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Annalise CXR Viewer
User Training Materials

Welcome to the following training presentation for the Annalise CXR Viewer.

As a user of the product, this presentation is intended to guide you through the key training modules to ensure you have a satisfactory level of understanding of the Annalise CXR product and how it operates. The trainee should demonstrate an understanding of each module and ensure that the learning objectives have been achieved.

At Annalise, we pride ourselves on customer feedback and would appreciate any thoughts or comments that would help us to improve our service including customer training. Please contact us at support@annalise.ai

The annalise.ai Customer Support Team

Disclaimer: All references to patient names in the pursuing screen shots are fictitious in nature as all patient details have been removed for the purposes of developing this training material.

Outline

The following training modules will cover the following areas:

Module 1 - Basic Operation

Module 2 - Configuration Options

Module 3 – Review Findings

Module 4 – Interpreting Findings

Module 5 - Troubleshooting

Technical & Application Support

Module 1 – Basic Operation Learning Outcomes

At the conclusion of this training module, you should be able to demonstrate a satisfactory understanding of:

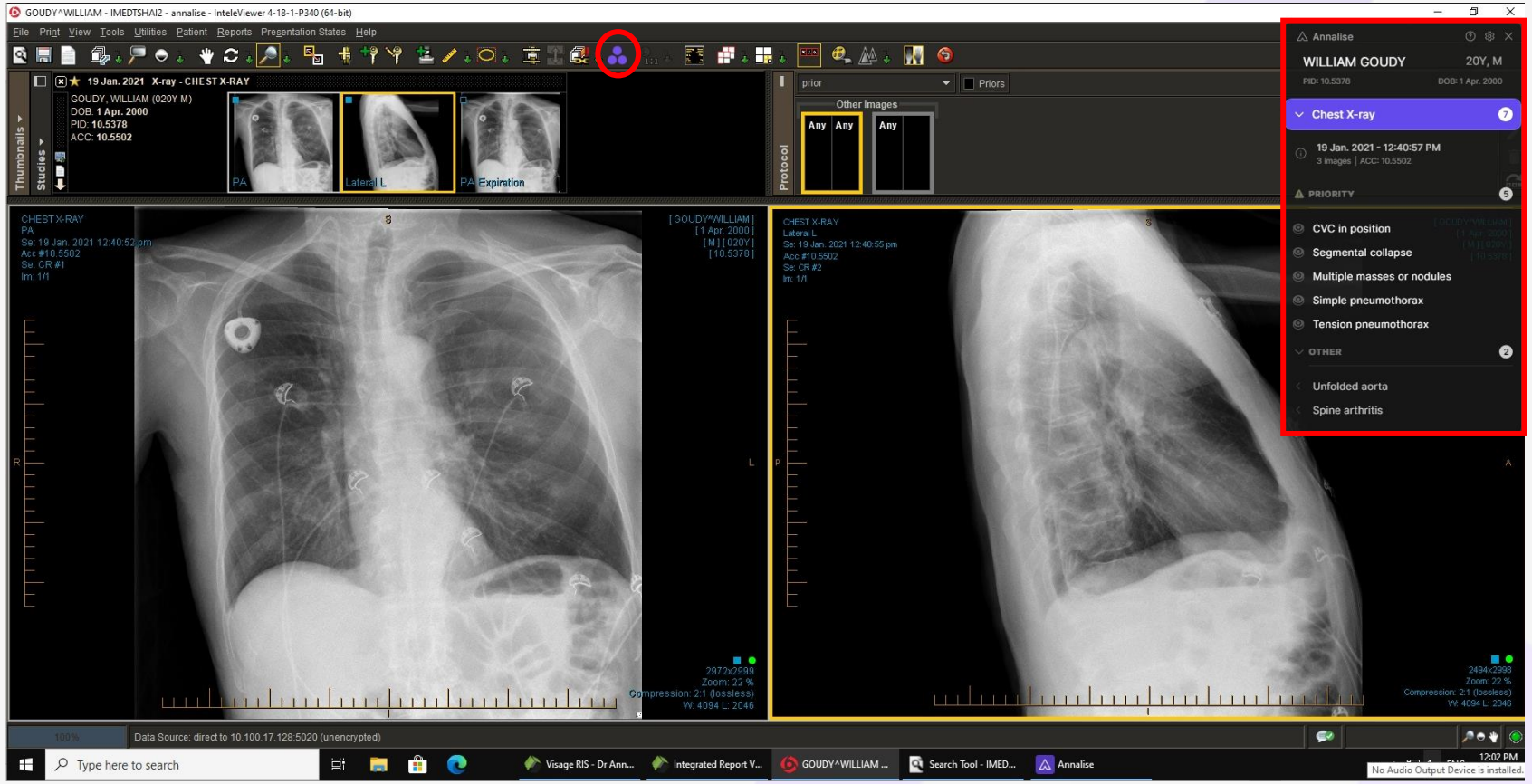
- ✓ Launching the Annalise CXR Viewer;
- ✓ Interacting with the Viewer inside PACS;
- ✓ How to locate the User Guide, Preference Settings and minimise the Viewer;
- ✓ How to refer to information about each of the 124 findings
- ✓ How to verify patient details.

