CHAPTER
4
VIEWING SEARCH RESULTS

This chaptersection describes search results that caIntegrator2 returns after queries.

Topics in this chaptersection include the following:

Search Results Overview

After you launch a search of a caIntegrator2 study, the system automatically opens the Search Results tab showing the results of your search.

If you have not configured column and sort display parameters before launching the search, by default the tab shows only the [subject] identifiers and a column that allows you to select each row of the data subset.

To display and/or sort additional data, you must return to the Columns and/or Sorting tabs to set display parameters, then re-run the search. The new search results will display the additional information, with the columns and data sorted as you specified.

caIntegrator2 paginates search results into pages of configurable size (default 50) with standard paginated navigation controls. Also be sorted ascending or descendin on any displayed field.

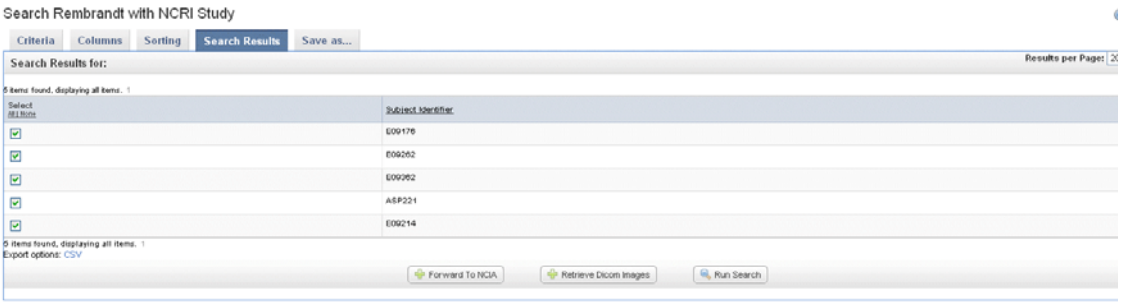
You can download search results as a CSV file. The file contains the annotations, columns and data sort configurations you specified in the search query.

Browsing Search Results

Clinical and Imaging Data

Clinical and/or imaging annotations you specified in the search query displays in the search results in tabular format. If you run the search before configuring column and

sort display parameters, only the [subject] ID that meet the criteria and a column allowing you to select each row appear on the table.



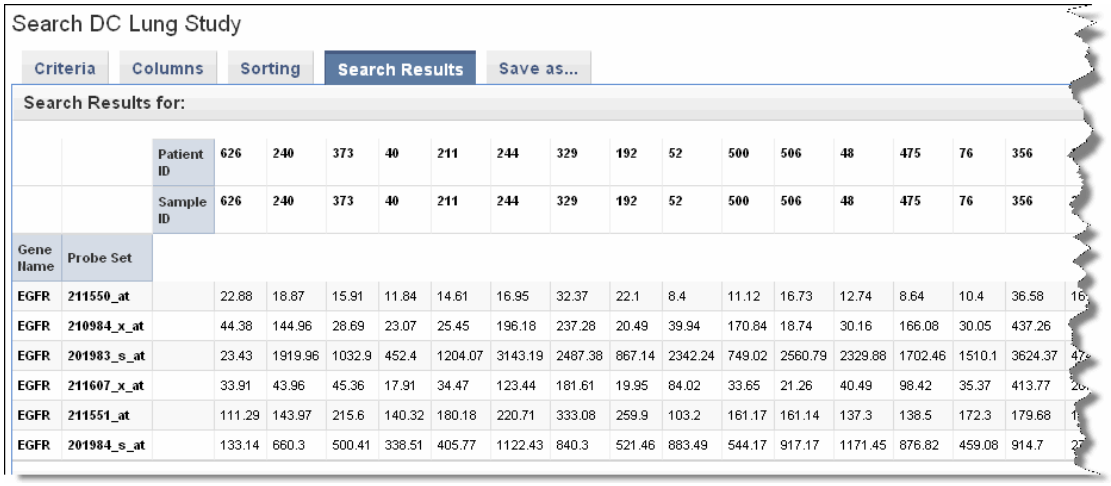
You can add details for a single subject by configuring them on the Columns tab. Annotations listed there are the column headers in the CSV file(s) that were uploaded to the study. For information about using the Columns tab, see *Columns and Sorting Tabs* on page 31.

Genomic Data

Genomic data search results display in a gene expression data matrix. Because the data was downloaded from caArray, the data permissions granted there still apply. In other words, if you have been given access to the data in caArray, you can see it in caIntegrator2.

