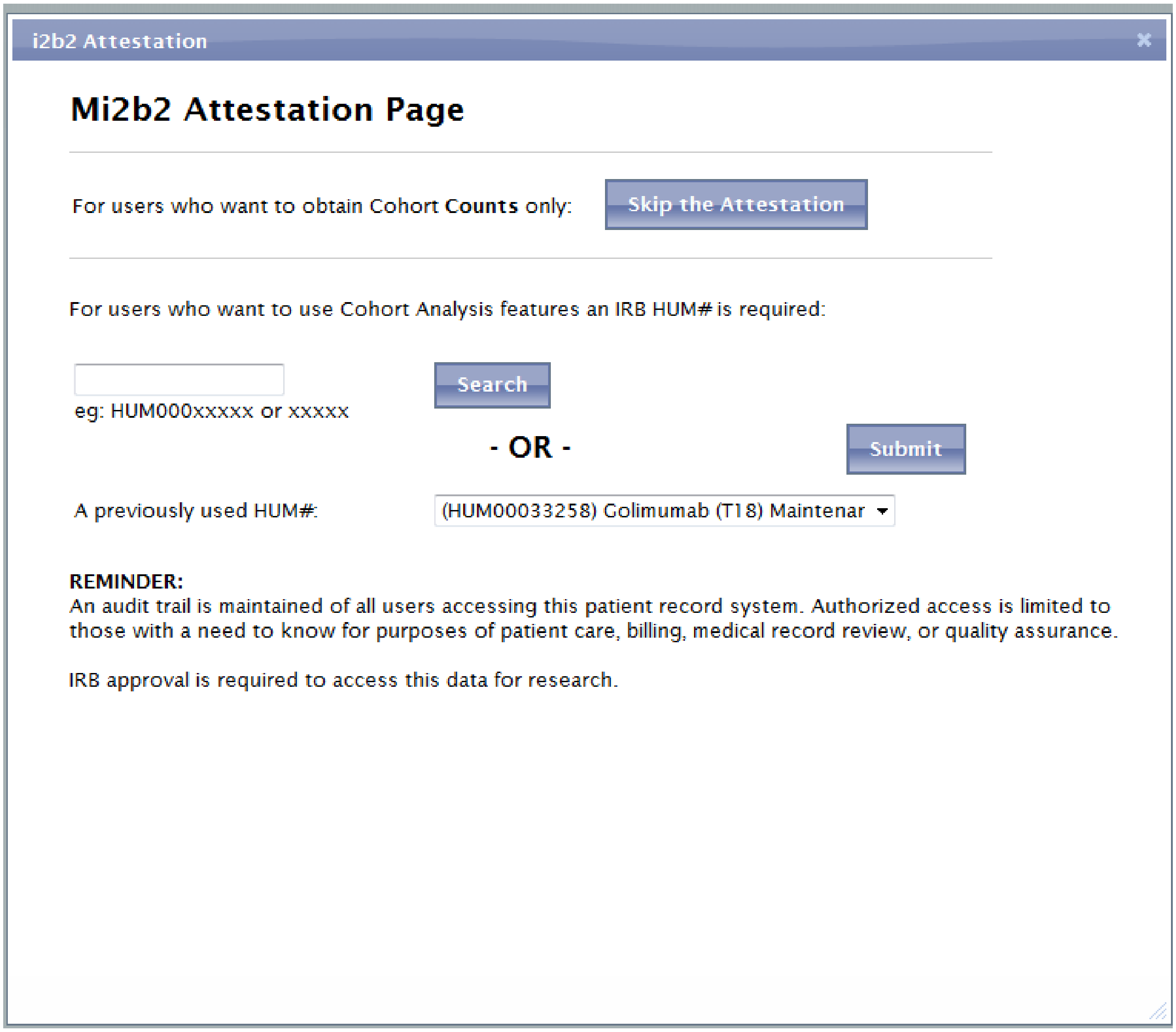
Enter your **Username (uniqname)**.

Enter your **Password (Outlook/Level 2)**.

The default **i2b2 Host:** should remain as **um-cohort**.

Pick the **Login** button to submit your login credentials.

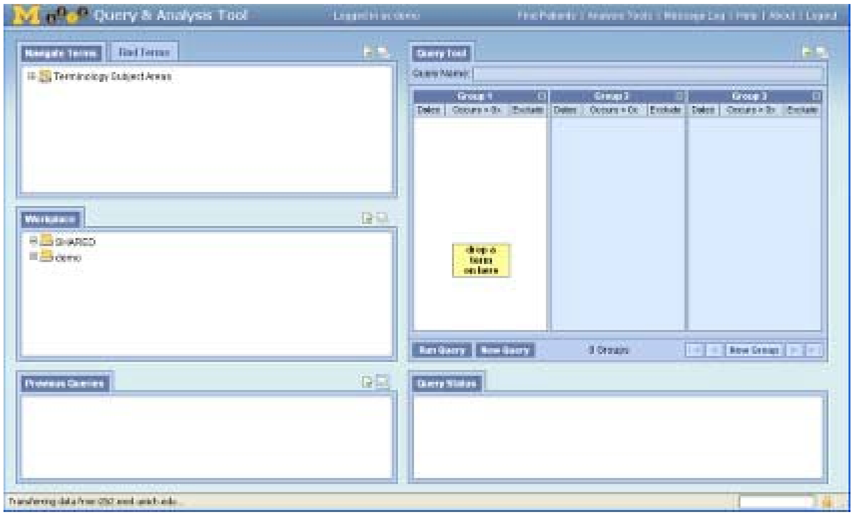
Mi2b2 Attestation Page



Click **Skip Attestation** if you wish to use Mi2b2 in it de-identified data or Cohort Discovery mode.

Enter your valid **IRB HUM#** number if you have one. Click **Search** to locate that study, validate it against the eResearch system, then click **Submit** to complete this attestation page.

Mi2b2 Web Client

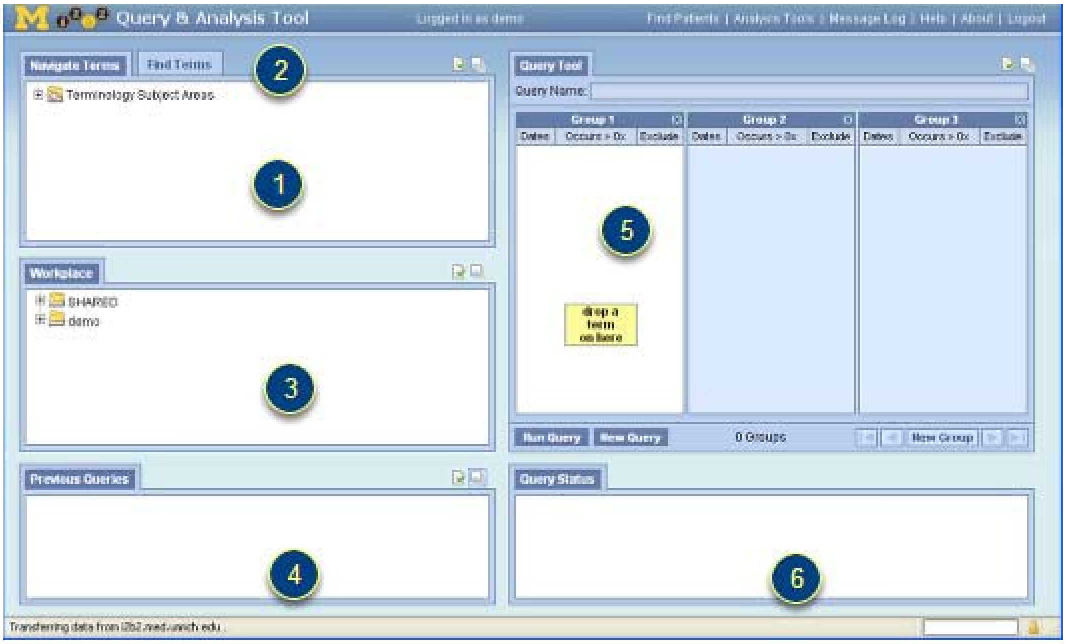


Following the validation of your login credentials, the **Mi2b2 Query & Analysis Tool** screen is displayed and available for use.

Mi2b2 - Web Client Interface

In this lesson, we will explore the **Mi2b2** Web Client user interface and options available for displaying and controlling queries and results.

The Mi2b2 Web Client



The basic Mi2b2 Web Client interface screen provides six primary tabbed panes for identifying, building and running cohort discovery queries. The tabbed panes include:

Navigate Terms - locates query search concepts using a hierarchical folder structure (referred to as the **Terminology Subject Areas** tree).

Find Terms - locates query search concepts using a representative word, phrase or specific code to describe the search concept.

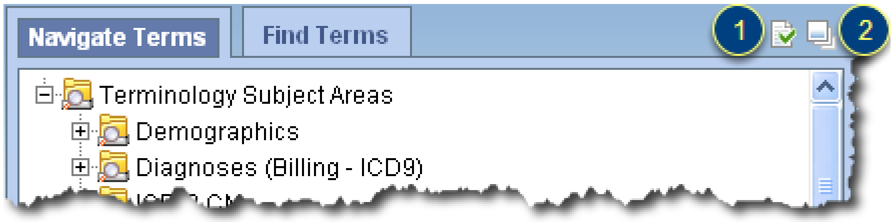
Workplace - **SHARED** and **personal** (your uniqname) directory areas used to store and share queries and results for later review.

Previous Queries - A log of previous queries and results for the current user.

Query Tool - The work area used to collect and refine query concepts.

Query Status - The area used to monitor the progress and results of a query as it runs.

Tabbed Pane - Show Options Icon



Several of the Tabbed Panes also provide options that can help control and view concepts or results for that pane. In this example, two options are available.

The **Show Options** icon and resulting dialog provides options to control what may be displayed in the selected tabbed pane....

The **Toggle Zoom** icon will toggle between the default tabbed pane size and a vertically expanded view of the pane. This can help minimize the amount of vertical scrolling.

Show Options - Navigate / Find Terms Tab Pane

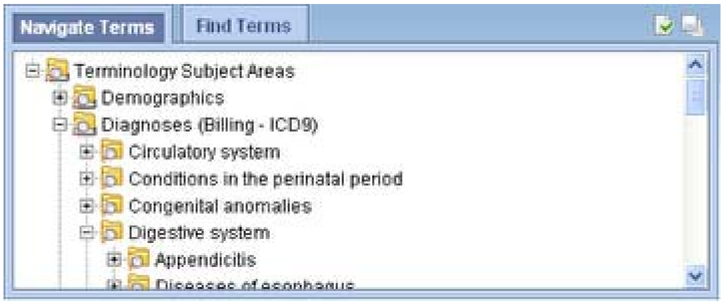
The **Show Options** icon in the **Navigate Terms** & **Find Terms** panes provides control of what may be displayed in the associated tabbed pane. This example shows its use in the **Find Terms** pane.

You may enter or modify the maximum number of **Children** (rows) that will be displayed in the visible pane.

Picking the **Show Hidden Terms** checkbox will ensure that all available terms are displayed.