Module 1 – Basic Operation
Launching Annalise CXR Viewer

The Annalise CXR Viewer will automatically launch into your PACS screen once a study has been loaded.

The application will detect if a CXR case has been loaded and the application will open to the right of your workstation screen.

The Annalise CXR Viewer can also be manually launched by selecting the  icon in the tool bar of your PACS window

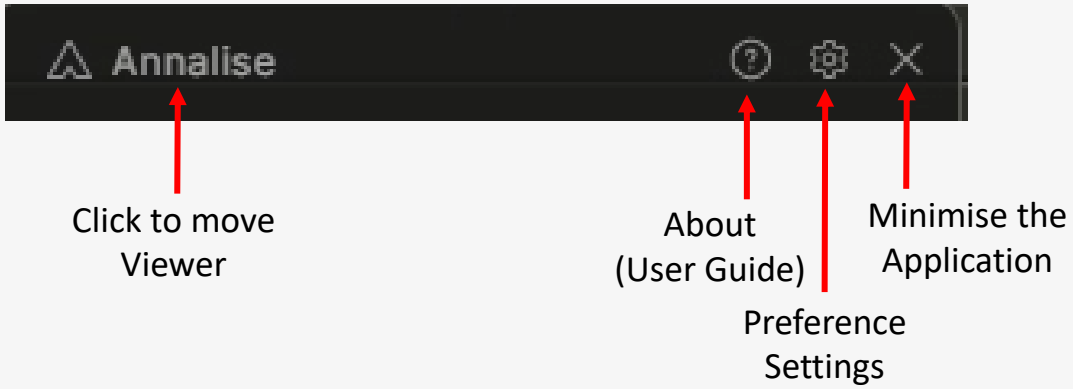


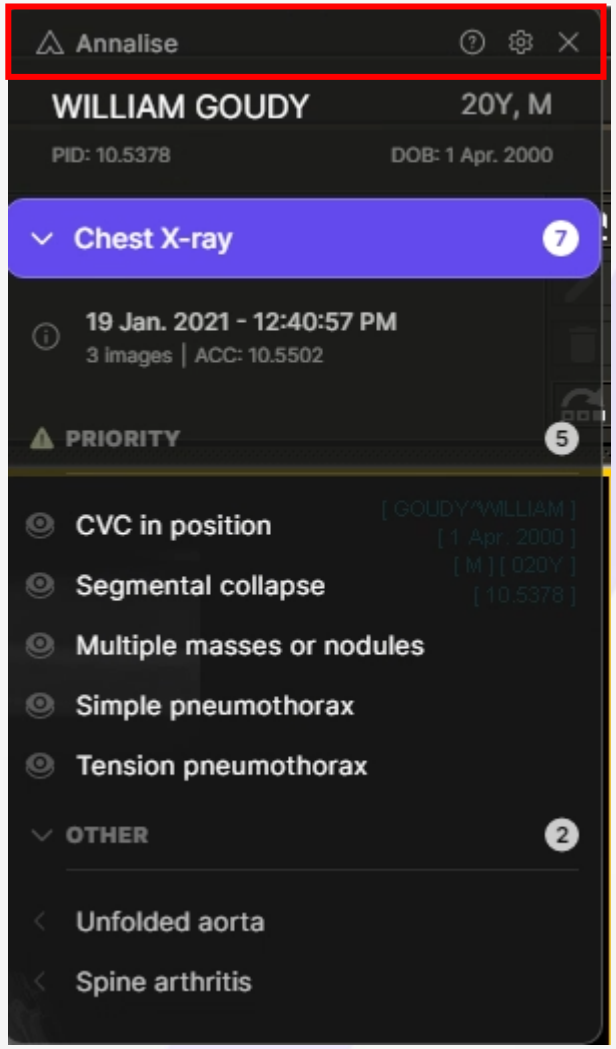
Module 1 – Basic Operation
Interacting with the Viewer