In the matrix, samples in the experiment form the column headings. If the rows display gene name, the cells display the average value for each gene. If the rows display Probe Set, the cells display the normalized signal-based value for a given reporter for a given sample.

Figure 4.1 Gene Name search EGFR, Reporter Type: Gene



Search DC Lung Study

Criteria | Columns | Sorting | Search Results | Save as...

Search Results for:

		Patient ID	626	240	373	40	211	244	329	192	52	500	506	48	475	76	356
		Sample ID	626	240	373	40	211	244	329	192	52	500	506	48	475	76	356
Gene Name	Probe Set																
EGFR	211550_at		22.88	18.87	15.91	11.84	14.61	16.95	32.37	22.1	8.4	11.12	16.73	12.74	8.64	10.4	36.58
EGFR	210984_x_at		44.38	144.96	28.69	23.07	25.45	196.18	237.28	20.49	39.94	170.84	18.74	30.16	166.08	30.05	437.26
EGFR	201983_s_at		23.43	1919.96	1032.9	452.4	1204.07	3143.19	2487.38	867.14	2342.24	749.02	2560.79	2329.88	1702.46	1510.1	3624.37
EGFR	211607_x_at		33.91	43.96	45.36	17.91	34.47	123.44	181.61	19.95	84.02	33.65	21.26	40.49	98.42	35.37	413.77
EGFR	211551_at		111.29	143.97	215.6	140.32	180.18	220.71	333.08	259.9	103.2	161.17	161.14	137.3	138.5	172.3	179.68
EGFR	201984_s_at		133.14	660.3	500.41	338.51	405.77	1122.43	840.3	521.46	883.49	544.17	917.17	1171.45	876.82	459.08	914.7

Figure 4.2 Gene Name search EGFR, Reporter Type: Reporter ID

- Genomic data does not display in tandem with clinical and imaging data; it only displays when you select the Genomic result type on the Columns tab. Genomic data is however, filtered by clinical and imaging query criteria configured on the Criteria tab.
- Click the Export Options CSV link to download the CSV file whose data displays on the Search Results tab. When you do so, the CSV file opens automatically in MS Excel or similar applications for working with spreadsheets, showing the columns and sorting as you defined them in caIntegrator2 on the appropriate tabs.

Imaging Data Results

Clinical and/or imaging annotations you specified in the search query display in the search results in tabular format. If you run the search before configuring column and sort display parameters, the Image Series IDs that meet the criteria and a column containing one checkbox per row display by default. If your annotation choice on the Columns page identifies annotations such as tumor size or tumor location, the search results display image series subsets that have those annotations. The checkboxes work in conjunction with buttons at the bottom of the results page.

In reviewing search results, it is important to remember the hierarchy of submissions in NCIA. This illustrates the relationship of patient to study to series and lastly to images.

Clinical trial > Patient (Subject) > Study > Series > Images

For example, the Study Instance UID is the set of images resulting from one patient office visit. When you upload a spreadsheet of an image series, the hierarchy of images in an image series might look like this:

Study Instance UID (one office visit):

Brain (image series)

- Brain image 1

- Brain image 2
- Brain image 3

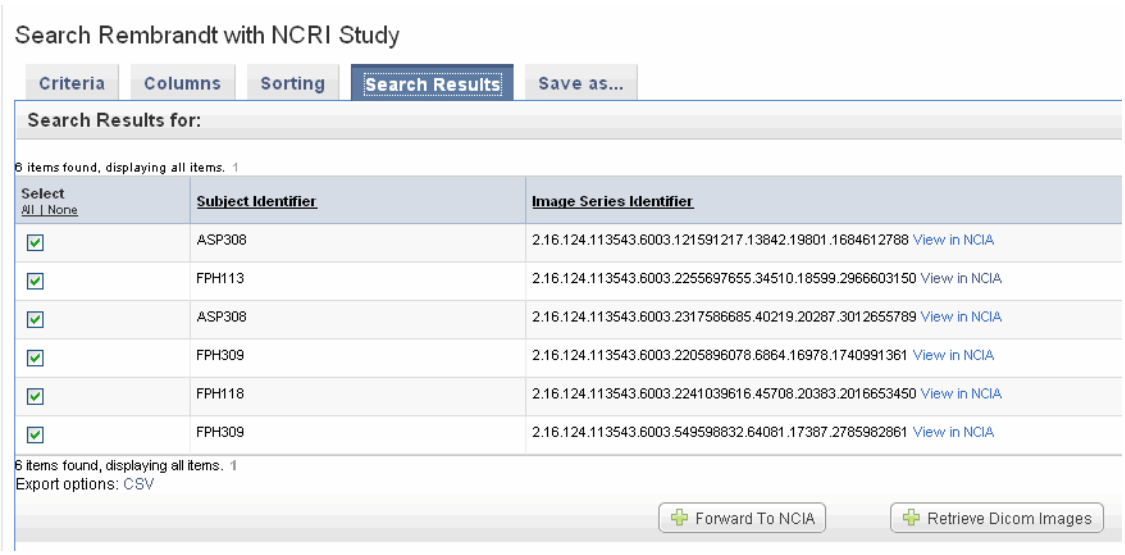
Leg (image series)

