

RSNA COVID-19 DICOM Data Anonymizer

This document shows how to install and use the RSNA Anonymizer to prepare DICOM objects for submission to the RSNA International COVID-19 Radiology Database (RICORD). Please review the instructions with your PACS administrator before proceeding. Successfully using Anonymizer for its intended purpose will require support from someone with technical knowledge of the configuration of your PACS and your local network.

Download and Install Anonymizer

The installer for Anonymizer is available for download at:

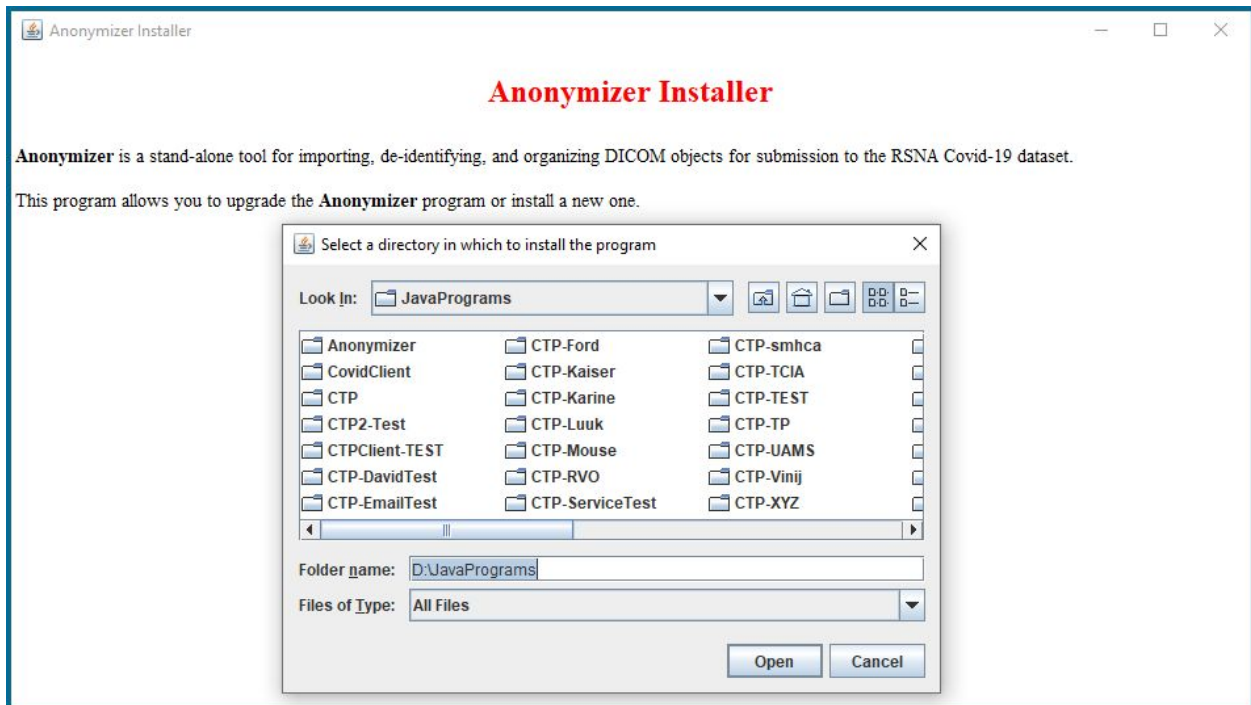
<http://mirc.rsna.org/download/Anonymizer-installer.jar>

The installer runs on any computer with a recent version of Java installed.

Save the installer to your local drive and double-click to launch. Alternatively, you can run the installer from a command window with the command:

```
java -jar Anonymizer-installer.jar
```

The installer will display a window like this:



Select the directory where you want to install Anonymizer and click **Open**.

The installer will create a directory called **Anonymizer** and install the necessary files there.

For convenience, you might create a shortcut to the **Anonymizer.jar** file and put it on your desktop.

After the installer finishes, close the window.

Running Anonymizer

To run the program, double-click the **Anonymizer.jar** file. The program will display a window containing a row of tabs across the top:



The first time Anonymizer runs, it generates a unique numerical SITEID parameter that is pre-pended to the pseudonymous patient IDs Anonymizer creates. This provides a way to distinguish datasets contributed by different sites without exposing the actual identity of the contributing site. The SITEID is maintained if you upgrade Anonymizer so that patient IDs remain consistent.

As Anonymizer imports and processes files, it stores the processed files in a directory tree that by default is called **Storage** and located in the **Anonymizer** directory. If you prefer to store the processed files elsewhere, click the **Directory** tab, click **Set Storage Directory**, and choose your preferred location.