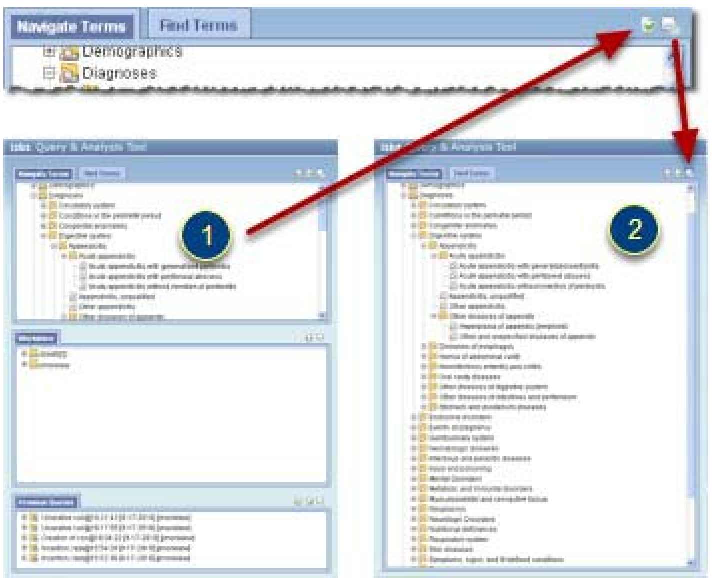
Picking the **Show Synonymous Terms** checkbox will also display synonyms for the original search term (e.g., an original search term of **appendicitis** will also display the terms containing the word **appendix**).

Using Navigate Terms to Find & Select Query Concepts



The **Navigate Terms** pane provides a hierarchical tree of search concepts that can be used to find and specify query criteria.

Tabbed Pane - Toggle Zoom Icon



The **Toggle Zoom** icon will toggle between...

The default tabbed pane size and...

a vertically expanded view of the pane. This can help reduce the amount of vertical scrolling. Any tabbed pane displaying the Toggle Zoom icon will allow you to expand the tab vertically to the full available height of the browser window.

Specifying Additional Query Criteria

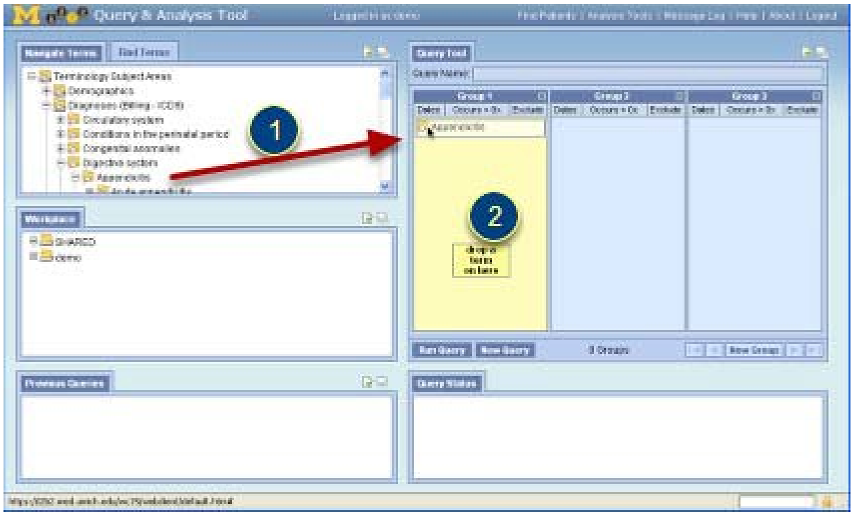
Multiple criteria can be used to help identify and refine a potential Patient Cohort, using the drag & drop tools of **Mi2b2.**

As a term is dragged into a **Group** a Green informational message rectangle (**one or more of these**) is displayed as a reminder that all query concepts in the **Group** will be considered.

If the **Exclude** link is used in a group of concepts...

a Pink informational message (**none of these**) as a reminder that none of the query concepts in the group will be considered.

Using Drag & Drop to Build your Query

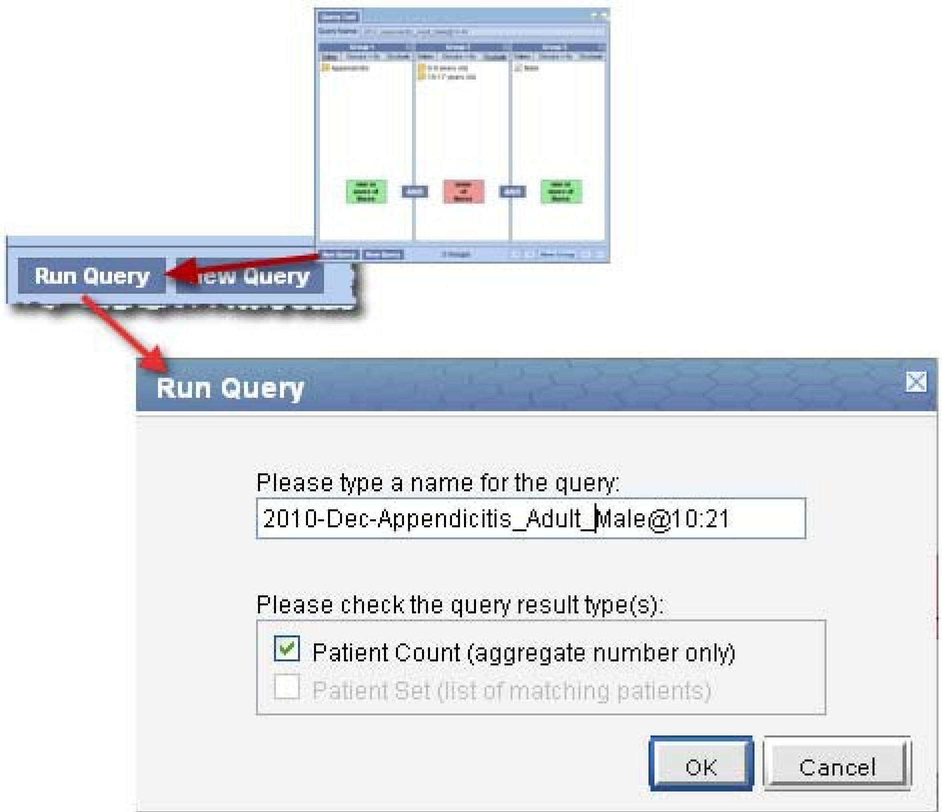


Once a search concept is located in the **Navigate Terms** or **Find Terms** tabbed pane,

Click, hold and drag the term (e.g., from the **Navigate Terms** pane)...

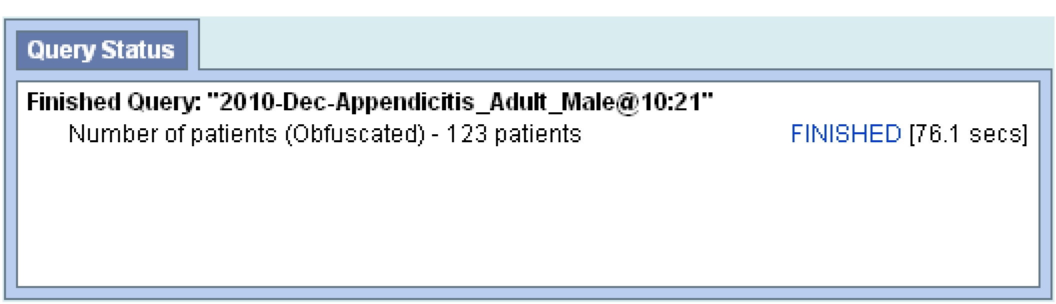
Into the next available **Query Tool** -> **Group** panel. This will add it to the active query criteria.

Running the Query



Once the query criteria is established, the **Run Query** button is picked to name the query to be generated. The default name is generally an abbreviation of the query criteria used, followed by the current time. The Patient Count (aggregate number only) is the default **…query result type…** for the standard Mi2b2 Cohort Discovery user role.

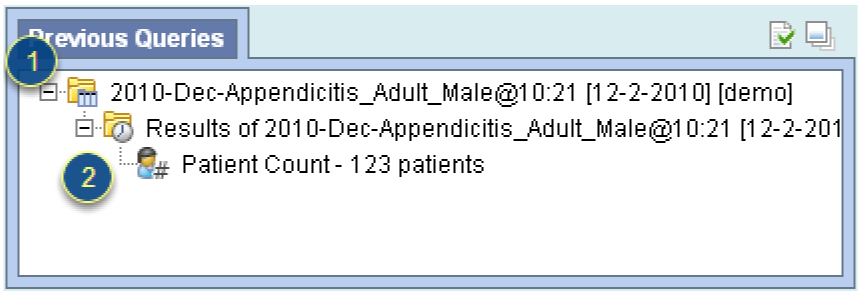
Query Status Tab



The **Query Status** pane, located below the **Query Tool** pane, displays query progress as it processes. Once the query completes, a summary of the requested query results is displayed.

Note: The query results returned are **Obfuscated** (obscured) by limiting the display of aggregate patient counts. Query counts are further obscured by returning +/- 3 records.

Previous Queries (Query History)



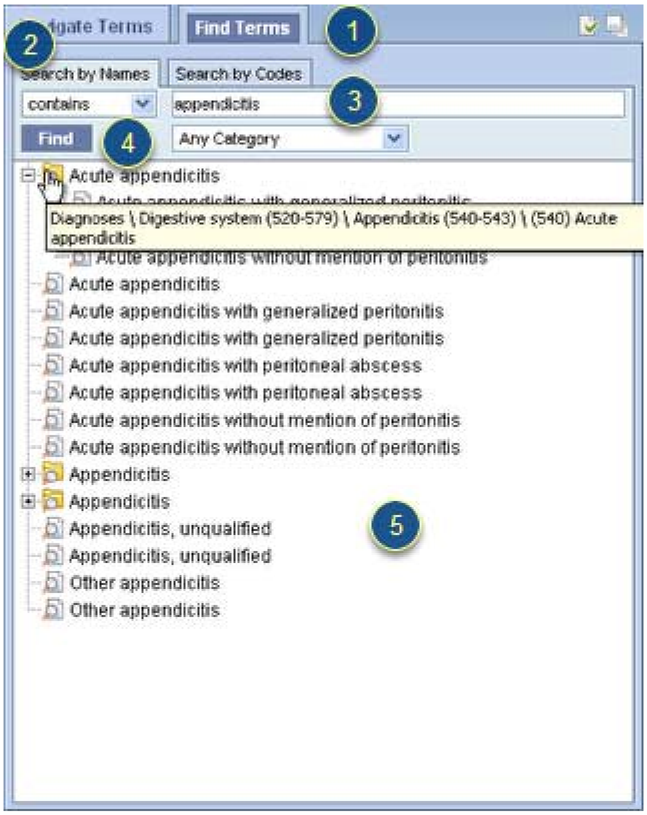
A new, named entry appears in the **Previous Queries** pane following the successful completion of each query run.

The aggregate **Patient Count** results will be available using a folder hierarchy display.

Mi2b2 - Additional Query Options

Although **Navigate Terms** can often be used as the primary method to build a query, **Find Terms** offers additional options for identifying cohort discovery criteria. These options include **Search by Names** and **Search by Codes**.

Using Find Terms and Search by Name in Your Queries



Using **Find Terms** & **Search by Names** offers significant flexibility in locating your query criteria. Full words, partial words or phrases can be used to locate desired search concepts.

Click the **Find Terms** pane.