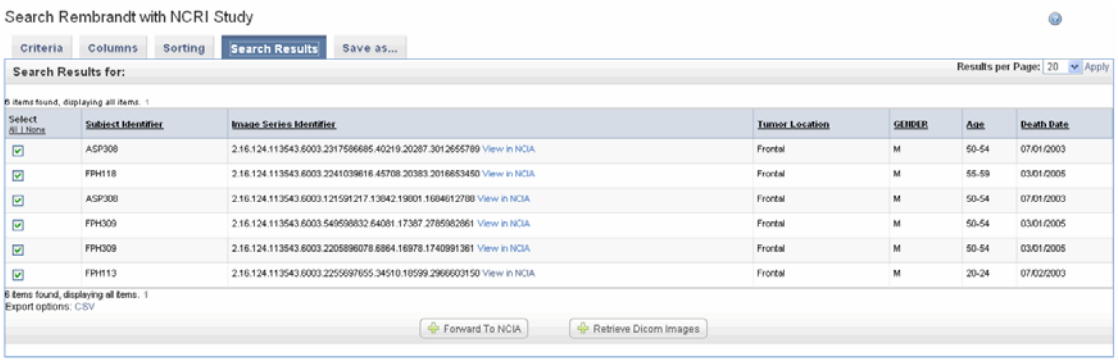
- Leg image 1
- Leg image 2
- Leg image 3

You can add details for images by configuring image annotations on the Columns tab. Annotations listed there are the column headers in the image series CSV file(s) that were uploaded to the study. Examples of image details include the following:

- All image details (name, size, etc.)
- The series that the image belongs to
- Image feature attributes
- The subject ID. Click the subject ID under Clinical Annotations on the Columns tab to display this.

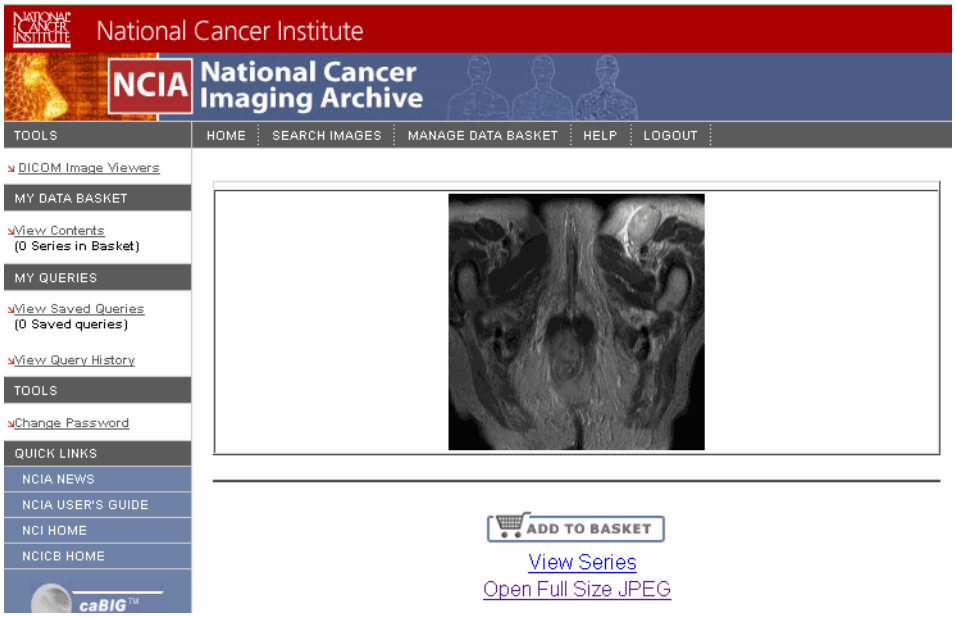
You can set display parameters for the results on the Columns and Sorting tabs. For more information, see *Columns and Sorting Tabs* on page 31. By expanding the display parameters, you can view complete details for an image.