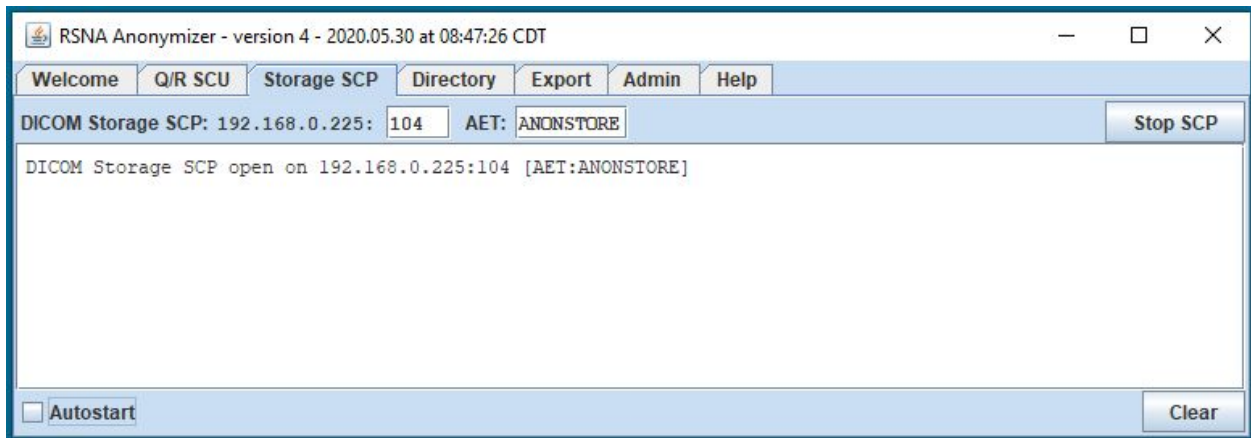
Importing and Processing DICOM Images

There are three ways to import images into Anonymizer:

- *Query PACS* - The **Q/R SCU** tab provides a DICOM Query/Retrieve Service Class User. You can use it to find cases on your PACS, select ones of interest, and retrieve them into Anonymizer (through a DICOM C-MOVE transfer).
 - **Accession** mode allows you to enter a list of accession numbers by hand, copy-and-paste a list, or open a file containing a list and then start the import process.
- *Send Studies from PACS* - The **Storage SCP** tab is a DICOM Storage Service Class Provider that receives images sent from a PACS, PACS workstation, or any DICOM Storage Service Class User.
- *Import from Local Storage* - The **Directory** tab lets you select files or directories containing DICOM images stored on your local computer and import them for processing.

Setting Up the Storage Service Class Provider

To receive images from the PACS or any Storage SCU, you need to configure the parameters on the **Storage SCP** tab:



The tab displays the IP address of the computer running Anonymizer, and provides fields for specifying the port on which the SCP will listen and the AE Title that it will use when communicating with the SCU that is sending images. The port number can reference any unused port on the local computer. You must coordinate these parameters with your PACS administrator, who will also need to configure the PACS to allow it to send to the SCP.

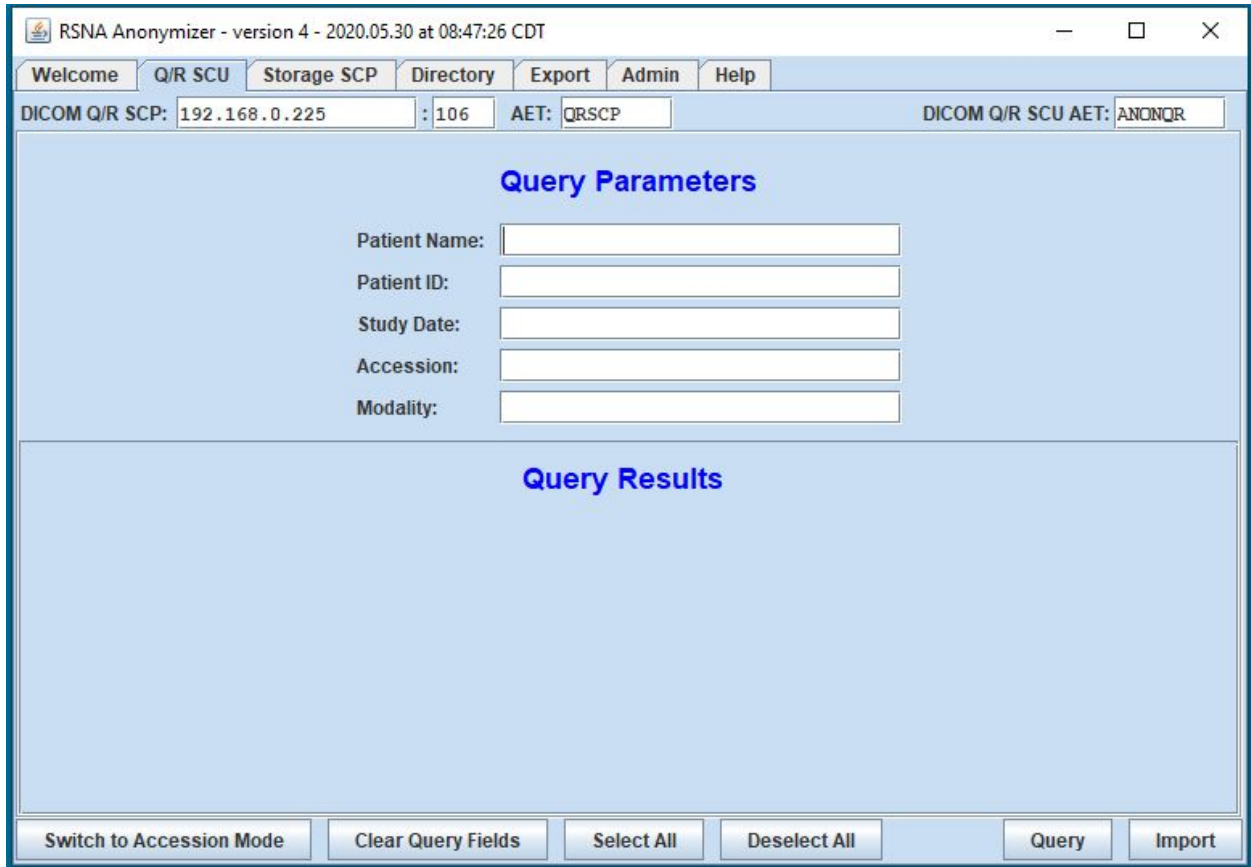
(Note: the SCP actually accepts all AE Titles, so you can use any AE Title that makes your PACS administrator happy. By tradition, AE Titles are single words in upper case, but this tradition is not enforced.)