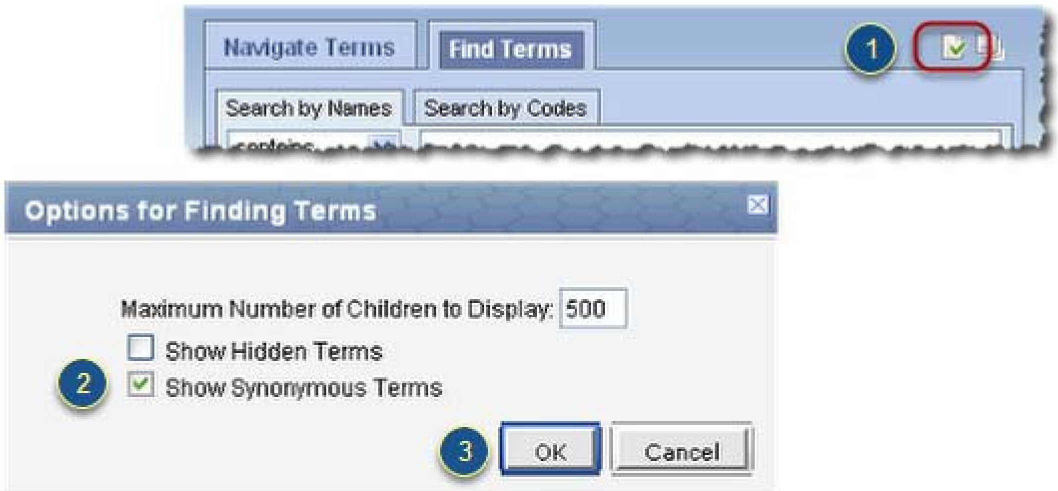
If not already selected, click the **Search by Names** tab.

To search for a term or phrase using the **contains** criteria, type the full or partial term in the text box to the right of **contains.**

Click the **Find** button.

All terms matching the **contains -> Find** criteria will be displayed.

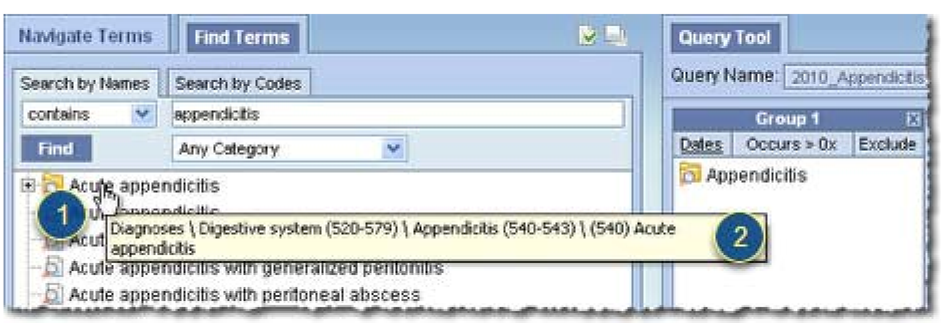
Showing Synonymous Terms in Search By Name



The default **Find Terms** capability (illustrated in the previous example) will only return those search terms containing the specified word or phrase (e.g., appendicitis). However, **Find Terms** offers options to change that behavior and extend the search results using Synonyms. To set this option...

1. To the right of the **Find Terms** tab, click the **Options** icon.
2. In the **Options for Finding Terms** dialog, pick the **Show Synonymous Terms** check box.
3. Click the **OK** button.

Additional Information Regarding Terms (tooltips)



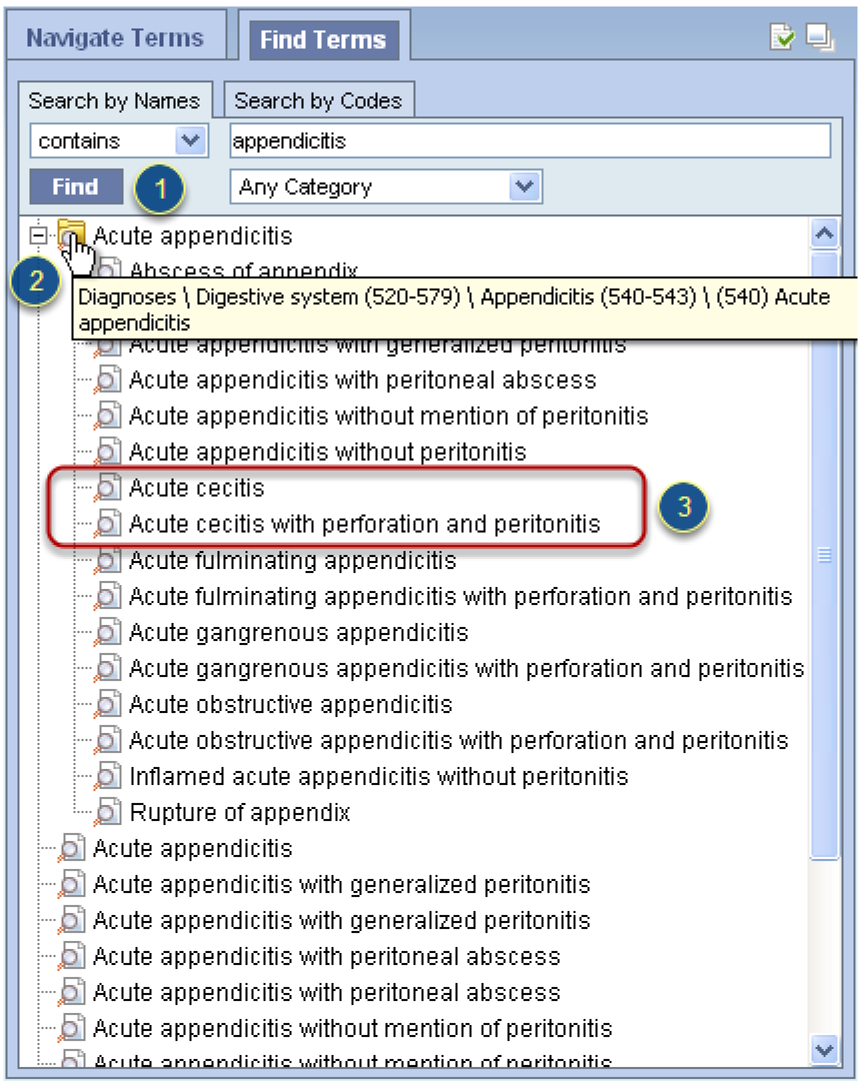
It is not uncommon to complete a search and discover that the same term may appear several times in the search results. This is generally because the identical term may be used in several search hierarchies (i.e., a term could be listed as a diagnosis and a description of an ICD9 code). The Mi2b2 web client provides a contextual reference ("tool tip") identifying the source of a search concept. To display "tool tips"...

Move your arrow cursor over any search concept or folder, until the cursor shape changes to a "pointing finger" then pause briefly...

A tooltip will appear showing the path of the search term from its originating source.

Note: Search concept paths in a "tool tip" may include a "code range" as a suffix (i.e., **... system (520-579)**) or a specific "code" as a prefix (i.e., **(540) Acute...**)

Using Find Terms and Search by Name in Your Queries

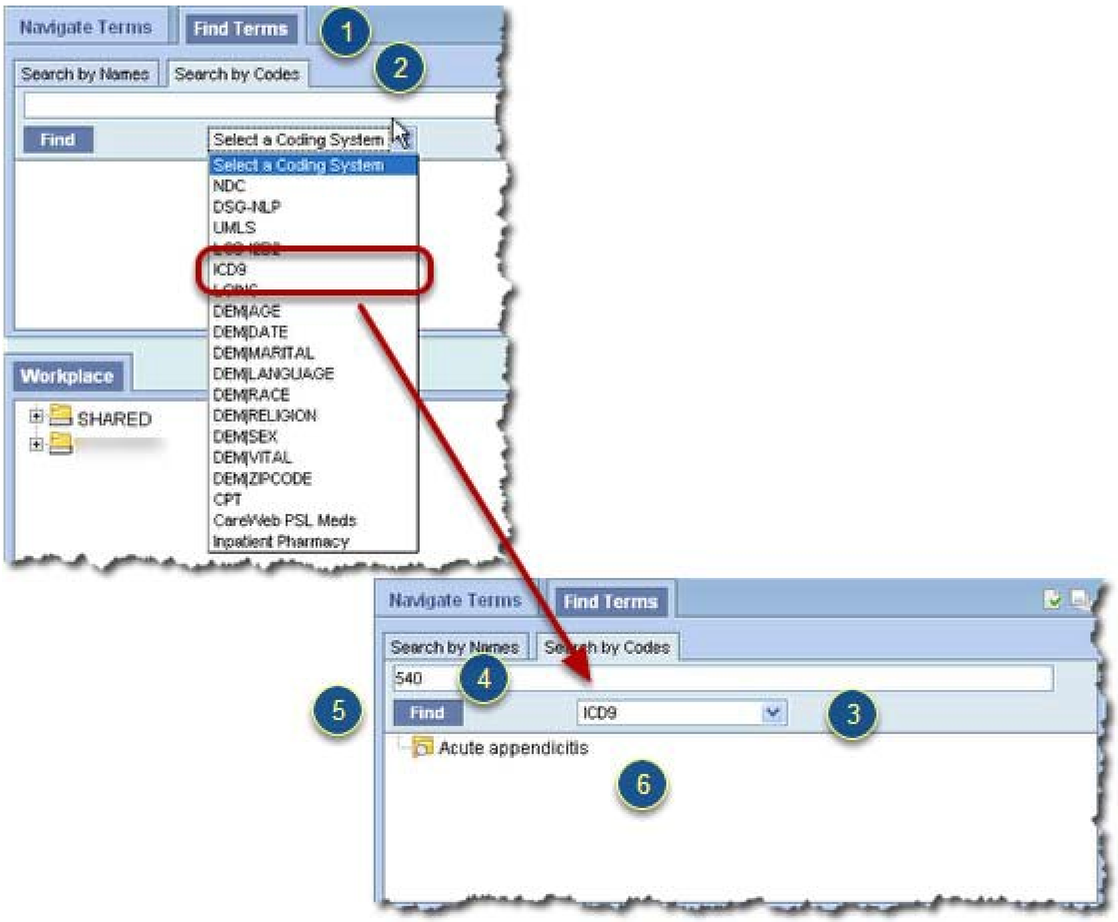


After setting the **Show Synonymous Terms** click the **Find** button again.

Expand the **Acute appendicitis** concept folder by clicking on the + sign next to the folder.

Notice the additional **Synonyms** displayed for the search results.

Using Find Terms and Search by Codes in Your Queries



In addition to searching by term names, **Find Terms** also offers the ability to **Search by Codes**...

If not already selected, click the **Find Terms** tabbed pane.

Click the **Search by Codes** tab.

Select the desired **Coding System** from the drop down list (e.g., **ICD9**).

Type in a specific code (e.g., **540**).

Click the **Find** button.

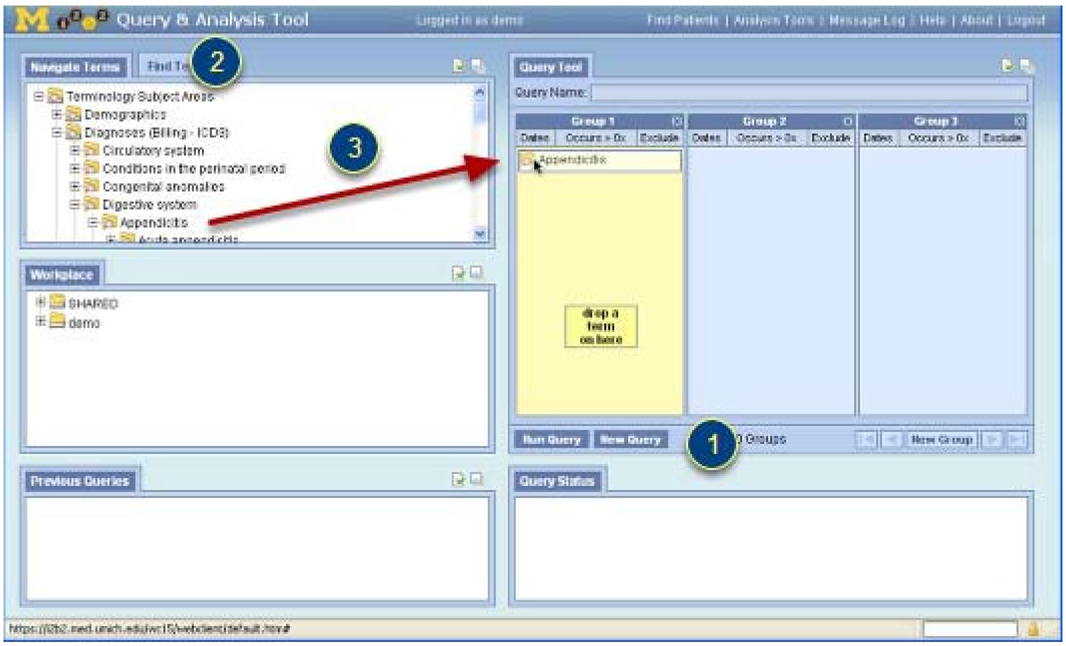
Any resulting query concept can be dragged into a **Group** within the **Query Tool** pane.