The Viewer can be moved to an area that is suitable by clicking and dragging the Annalise logo

The settings can be accessed by clicking on the Preference Settings icon (see next section).

You can also access the current version of the User Guide by clicking on the Information icon



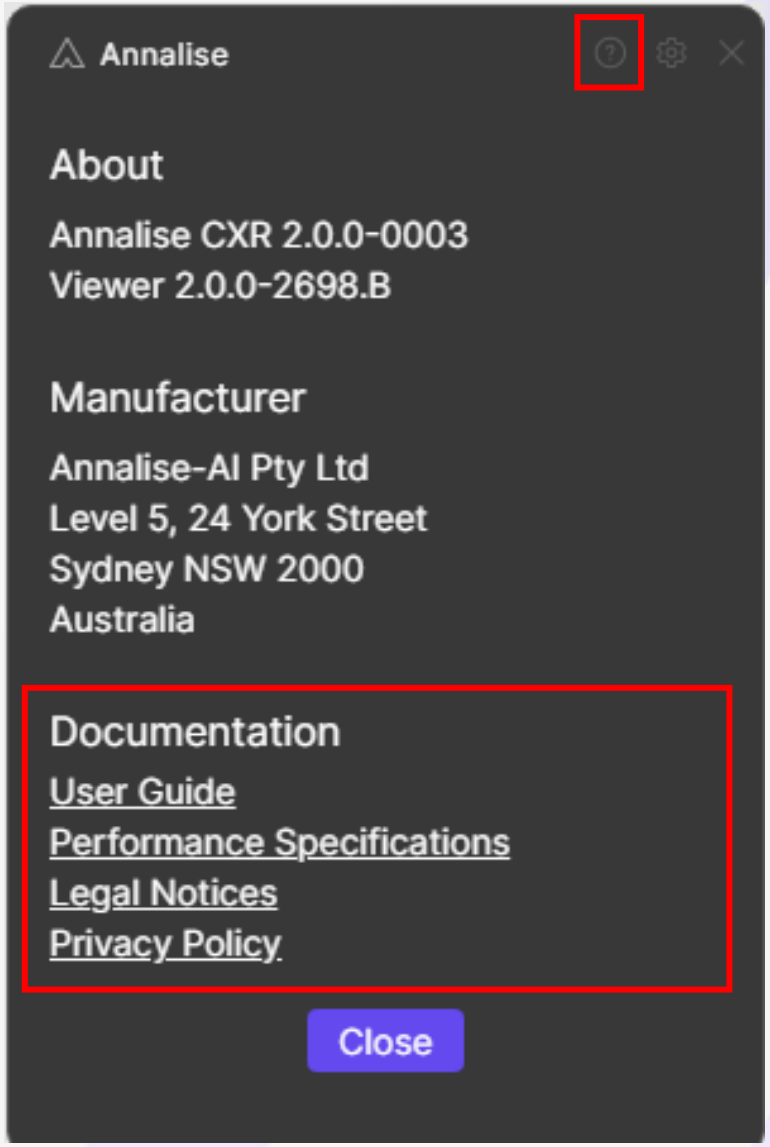


Module 1 – Basic Operation
“About” icon

Clicking on the “About” icon, will provide access to several important documents including:

User Guide: Provides detailed information about User instructions, product features and a full list of all 124 findings, including their description.