If you are using the SCP to receive images, it will be convenient to check the **Autostart** checkbox so the SCP starts whenever Anonymizer does.

To receive images, your PACS administrator will need to disable any firewall rules blocking connections from the sender to the local computer.

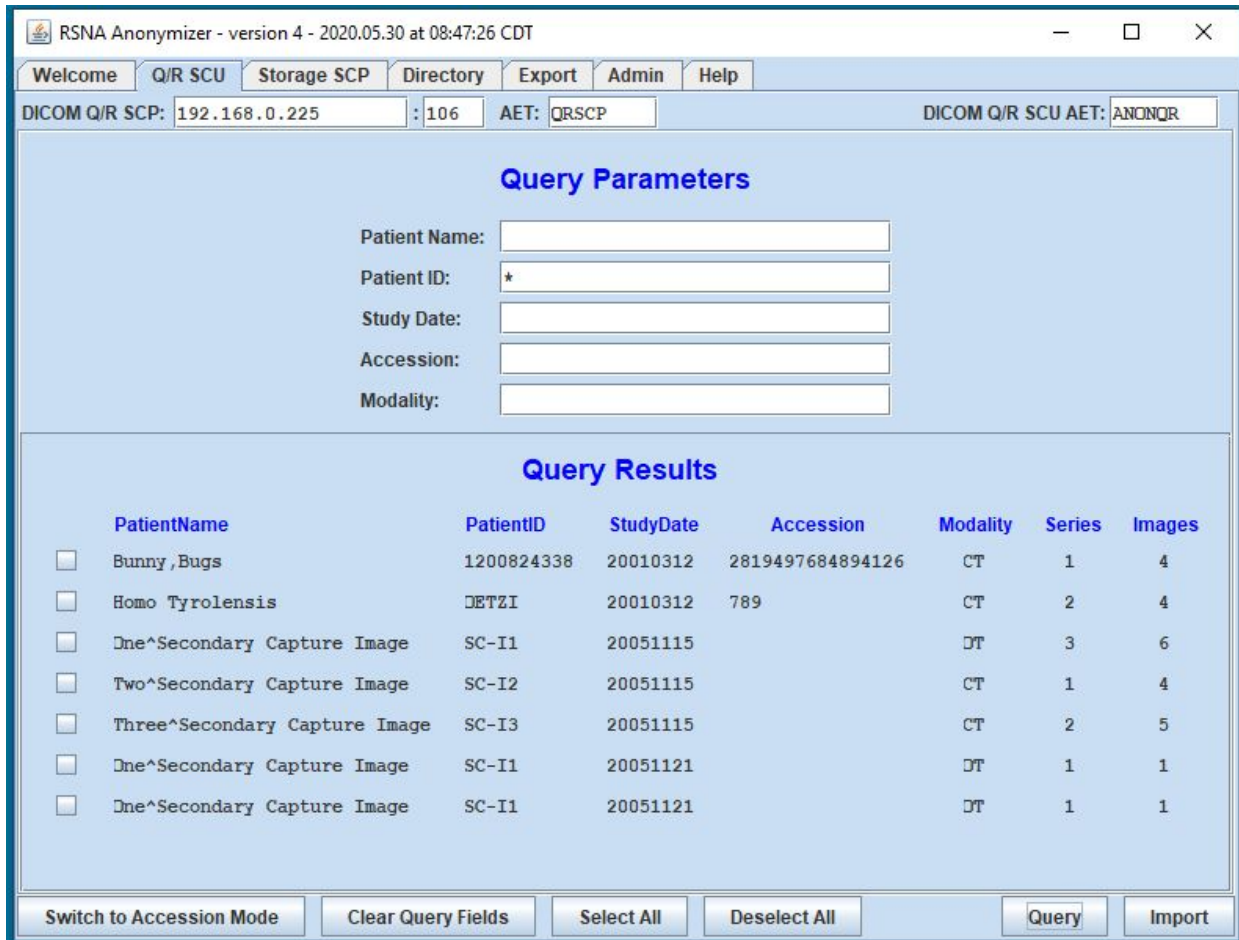
Querying PACS with the Q/R Service Class User

To query your PACS and retrieve images into Anonymizer, you need to configure the parameters on the **Q/R SCU** tab:



Obtain the IP address, port, and AE Title of your PACS Q/R SCP from the PACS administrator and enter those values in the corresponding fields in the tab header. Give the PACS administrator the AE Title of Anonymizer's Q/R SCU, which is shown in the field at the far right of the header.

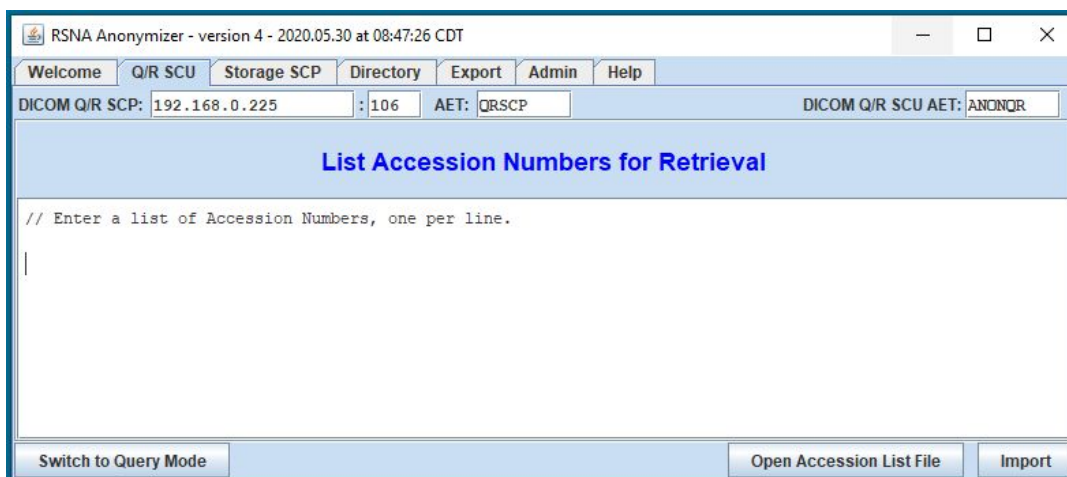
Once those parameters are coordinated with the PACS, you can enter text in one or more of the **Query Parameters** field and click **Query** at bottom right. (The asterisk can be used as a wild card, but do so carefully.) The response from the PACS is displayed as shown below:



Click the boxes of the desired studies and then click **Import**.

Using the Q/R Service Class User Accession Mode

The SCU has a mode for importing a list of studies identified by accession number. To use this mode, click **Switch to Accession Mode** in the footer:



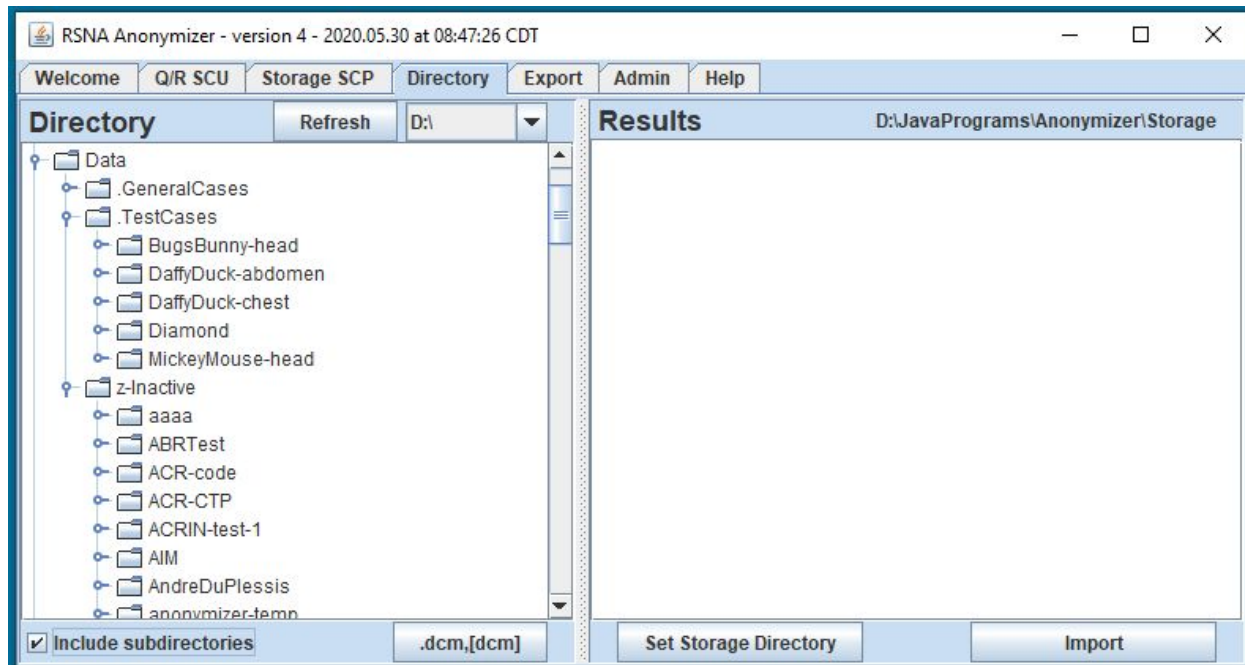
You can type or copy-and-paste a list of accession numbers or click the **Open Accession List File** button to read the list from a text file.

(Blank lines are ignored, and all text after two slashes on a line is ignored.)

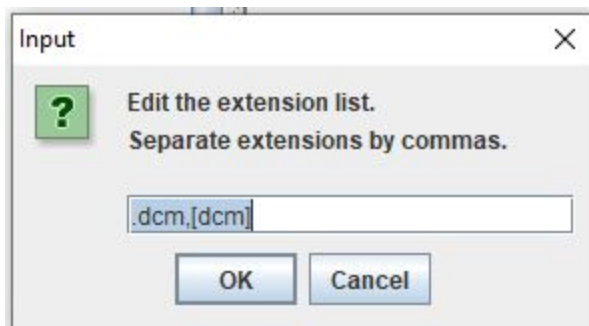
When your list of accession numbers is entered, click **Import**.

Importing Images from a Local Directory

To import images from a local directory, click the **Directory** tab:



The left pane shows the local file system. To change partitions, use the selector in the upper right corner of the left pane (shown as **D:** in the image above). To select which file types will be shown, click the button in the lower right corner of the left pane (shown as **.dcm,[dcm]** in the picture above). A popup will appear:



You can enter a list of extensions, separated by commas. The special designation **[dcm]** matches any file whose name consists of number and periods. This is useful for matching images on DICOM CDs or files stored by their SOPInstanceUIDs.