You can click links on the Search Results tab to view or download image data.

- **View in NCIA** – This link corresponds to each Image Series listed in the results table. If you click the link, NCIA brings up the first image in the corresponding Image Series. You must log in to NCIA to see the data. On the NCIA page that opens, you can opt to view the entire series containing this image, or you can display the image as a large JPEG-formatted image You can also add the image to the NCIA basket. For more information, see the NCIA online help or user's guide accessible from NCIA.



- **Forward to NCIA** – This button is linked to results you have selected by row. Click the button to open NCIA, where the image series you select are loaded in the NCIA image basket. In the event that the cai2 study was NOT configured with image annotation for an image series, cai2 sends NCIA a list of Study Instance UIDs, for which NCIA will add all corresponding image series to basket. In the event that the cai2 study was configured with annotations for an image series, the system sends NCIA a list of Image Series IDs, for which NCIA adds all corresponding image series to the basket.

- **Retrieve Dicom Images** – This button is linked to results you have selected by row. Click the button to retrieve the corresponding image(s) from NCIA through the grid. NCIA organizes the downoad file by patientID, StudyInstanceUID, and ImageSeriesUID, and compresses it into a zip file. When caIntegrator 2 notifies you that the file is retrieved, The DICOM Retrieval page indicates whether the retrieved files are Study Instance UIDs or Image Series UIDs. For more information, see the note below.

Click the **Download DICOM** link to download and save the file. caIntegrator2 unzips the file and displays the list of images in the file. To open the DICOM images, you must have a DICOM image viewer application installed on your computer. X ref??

Note:

If you do not set search criteria for image annotations on the Columns tab, even though I've selected image criteria on the Criteria tab, no imaging results display. Images can be accessed in NCIA if see buttons there. see comment from previous chapter

In the search results, not all of the patients in the data subset may be mapped to image series IDs. If you select a mixture of patients that have image annotations as indicated by an image series ID and patients that do not have image annotations (no image series ID), when you click the **Retrieve DICOM Images** button, NCIA retrieves the images for the entire *NCIA study instance UID* that includes the image seriesIDs you checked.

If on the Search Results tab you select only patients that have image annotations as indicated by an image series ID, when you click the **Retrieve DICOM Images** button, NCIA retrieves images for the *NCIA image series* that were matched in the search. If the results are a mixture, but you select one specific row with a valid image annotation, caIntegrator2 aggregates to the *images series*. If results are a mixture and you select multiple rows, caIntegrator2 aggregates to the NCIA study in which multiple image series you have selected in the search results are found.

If query does not have image annotations and all check boxes are selected, results will go up to image series UID and gives all image series in it.

Sometimes when I select multiple rows, DICOM Retrieval page lists several image series IDs rather than the StudyInstance ID. What causes what? Can I predict what will happen? How do I know? Possiblity for multiple studies?

If no image series showing in query results, simply mean not mapped. Will to up to Study Instance UID.

2 ways defined:

1. Image series annotations. Pulls up image series IDs.

2. Image links to NCIA. In this case, pulls up Sugdy instance level.

If query does not have image annotations and all check boxes are selected, results will go up to image series UID and gives all image series in it.

User is searching a study that has image data and image annotation for at least one image series.

1. Open a study that has imaging data associated with it, and who's pointing to production NCIA server (small-study doesn't currently).
2. Make a query that will have image series or patients who are associated to Image Studies and select X amount of those patients in the checkbox.
3. Click the "Retrieve Dicom Images" button

   Note that it aggregates to the image study
4. Now go back to Columns tab, select all image annotations and run the query again.
5. Select an image series type column and click Retrieve Dicom Images button.

   caIntegrator2 now aggregates to the Image Series that were selected and not the Image Study.
6. Select a row that doesn't have image series data, and a row that does, and push the button.

This should aggregate to the study for the rows selected.

7. Click Forward to NCIA. YOu should see the same types of aggregation for these tests.

When the image Study is in the checked boxes (regardless of image series being there or not) aggregated up to the Image Study level.

Exporting Data

You can choose to download tabular search results as a CSV file. Click the Export .csv link at the bottom of the page. You may need to scroll the page to see it.The file contains the annotations, columns and data sort configurations you specified in the search query.

You will not see this option when genomic data displays as query results.