CT Chronic Obstructive Pulmonary Disease (COPD)

Purpose

CT COPD helps visualize and quantify the destructive process of diffuse lung disease (e.g. emphysema). The application provides a guided workflow for airway analysis, reviewing and measuring airway lumen, and air trapping analysis.

Benefits

- Automatic lung and lobes segmentation,
- Automatic airway extraction, airway tree segmentation and navigation path extraction, enabling the measurement of airway parameters such as lumen diameter and wall cross section.
- Tools for qualitative and quantitative temporal comparison of up to four follow-up studies in order to determine the progression of the disease

Workflow

Before you begin

The application supports contrast-enhanced and non-contrast prospectively ECG-gated axial or retrospectively-gated helical CT images, as well as contrast and non-contrast volumetric helical scans of the lungs, 1-mm thin images every 10 to 15 mm in either standard or high resolution. Data reconstructed with 512, 768, and 1024 matrix is also supported. Volumetric analysis cannot be performed on noncontiguous axial datasets.

To process COPD exams:

1. From the Patient Directory, select the study and series and click 

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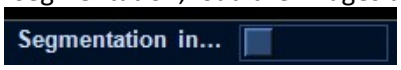
   The first step is to segment the lungs and trachea, which can be done manually or automatically.

Tip A feature of the IntelliSpace Portal is the ability to capture and save key images and displays. To capture a key image, select the image and press **SPACE** on the keyboard. To capture key displays, press **SHIFT** + **SPACE** on the keyboard.

Note If pre-processing was performed, also select series COPD Preprocess results from the Patient Directory. Then go to Step 3.

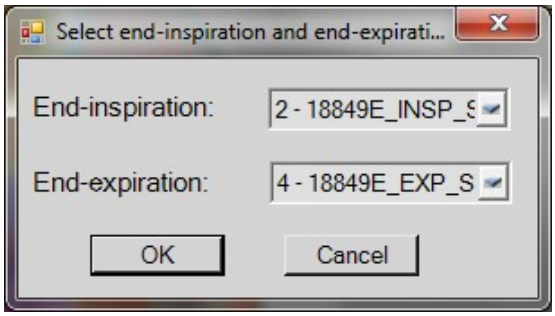
2. For manual segmentation, load the images and refer to the Progress bar located in the lower right corner of the screen 

3. To verify segmentation, click  (**Edit Airway**),  (**Edit Lungs**), or  (**Edit Lobes**) to make corrections as needed.
4. If multiple series were loaded, click  (**Next series**).

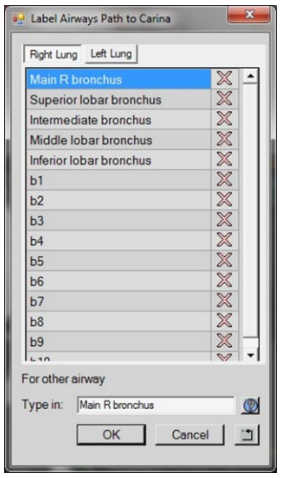
Important If supine and prone datasets or inspiration and expiration were loaded, all tissues from each study must be verified before you can move on to second step.

5. Click  (the Forward arrow) next to Verify Segmentation to move on to 2, **Lung Density**.
6. Select either the **Threshold** or **Percentile** radio button.

7. Do one or more of the following as needed:
   - Click  (**Draw spline ROI**).
   - Click  (**Draw smart ROI**).
8. From the **Volumetric Measurements** table, click  (**Copy table to clipboard**) to copy the table content into a non-DICOM document.
9. If inspiration and expiration images were loaded, click the drop-down arrow next to **Emphysema Analysis** and select **Air Trapping Analysis**.
10. Confirm that the correct series are loaded.



11. Under **Set Air Trapping Parameters**, adjust the parameters as needed.
12. Click  (**Draw spline ROI**).
13. From the **Volumetric Measurements** table, click  (**Copy table to clipboard**) to copy the table content into a non-DICOM document.
14. Click  next to Lung Density to move on to 3, **Verify Airway Extraction**.
15. Point to an airway and then right-click it to access the **Label Airways Path to Carina** dialog box.



16. Select the appropriate airway and click 

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17. Click  (**Edit Centerline**) and edit the centerline as needed.
18. Click  (the forward arrow) next to Verify Airway Extraction to move on to 4, **Airway Measurements**.
19. Do one of the following:
    - Click  (**Local 2D Inspection**) and mark airway for inspection.
    - Click  (**Along Centerline**) to display automated FWHM measurements based on the centerline location.

Noncontiguous axial datasets can only be analyzed with Local 2D Inspection.

20. In the table at the bottom of the screen, do one or more of the following:
    - Click 

to place additional measurement points to the centerline.
    - Click 

to change or add measurements to the table.
    - Click  (**Copy table to clipboard**), open Microsoft Word or Excel, and press **CTRL** + **V** on the keyboard.
21. Do one or more of the following:
    - To save the images, click  (**Save selected images as…**) and select the way you want to save the images.
    - To save tables in non-DICOM format, click  (**Save all tables as…**).
    - To save a key image(s), in the left **Navigation** pane, click the  (drop-down arrow) and select **Key Images**. Then select a single image and click  or press **CTRL** on the keyboard, select multiple images, and click  .
    - To bookmark the images, click  (**Bookmark**) and set the bookmark in the **Save Bookmark** dialog box.
    - To send the final images to the reporting package, click (Send selected images to report).
    - To send the patients clinical information to the report click the drop down next to the displayed reporting option and click  (**Send Findings to Report**).

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