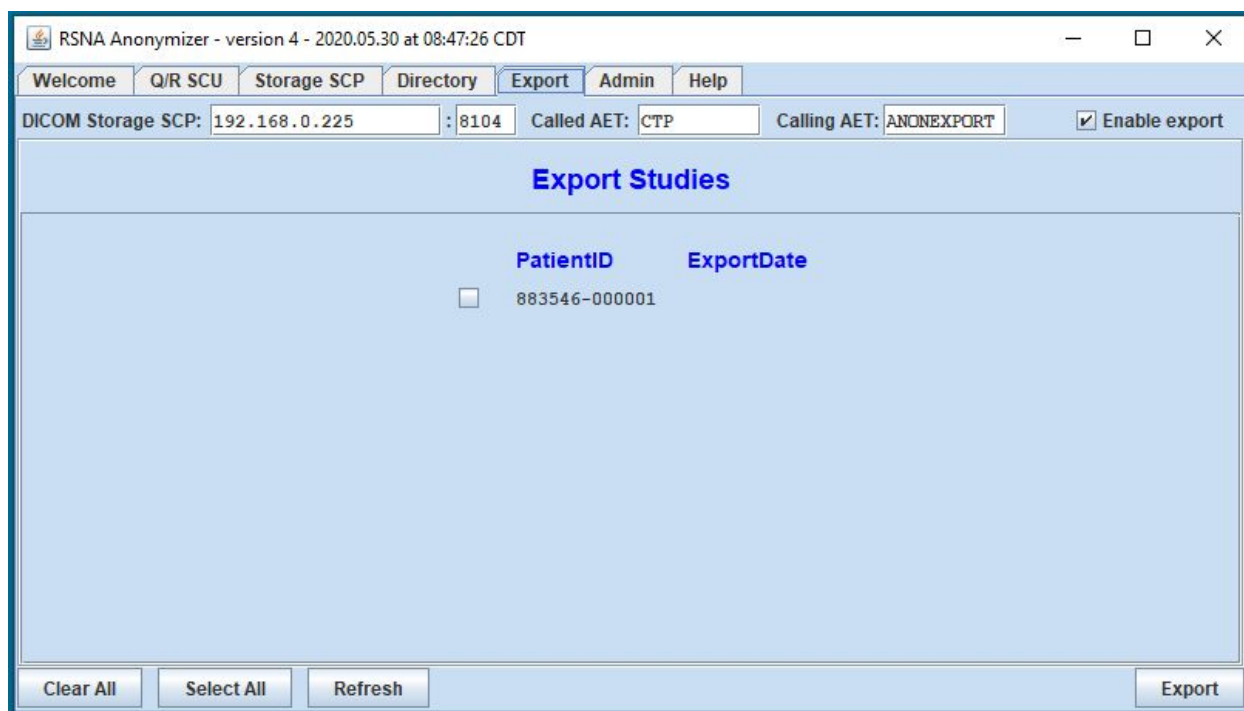
You can select an individual file or a directory in the left pane. If a directory is selected, all matching files in the directory are included. If a directory is selected and the **Include subdirectories** box is checked, all matching files in the directory and any of its subdirectories are included.

To start the import process, click **Import**. As the files are imported and processed, they are logged in the right pane.

The directory in which processed files are stored is shown in the upper right corner of the right pane. As a convenience, clicking on that text jumps the left pane to that directory.

Exporting Images to the RICORD Collection

To export processed cases to the RICORD image collection, click the **Export** tab:



RSNA staff and MD.ai, the host of the RICORD data staging platform, will provide you with a unique IP address, port, Called AE Title, and Calling AE Title. If you have not already received this information, send a request to informatics@rsna.org.

The tab lists all the patients received and processed by Anonymizer. The export date will be shown for patients whose studies have already been exported. Clicking **Select All** checks the boxes of all patients whose studies have not been exported.

If studies are received while the Export tab is displayed, it may be necessary to click **Refresh** to include them in the list.

Select the boxes of the patients you wish to export and click **Export**. When each patient's data export is complete, the date is displayed in the ExportDate column and the patient's checkbox is unchecked.

(The **Enable Export** checkbox must be checked for exporting to take place. It is included in the user interface for debugging purposes.)