Mi2b2 – Cohort Discovery Sample

To illustrate how Mi2b2 can be used for cohort discovery, let's try a sample scenario. We will build a query to identify:

Adult Male patients (ages older than 17) diagnosed with Appendicitis during the period 1/1/2010 to the present.

Identify the Diagnosis



If an existing query exists in the **Query Tool**, click the **New Query** button to clear the **Query Tool.**

Open the **Terminology Subject Areas** -> **Diagnoses (Billing - ICD9)** -> **Digestive System** search concept folders by clicking on the **+** symbol to the left of each folder.

Click and hold on the **Appendicitis** folder then drag it to **Group 1** column of the **Query Tool** and drop it once the column turns yellow.

Refining the Query by Limiting Dates

Let's limit the date range for the **Group 1** to only those patients diagnosed during the current year.

Click the **Dates** Link in the **Query Tool** -> **Group 1** column.

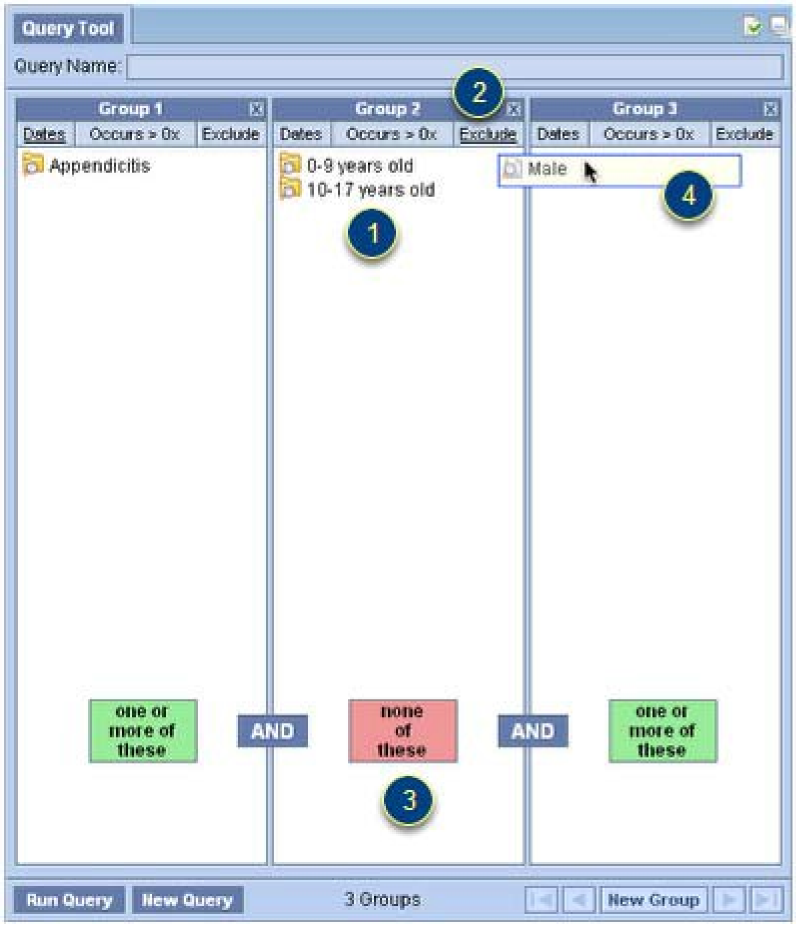
Click in the checkbox in the **From:** date control.

Change the **From:** date to **01/01/2010** (if the **To:** date is not selected, it will default to today's date).

Click the **OK** button.

Note: Once a date range has been set, the **Dates** link will remain underlined (i.e., **Dates**)

Specifying Other Query Criteria (Age Demographics & Gender)



Now let's limit the patient cohort age range to Adult Males

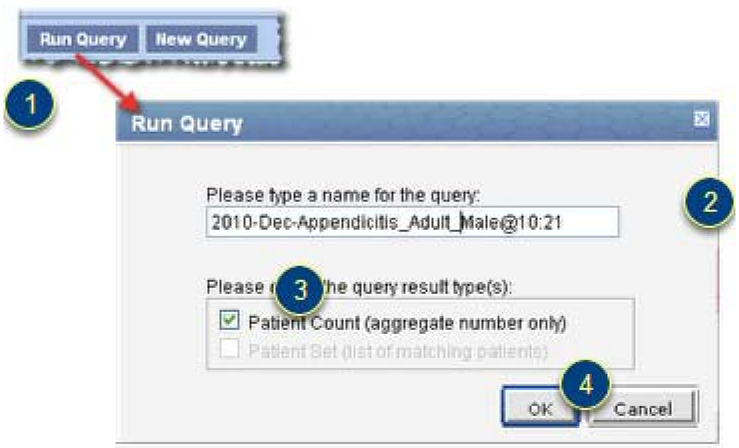
Open the **Terminology Subject Areas** -> **Demographics** -> **Age** concept tree then drag & drop the **0-9** & **10-17 years old** folders into **Group 2** of the **Query Tool.**

Next, click the **Exclude** link from the **Group 2** header.

Notice that the pink relationship message (**none of these**) that confirms that patients under age 18 will be excluded.

Now, open the **Terminology Subject Areas** -> **Demographics** -> **Gender** concept tree then drag & drop the **Male** gender concept into **Group 3** of the **Query Tool.**

Running the Query



Now, let's run the query to find a Patient Count. We can further refine the query later if necessary.

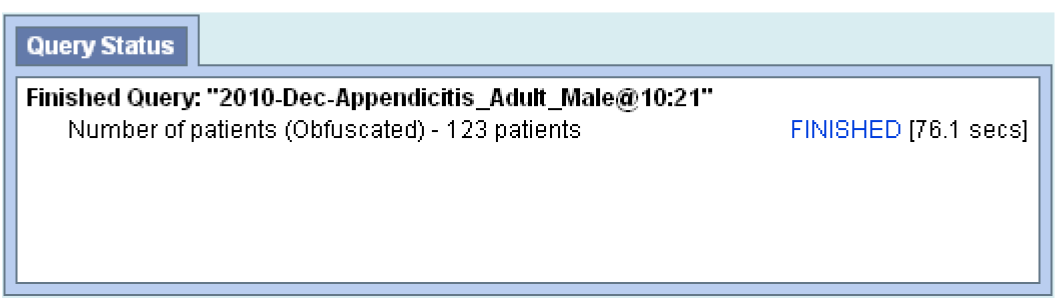
Click the **Run Query** button from the **Query Tool** pane.

Modify the default, abbreviated name for the query to **2010-Ded-Appendicitis_Adult_Male** and leave the **@** and the **time** unedited.

Make sure that the **Patient Count** checkbox is selected.

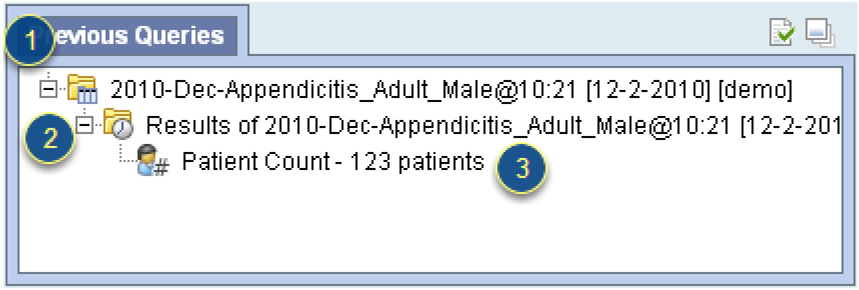
Click the **OK** button to execute the query run.

Query Results for the Patient Count



The **Query Status** panel shows the result of the query for the aggregate number of potential patients.

Reviewing the Patient Count Results



Once the query run has completed, the results can be previewed by selecting the query from the Previous Queries pane.

Click on the **+** symbol next to the **2010-Dec-Appendicitis_Adult_Male** folder. The **Results...** folder will be revealed.

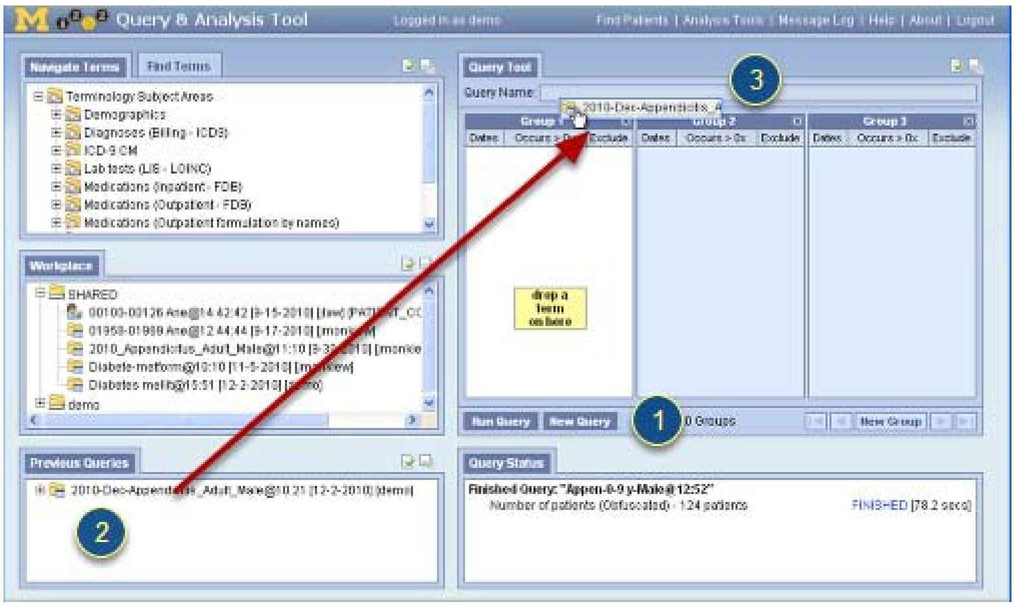
Click on the **+** symbol next to the **Results of 2010-Dec-Appendicitis_Adult_Male** folder.

The **Patient Count** results will be revealed.

Mi2b2 - Refining a Previous Query

Using our previously completed query for Adult Appendicitis patients, let's limit the cohort to those patients within the same geographic area, as defined by a series of Zip codes.

Using a Previous Query

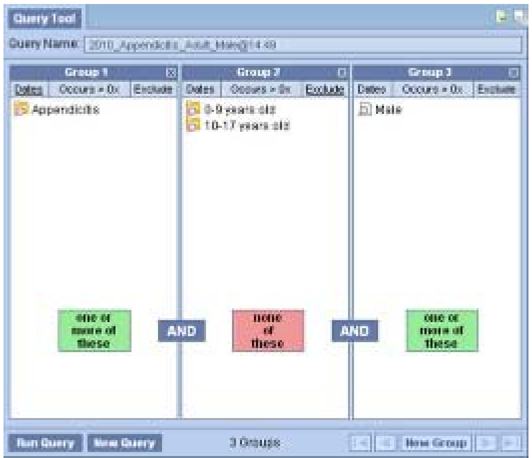


If an existing query exists in the **Query Tool**, click the **New Query** button to clear the **Query Tool.**

Click and hold the **2010-Dec-Appendicitis_Adult_Male** folder in the **Previous Queries** pane.