Performance Specifications: Contains product performance information including results based on the data set that has been used to evaluate the Annalise CXR Solution. This includes information about the mean AUC result for each finding, origin of the datasets, differences in demographic, imaging equipment and other variables.

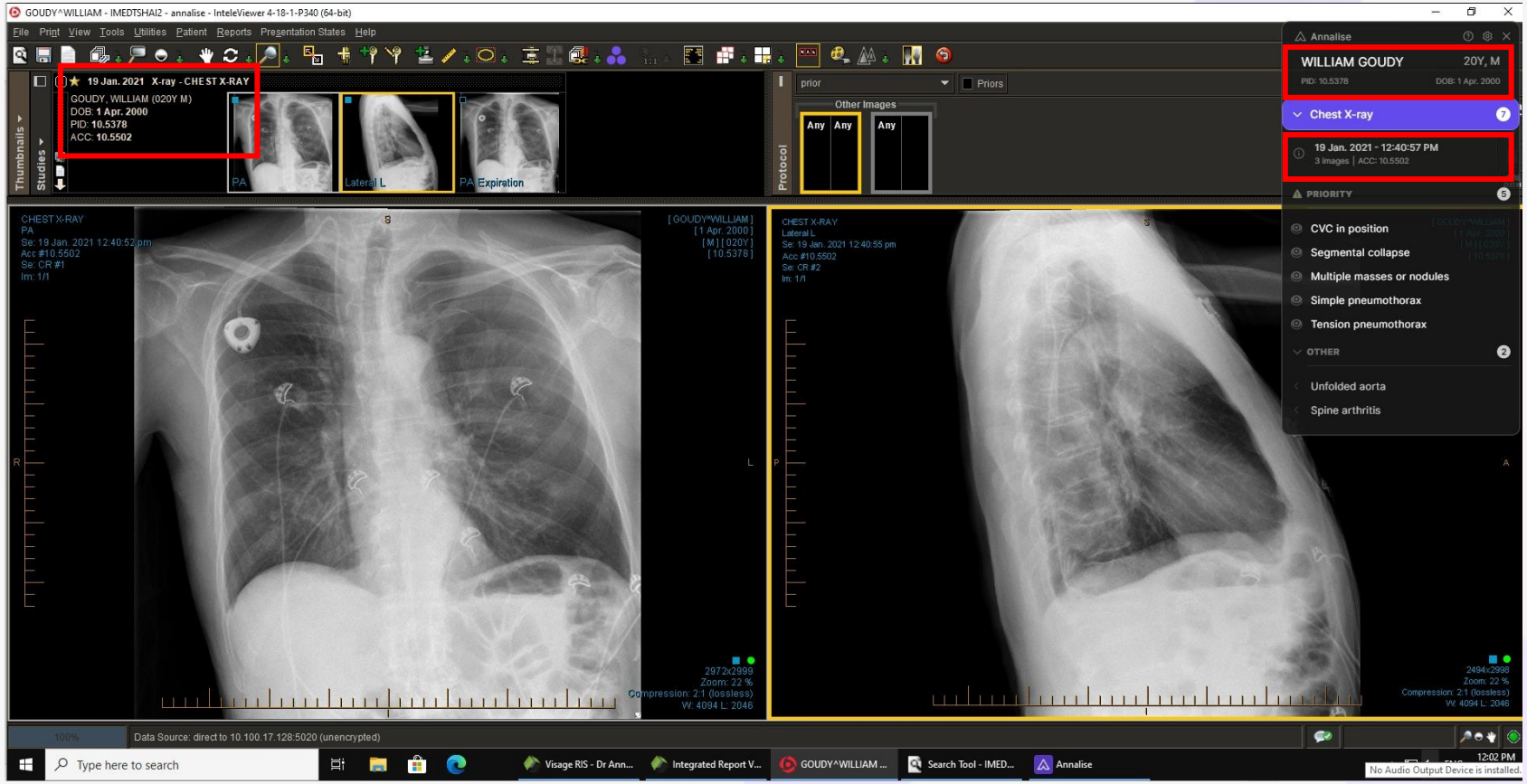


Module 1 – Basic Operation
Verifying Patient ID Details

If the study has been processed by the Annalise CXR Viewer, the results will be displayed.