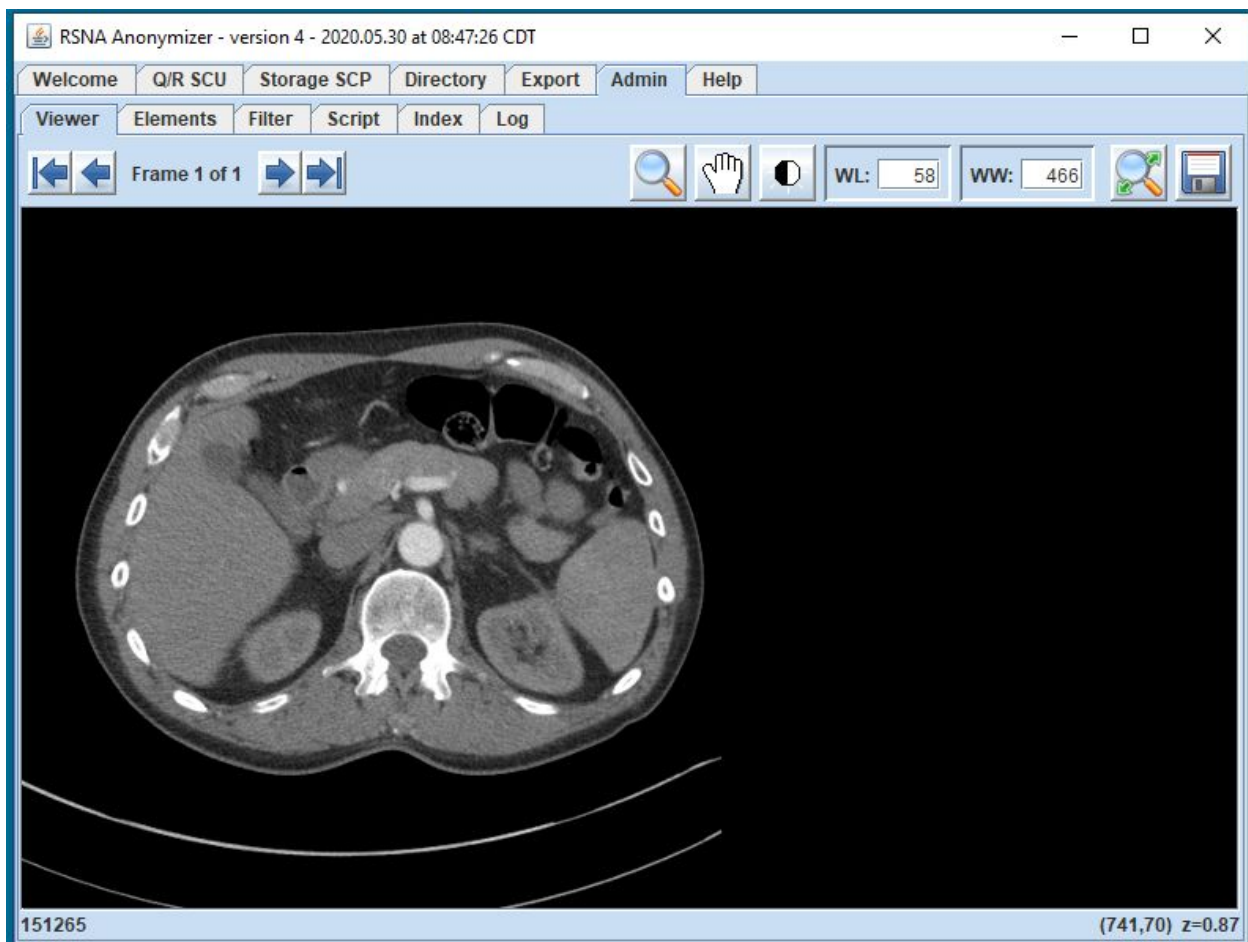
The Admin Tab

The Admin tab provides access to several functions that are not normally used when processing images. Clicking the tab displays a lower row of tabs:

- Viewer –display images
- Elements – list DICOM element s
- Filter – control which received files are accepted for processing
- Script – control how the anonymizer modifies files
- Index – search the database to connect certain anonymized values with their PHI counterparts

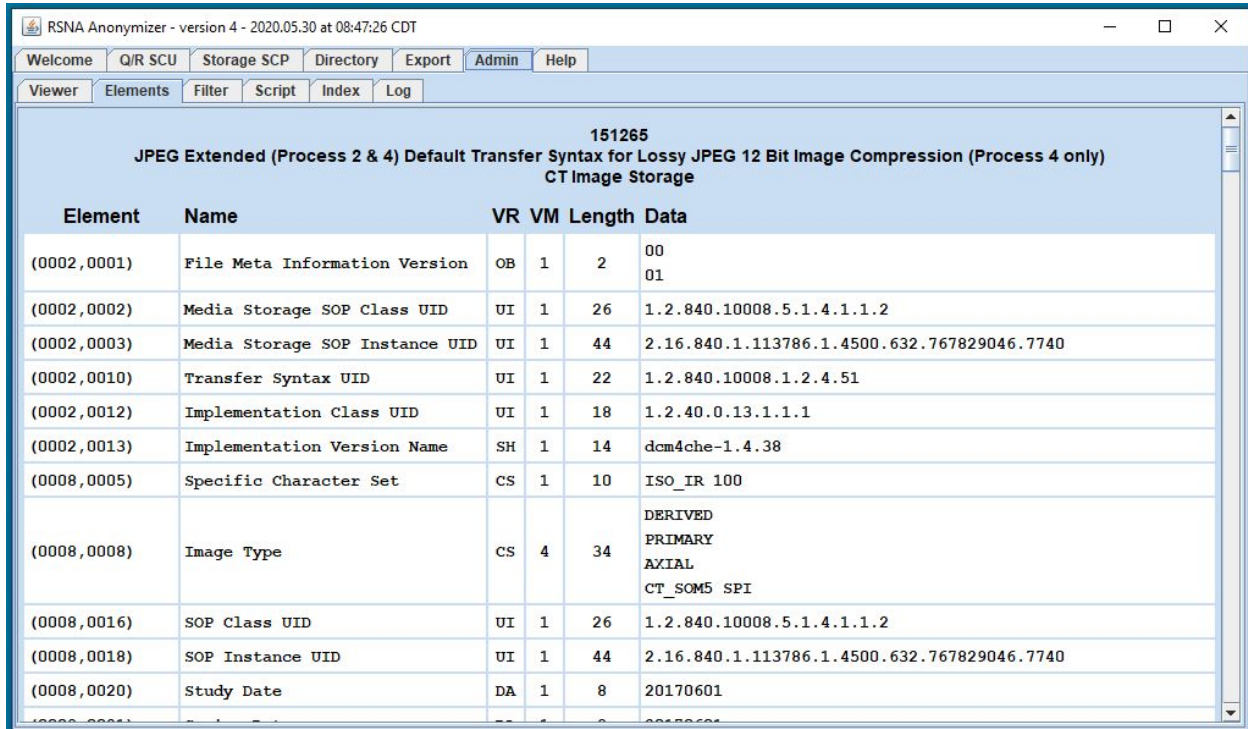
The Viewer Tab

When selecting images for processing, or when reviewing processed images, you can select an image in the left pane of the Directory tab and then view it in the Viewer tab:



The Elements Tab

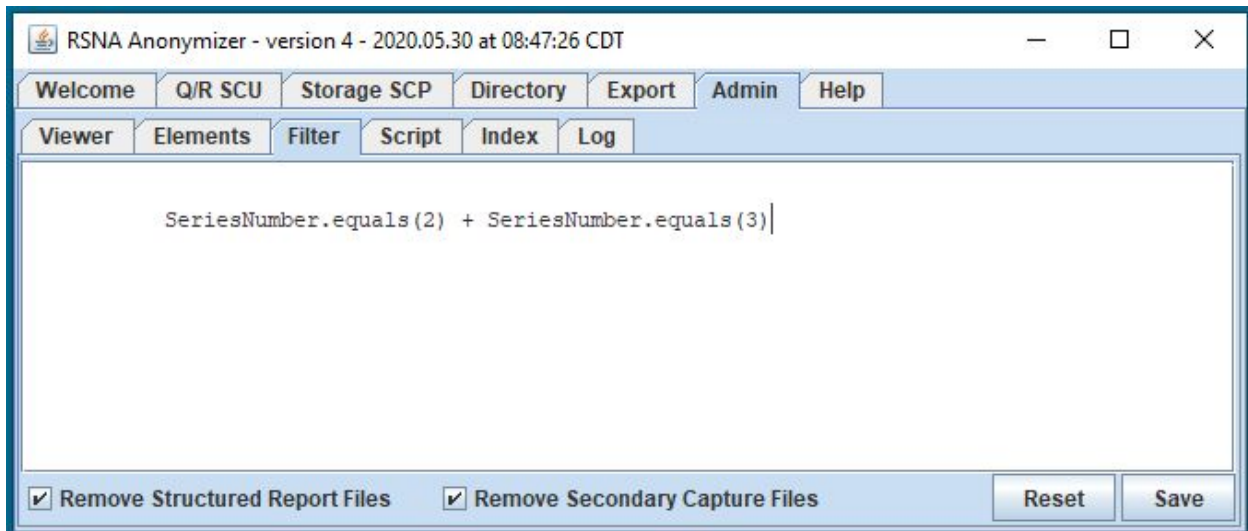
When selecting images for processing, or when reviewing processed images, you can select an image in the left pane of the Directory tab and then view its DICOM elements in the Elements tab:



Element	Name	VR	VM	Length	Data
(0002,0001)	File Meta Information Version	OB	1	2	00 01
(0002,0002)	Media Storage SOP Class UID	UI	1	26	1.2.840.10008.5.1.4.1.1.2
(0002,0003)	Media Storage SOP Instance UID	UI	1	44	2.16.840.1.113786.1.4500.632.767829046.7740
(0002,0010)	Transfer Syntax UID	UI	1	22	1.2.840.10008.1.2.4.51
(0002,0012)	Implementation Class UID	UI	1	18	1.2.40.0.13.1.1.1
(0002,0013)	Implementation Version Name	SH	1	14	dcm4che-1.4.38
(0008,0005)	Specific Character Set	CS	1	10	ISO_IR 100
(0008,0008)	Image Type	CS	4	34	DERIVED PRIMARY AXIAL CT_SOM5 SPI
(0008,0016)	SOP Class UID	UI	1	26	1.2.840.10008.5.1.4.1.1.2
(0008,0018)	SOP Instance UID	UI	1	44	2.16.840.1.113786.1.4500.632.767829046.7740
(0008,0020)	Study Date	DA	1	8	20170601

The Filter Tab

You can limit the images accepted for processing and storage by entering a filter script in the Filter tab:



The script language is described on the RSNA MIRC Wiki at http://mirwiki.rsn.org/index.php?title=The_CTP_DICOM_Filter.

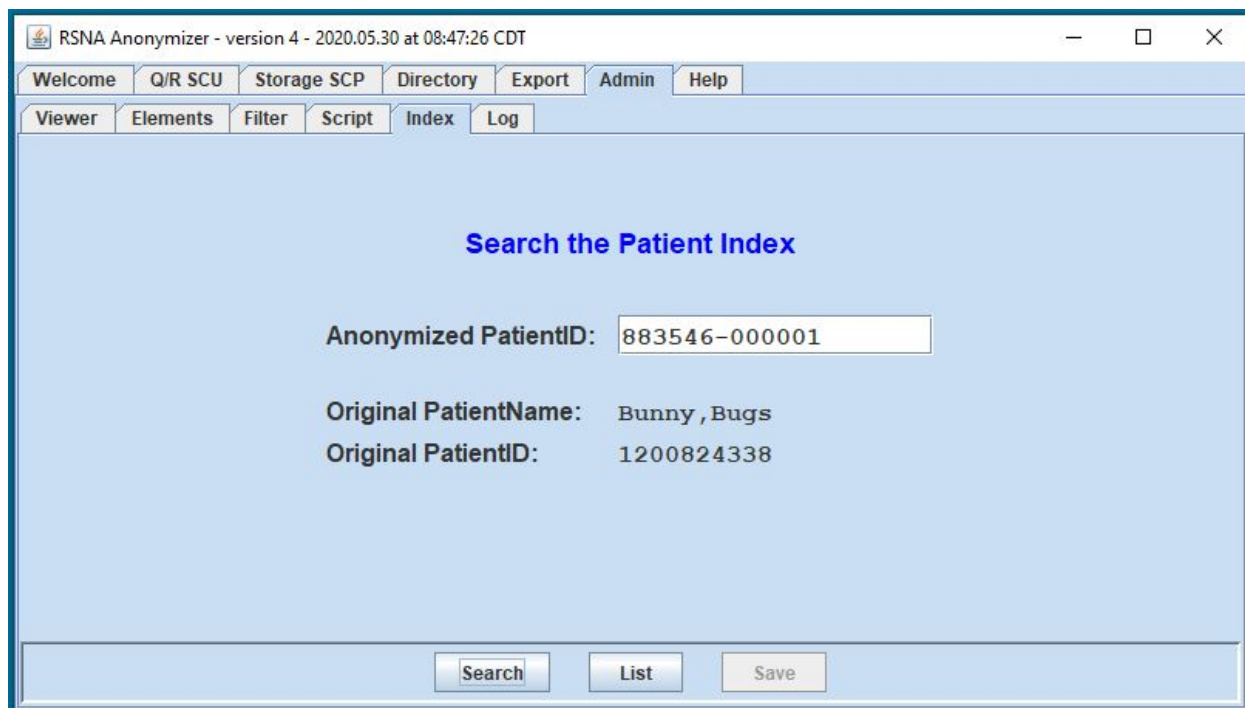
In most situations, no filter script is required. A blank filter script accepts all objects. If the **Remove SR Objects** box is checked, however, SR objects are not accepted, even if the script allows them.