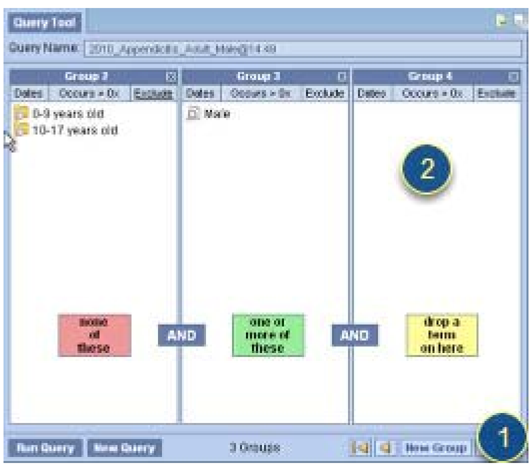
Drag and drop the folder in the **Query Name:** field of the **Query Tool** pane (highlighted in yellow).

The Query is Re-Loaded



A brief **LOADING** status message is displayed, then the criteria from the previously completed query appears in the **Group** columns.

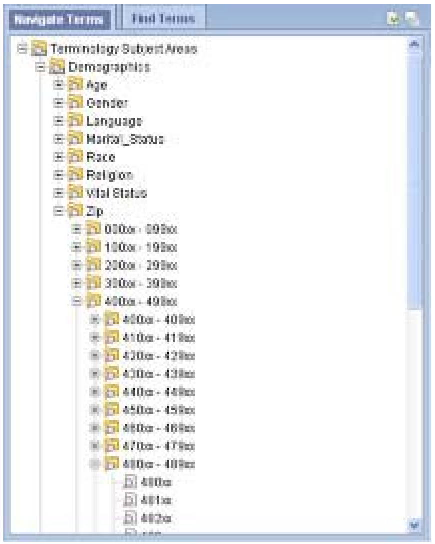
Adding Additional Query Groups



To add additional criteria, click the **New Group** button in the lower right corner of the **Query Tool**.

A new, empty **Group**, labeled **Group 4** will be displayed and previous query groups will be moved to the left in the display.

Adding a Zip Code Range as New Query Criteria



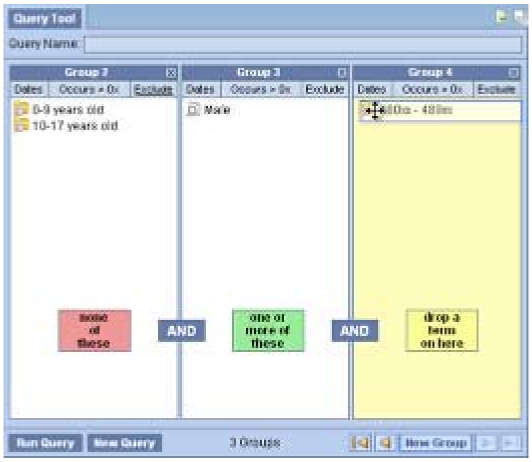
Return to the **Navigate Terms** -> **Terminology Subject Areas** - > **Demographics** query concepts.

Expand the query concepts folders for **Zip** code until the **480xx-490xx** folder is visible.

Note: In order to limit re-identification of individuals, Zip codes within the data mart have been modified as follows:

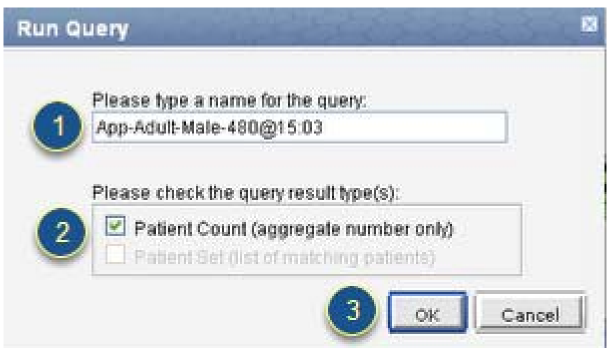
- All Zip codes are truncated to the 1st 3 digits + 00 (e.g., 481xx)
- Zip Codes for counties of less than 20,000 are set to 00000
- All missing Zip Codes are set to 00000

Adding New Query Criteria



Click and drag the **480xx-490xx** folder to the **Group 4** column, the drop the folder when the column highlights in yellow.

Running the New Query



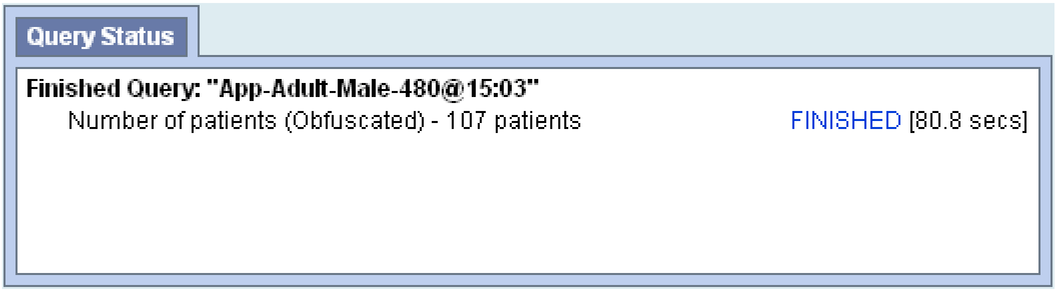
Run the newly modified query using the **Run Query** button in the **Query Tool** pane.

Use the default, abbreviated query name that includes the time the query was run.

If not already selected, pick the **Patient Count (aggregate number only)** option.

Click the **OK** button to run the query.

Confirming Query Results



Notice the reduced number of Patients identified (based on the additional **Zip** code criteria) in the **Query Status** pane.

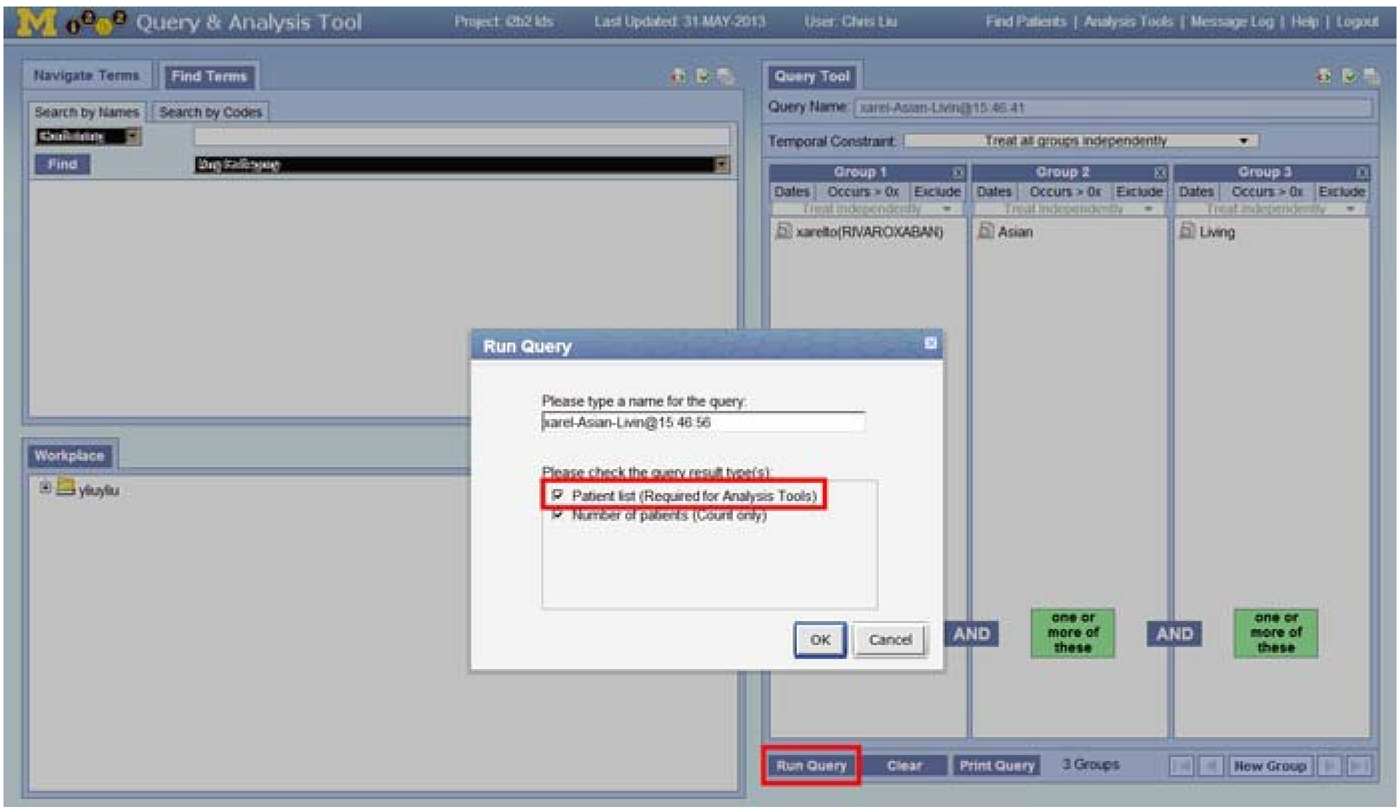
Mi2b2 - Cohort Analysis Tools

In this lesson, we will explore the **Mi2b2** Analysis Tools available for cohort dataset analysis, review, and refinement.

These identified-data analysis tools require an IRB HUM# to be entered on the Attestation Page.

To demonstrate the analysis tools we will construct a sample query. We will build a query to identify: Living Asian patients with using a Medication "Xarelto", however not limiting the date range.

Selecting Patient List Checkbox

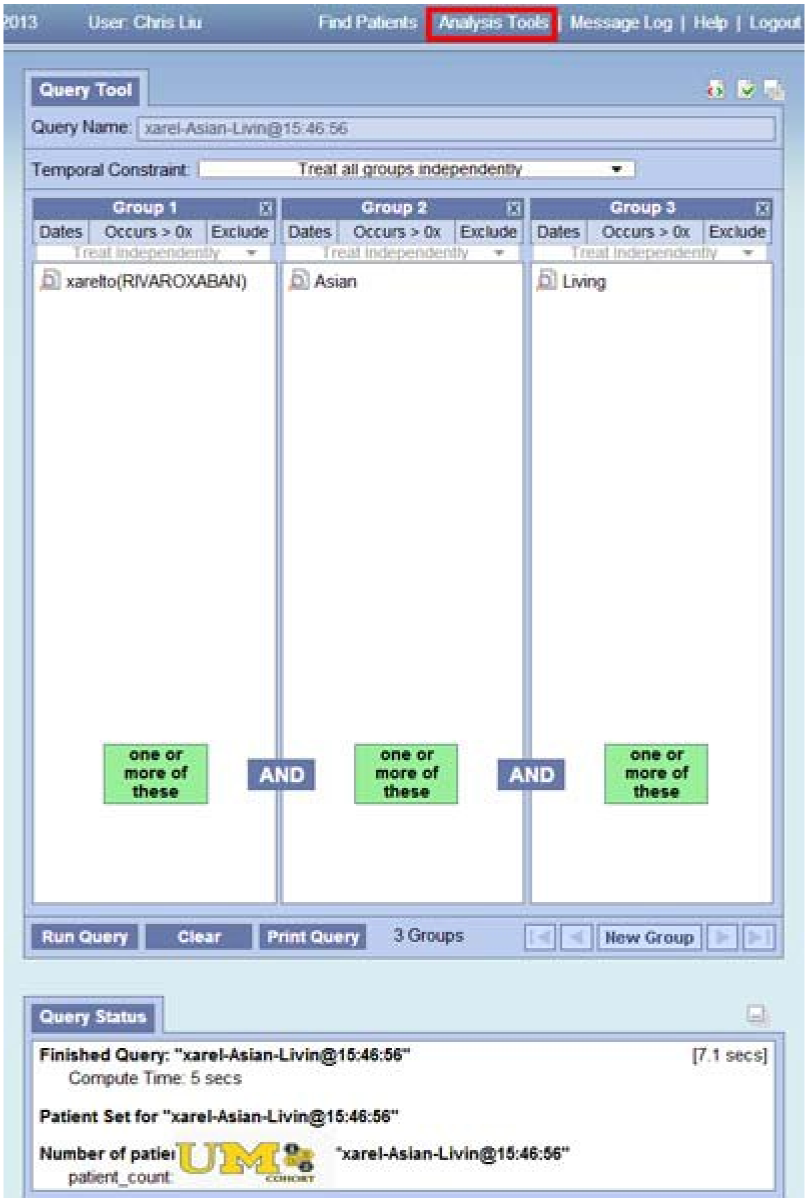


Click the **Run Query** button from the **Query Tool** pane when you are finished with dragging and dropping.

Make sure that the **Patient List** check-box is also selected.

Click the **OK** button to execute the query run.

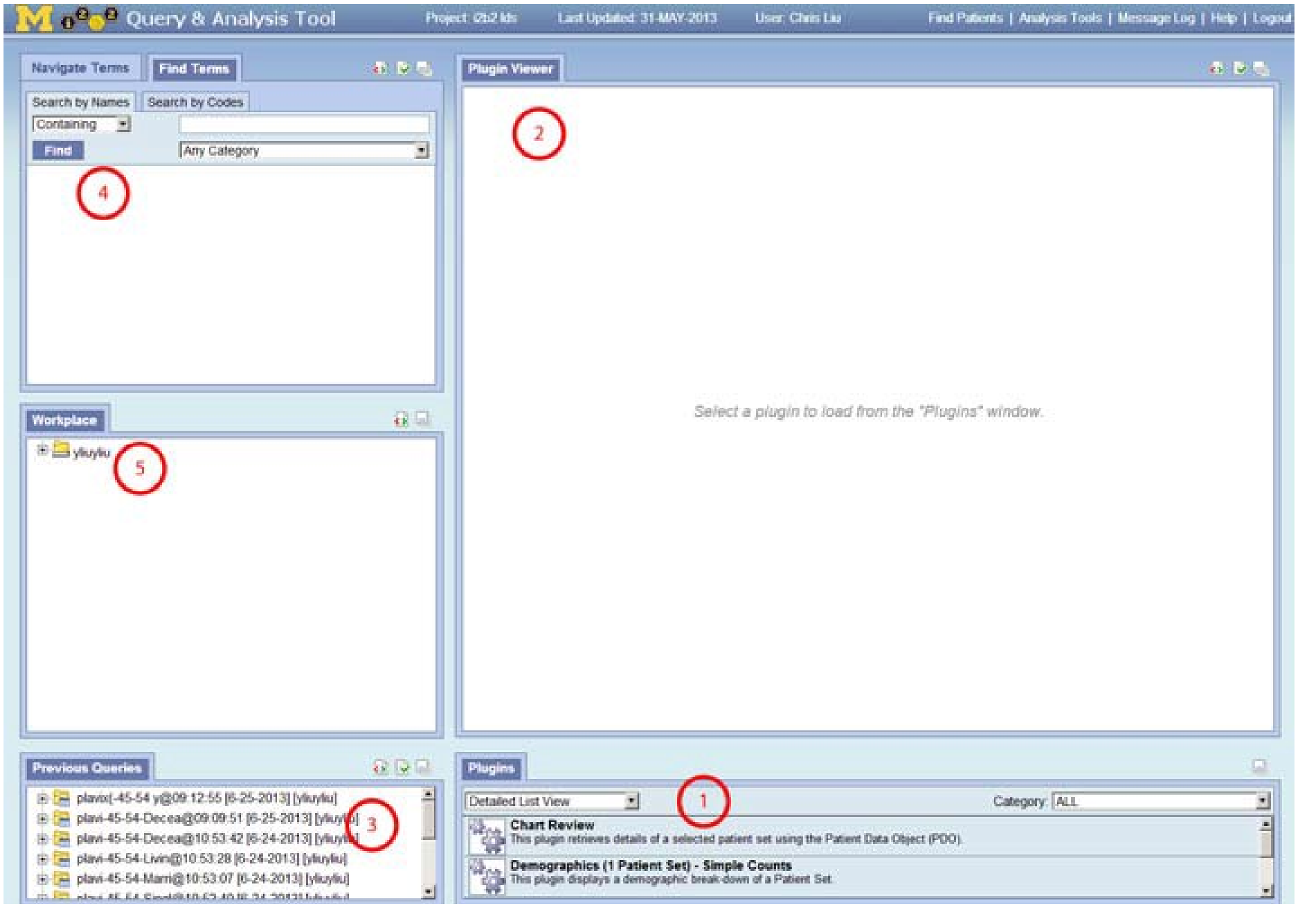
Refining the Query by Limiting Dates



Once you get the Patient Set results in the **Query Status**, you will be able to go to **Analysis Tools** (see the screenshot).

Demographics Analysis Tool

In this lesson, we will explore the **Mi2b2** Analysis Tools user interface and "**Demographics - Simple Counts**" analysis tool available for charting demographics data.



The basic Mi2b2 Analysis Tools interface screen provides three primary tabbed panes for choosing plugins, identifying previous queries, and viewing plugin results. The tabbed panes include:

Plugins - Chooses a Plugin from plugins list ("Chart Review", "Demographics for 1 Patient Set", and "Demographics for 2 Patient Sets" are provided).

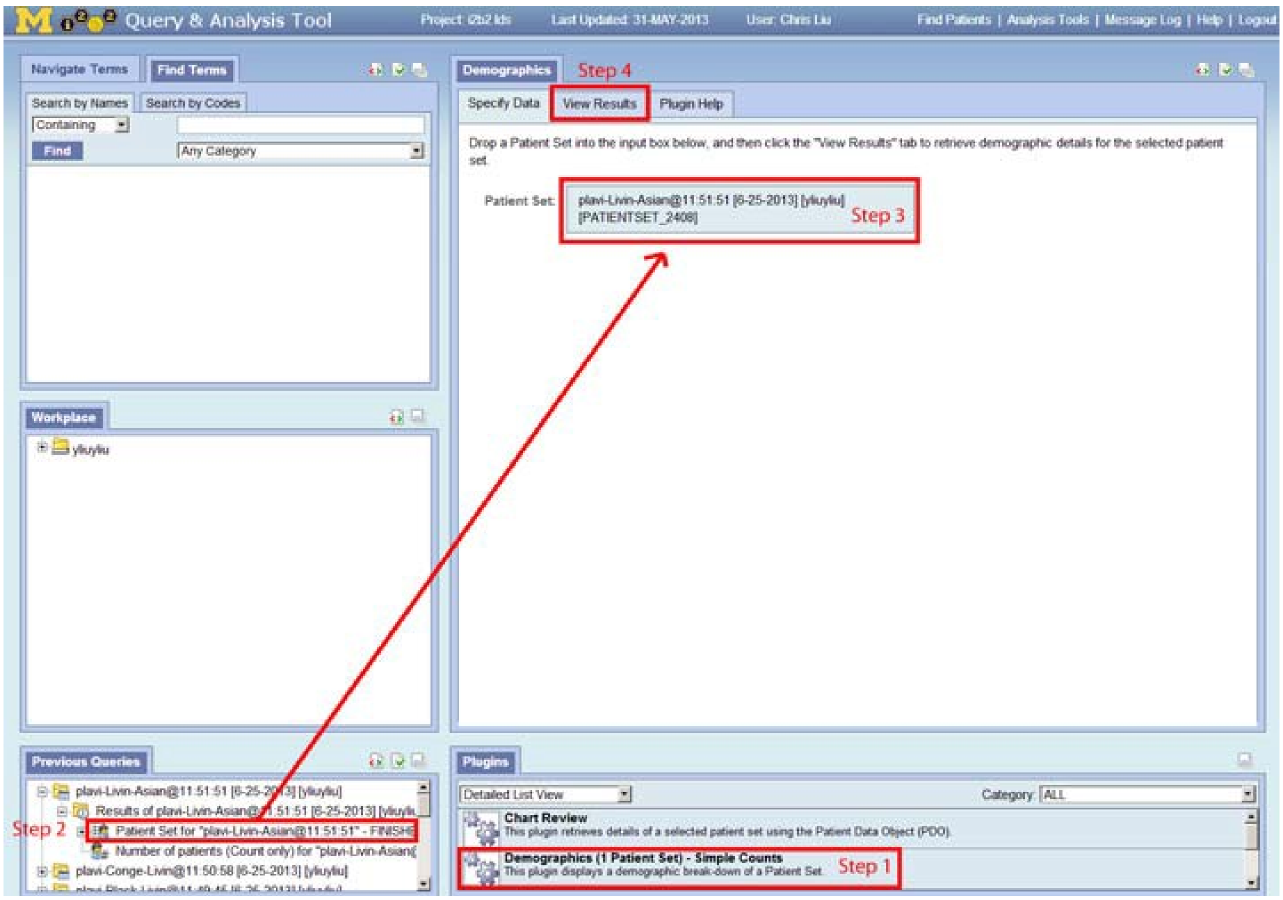
Plugin Viewer - The area used to collect previous queries and viewing plugin results.

Previous Queries - A log of previous queries and results for the current user.

Find Terms - Locates query search concepts using a representative word, phrase or specific code to describe the search concept.

Workplace - **SHARED** and **personal** (your uniqname) directory areas used to store and share queries and results for later review (Not used for Analysis Tools).

Using Click, Drag & Drop to View Patients Demographics (1 Patient Set)



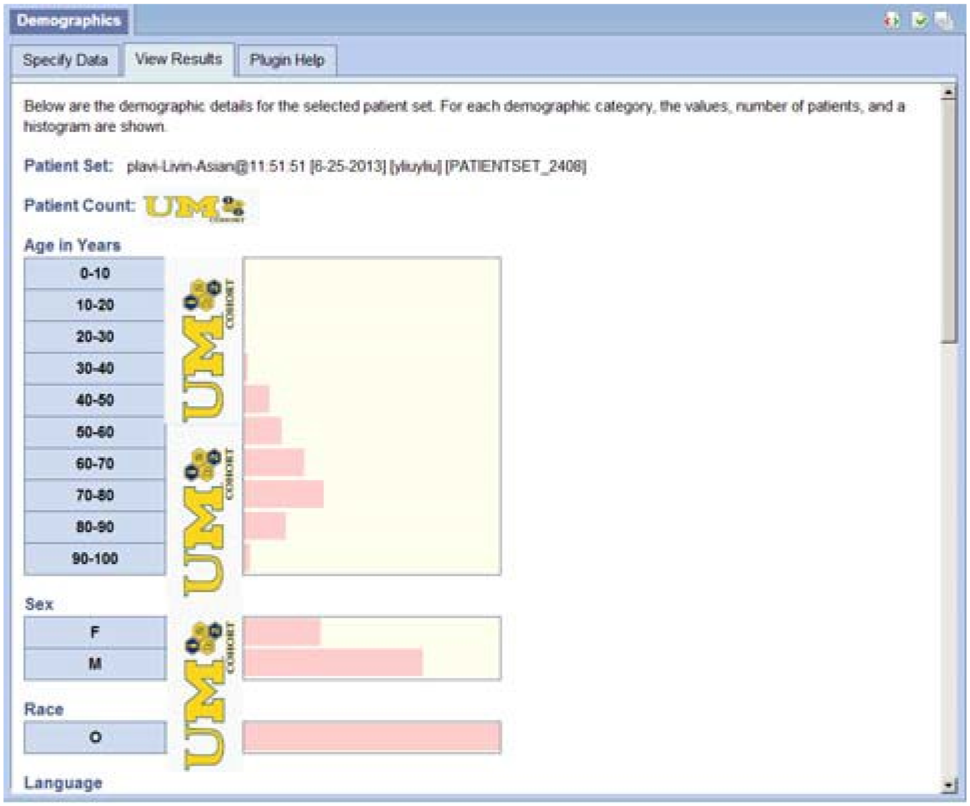
First, click **Demographics (1 Patient Set) - Simple Counts** once in the **Plugins** tabbed pane.