The Script Tab

If required by your IRB, you can modify the anonymizer script in the Script tab. Changing the script is generally discouraged. The default script included with Anonymizer is configured specifically to implement the de-identification protocol of the RSNA RICORD dataset.

The Index Tab

Anonymizer maintains a database of the patients and studies it has processed, including the PHI and anonymized values of the PatientName, PatientID, StudyDate., and AccessionNumber elements. The index tab provides a search capability for mapping from anonymized PatientID to PHI PatientName and PatientID:



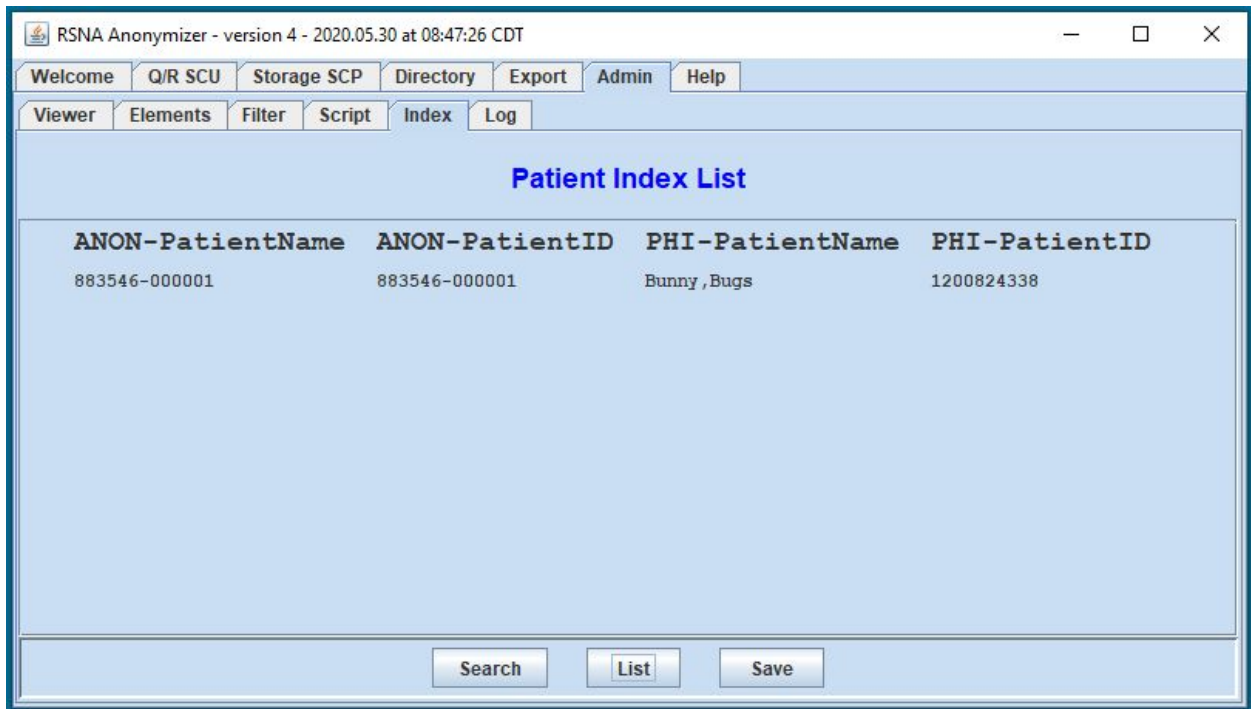
The screenshot shows the RSNA Anonymizer application window. The title bar reads "RSNA Anonymizer - version 4 - 2020.05.30 at 08:47:26 CDT". The main menu includes "Welcome", "Q/R SCU", "Storage SCP", "Directory", "Export", "Admin", and "Help". The sub-menu includes "Viewer", "Elements", "Filter", "Script", "Index", and "Log". The "Index" tab is active, displaying "Search the Patient Index". Below this, there is a search form with the following fields and values:

Anonymized PatientID:	<input type="text" value="883546-000001"/>
Original PatientName:	Bunny , Bugs
Original PatientID:	1200824338

At the bottom of the form, there are three buttons: "Search", "List", and "Save".

Clicking the **Search** button does one lookup based on the entry field.

Clicking the **List** button lists the contents of the database:



If the list is displayed, the **Save** button is enabled. Clicking it saves an Excel spreadsheet with the entire contents of the database, including study information.

The Log Tab

Anonymizer maintains a log of error conditions. The file is located in the `Anonymizer/logs/anonymizer.log` file. The **Log** tab displays the most recent entries in the log. If a problem is encountered, the log file can help in diagnosing and debugging.