Second, click, hold and drag the patient set (e.g. plavi-Livin-Asian@11:51:51, from the **Previous Queries** pane)...

Third, drop the patient set into the next available **Patient Set**-> **Specify Data** panel.

Fourth, click **View Results** tab for displaying demographics data. This will take few seconds to show.

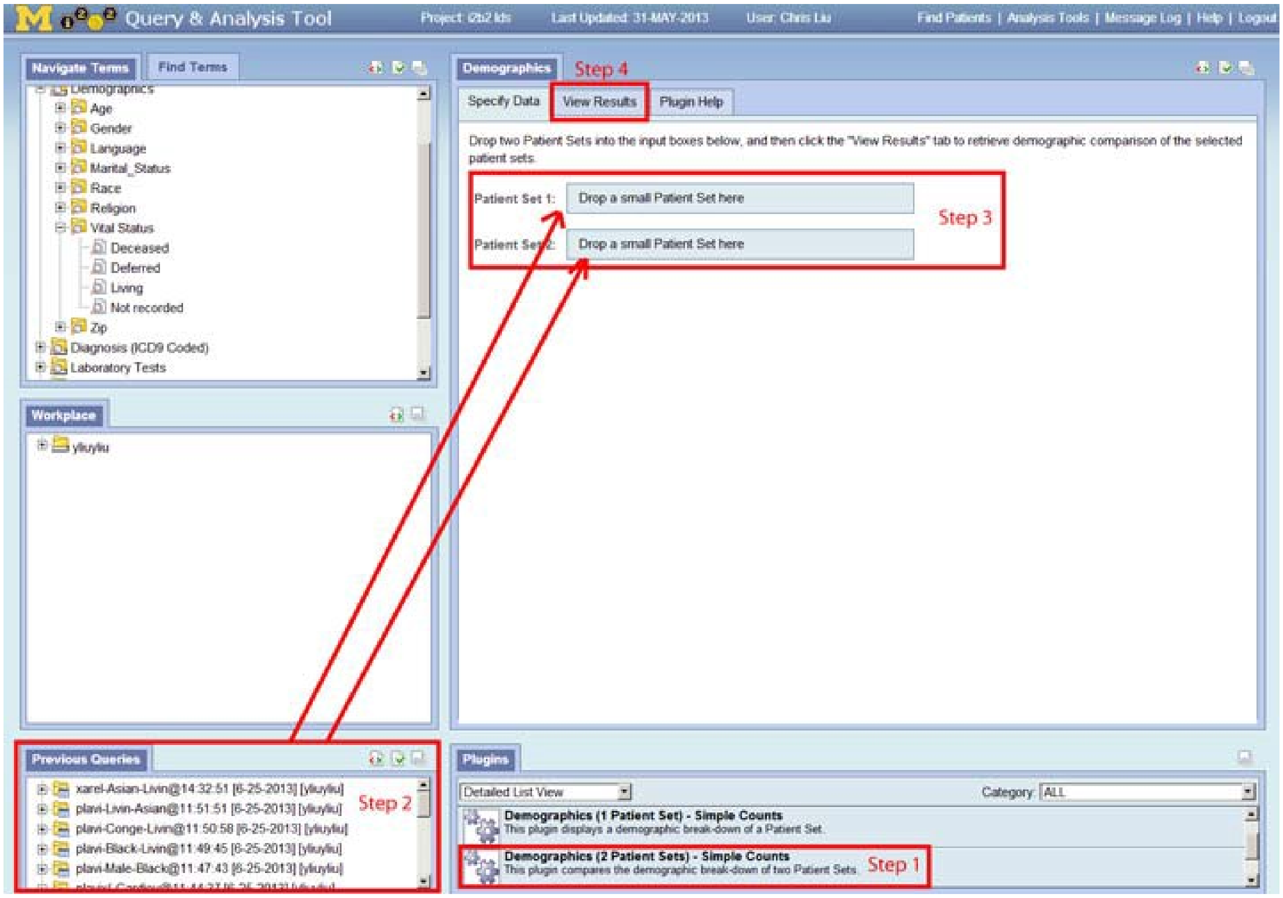
Viewing Demographics Results (1 Patient Set)



Once you click View Results tab, you will see the results in few seconds.

These results are displayed in numbers and bar charts.

Using Click, Drag & Drop to View Patients Demographics (2 Patient Sets)

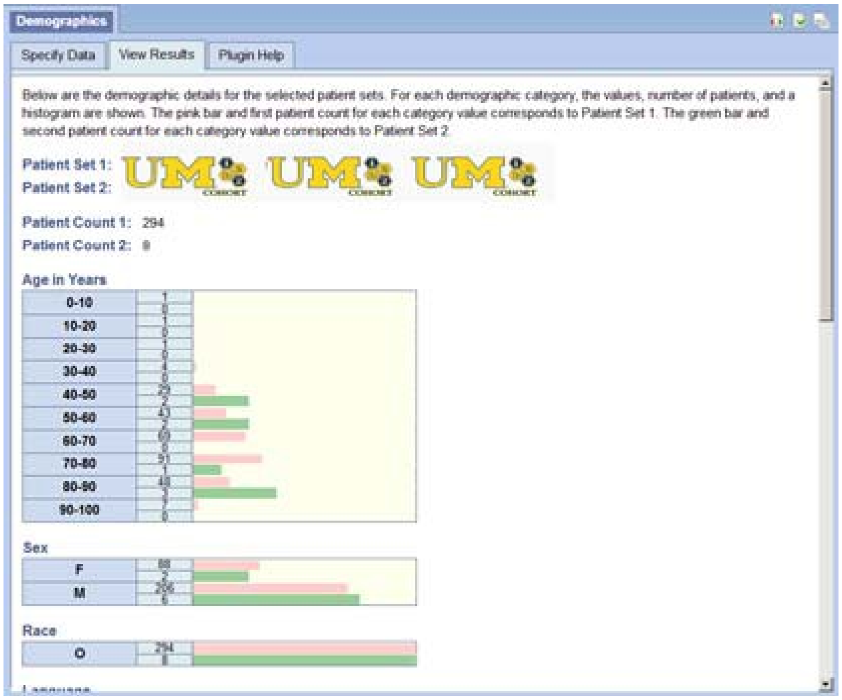


First, click **Demographics (2 Patient Set) - Simple Counts** once in the **Plugins** tabbed pane.

Second, click, hold and drag **two** patient sets from the **Previous Queries** pane.

Third, drop **two** patient sets into the next available **Patient Set 1 and Patient Set 2**-> **Specify Data** panel.

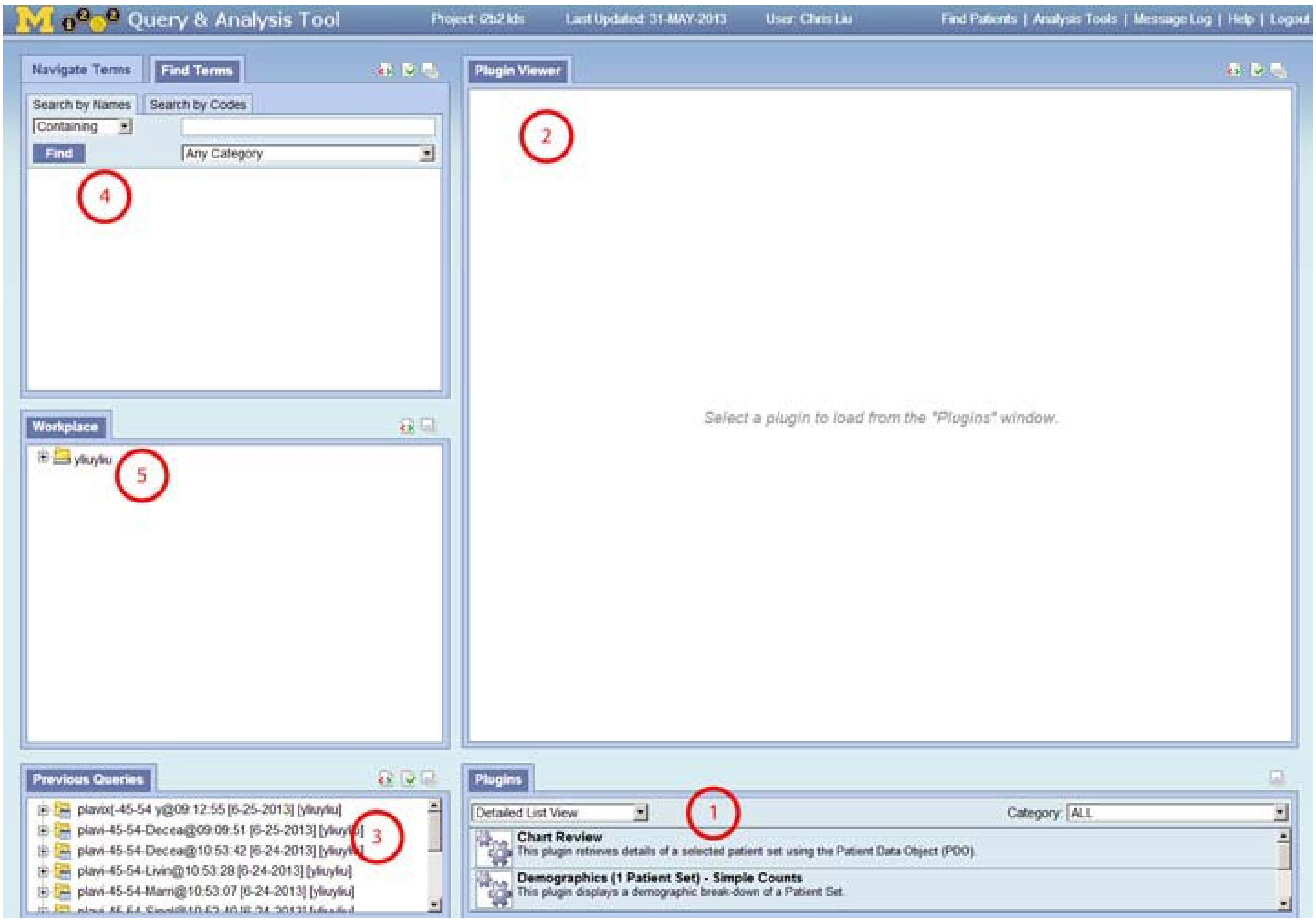
Fourth, click **View Results** tab for displaying demographics data. This will take few seconds to show.



Once you click View Results tab, you will see the results in few seconds. These results are displayed in numbers and bar charts.

MiChart Chart Review Analysis Tool

In this lesson, we will explore the **Mi2b2** Analysis Tools user interface and "**MiChart Chart Review**" analysis tool available for viewing MiChart Patient Summary Reports for each member of a cohort dataset.



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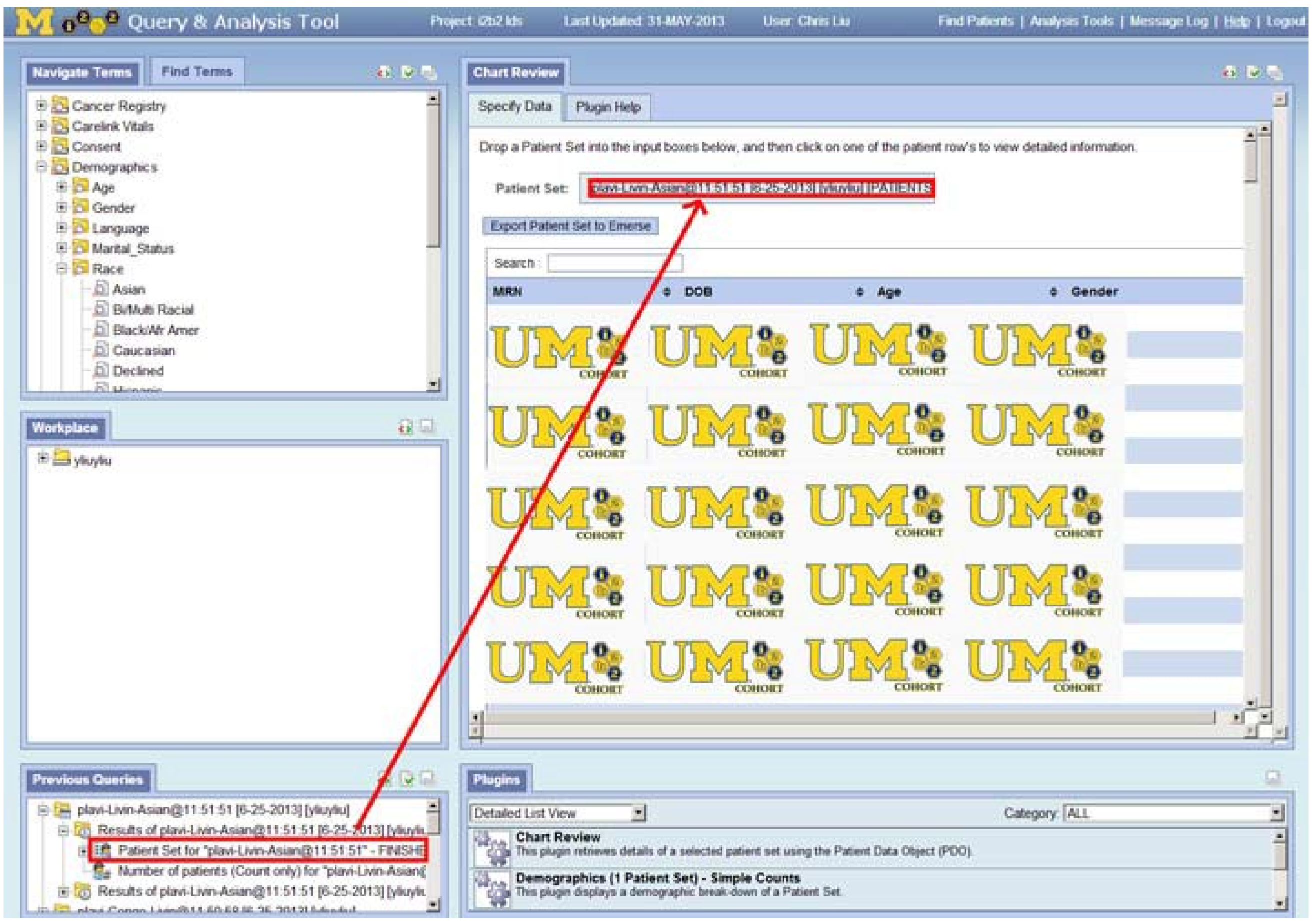
Plugin Viewer - The area used to collect previous queries and viewing plugin results.

Previous Queries - A log of previous queries and results for the current user.

Find Terms - Locates query search concepts using a representative word, phrase or specific code to describe the search concept.

Workplace - **SHARED** and **personal** (your uniqname) directory areas used to store and share queries and results for later review (Not used for Analysis Tools).

Using Drag & Drop to View Patients List

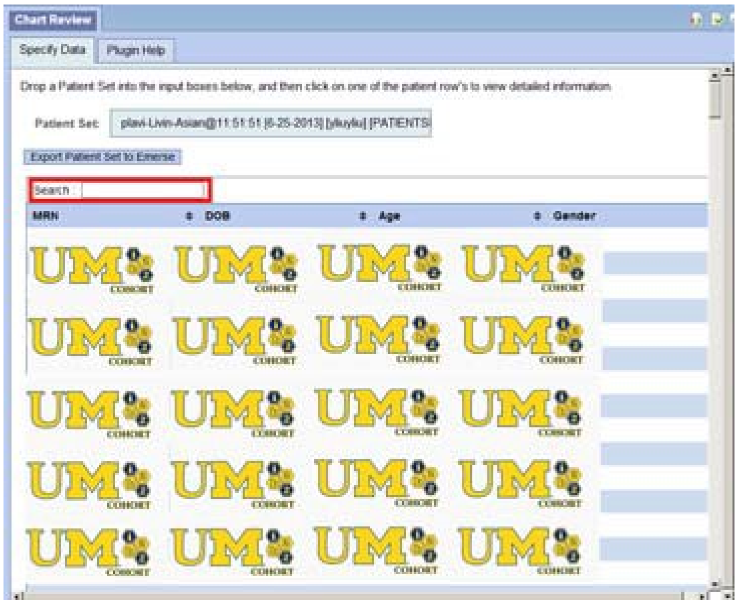


First, click **MiChart Chart Review** once in the *Plugins *tabbed pane.

Once a previous query is located in the **Previous Queries** tabbed pane, Click, hold and drag the patient set (e.g. plavi-Livin-Asian@11:51:51, from the **Previous Queries** pane)...

Into the next available **Patient Set**-> **Specify Data** panel. This will take few seconds to show patient list.

Searching in Patient List

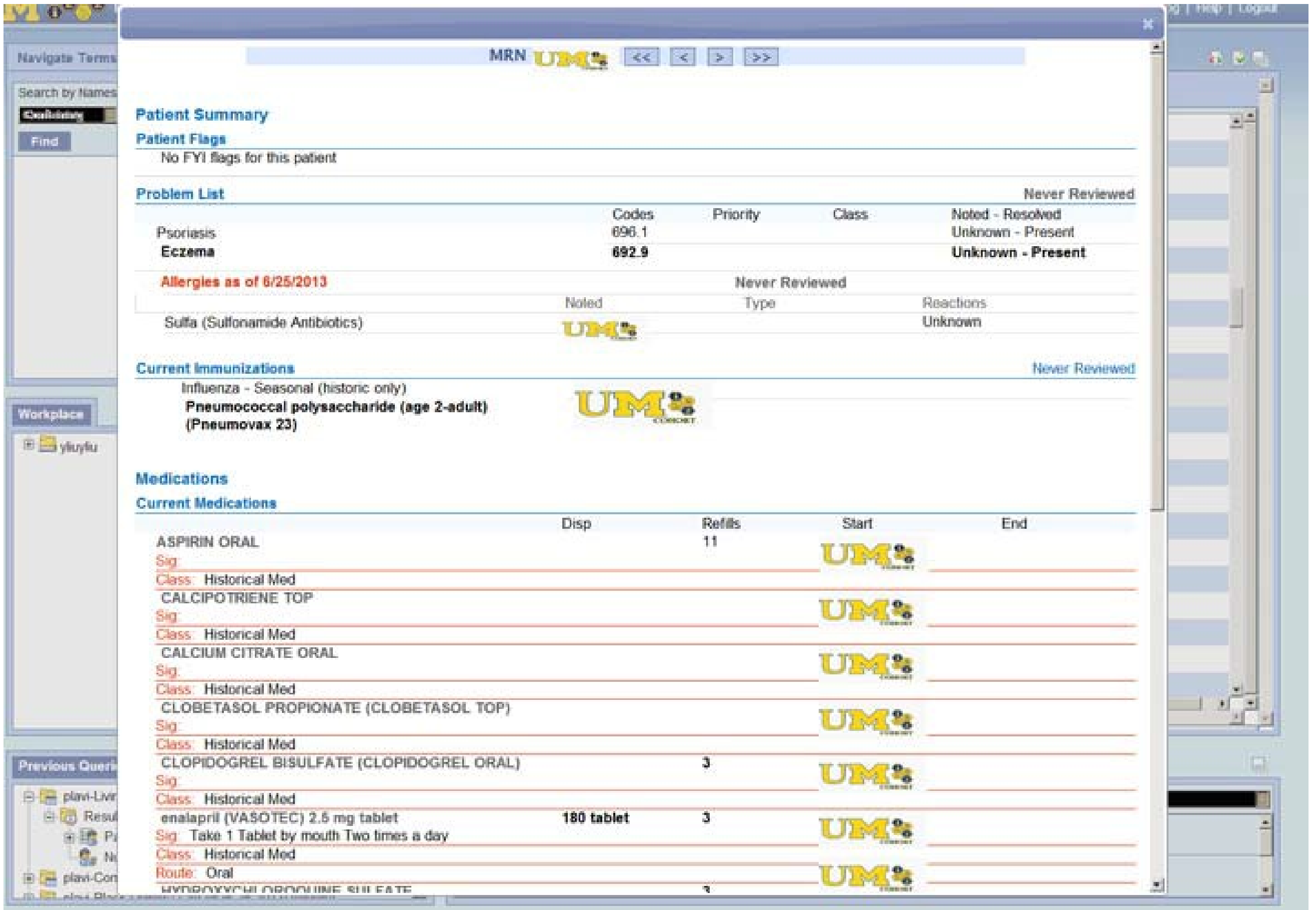


The **Search** input in the **Chart Review** panes provides searching function for current patient list. This example shows its use in the **Find Terms** pane.

You may enter number or text which will match MRN, DOB, Age, or Gender.

For example: if you input "M" in the Searching, the Patient List will only show patients whose gender is male.

Viewing a MiChart Patient Summary Report



You may **click once** on any patient you are interested in. You will be able to view detailed patient chart.

The **Patient Summary** shows the patient summary including patient flags, problem list, current immunizations, medications, health maintenance plans, pending health maintenance, patient history, surgical history.

EMERSE Export Analysis Tool

In this lesson, we will explore the **Mi2b2** Analysis Tools user interface and "**EMERSE Export**" analysis tool available for exporting a cohort dataset MRN list to the EMERSE tool.

EMERSE (The Electronic Medical Record Search Engine) is an intuitive, powerful search engine for free-text documents in the Electronic Medical Record (EMR). It offers multiple options for crating complex search queries yet has an interface that is easy enough to be used by those with minimal computer experience. EMERSE is ideal for retrospective chart reviews and data abstraction and may have potential for clinical care as well.

If you are a current user of EMERSE, this exporting function will be easy to add current patient set into EMERSE.

If you are currently not an EMERSE user, you may require an account by completing an EMERSE Request Form available on the HBO website (Self-Serve Tools).

Clicking **Export Patient Set to EMERSE** provides a simple way to transfer the current Mi2b2 patient set MRNs into EMERSE (a separate EMERSE account is required).