It is important to verify the Patient ID details for each case.

Navigate to the Study Details Panel and check that the Patient ID and Accession No. correlate to the same study loaded into PACS.



Module 2 – Configuration Options Learning Outcomes

At the conclusion of this training module, you should be able to demonstrate a satisfactory understanding of:

- ✓ How to locate and configure Preference Settings including Viewer & Display preferences;
- ✓ How to configure Findings at an Organisational level.

Module 2 – Configuration Options
Preference Settings

There are severable preference settings, customisable for each user

Viewer Size: The viewer may be re-sized by changing the zoom levels;

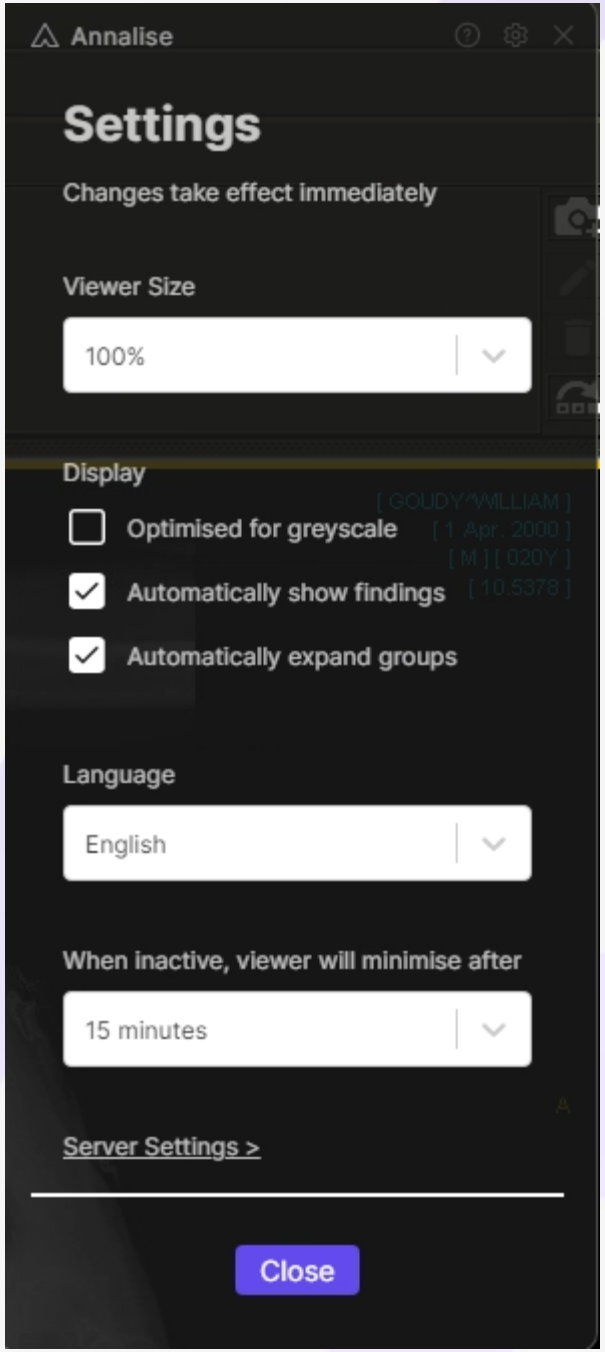
Optimised for Grayscale: When enabled, the user interface removes reliance on colours to display findings. When disabled, the user interface uses colour to highlight findings and priority findings as Regions of Interest (ROIs);

Automatically show findings: When enabled, the findings panel is expanded when a new study is loaded. When disabled, the findings panel must be manually expanded on each study load;

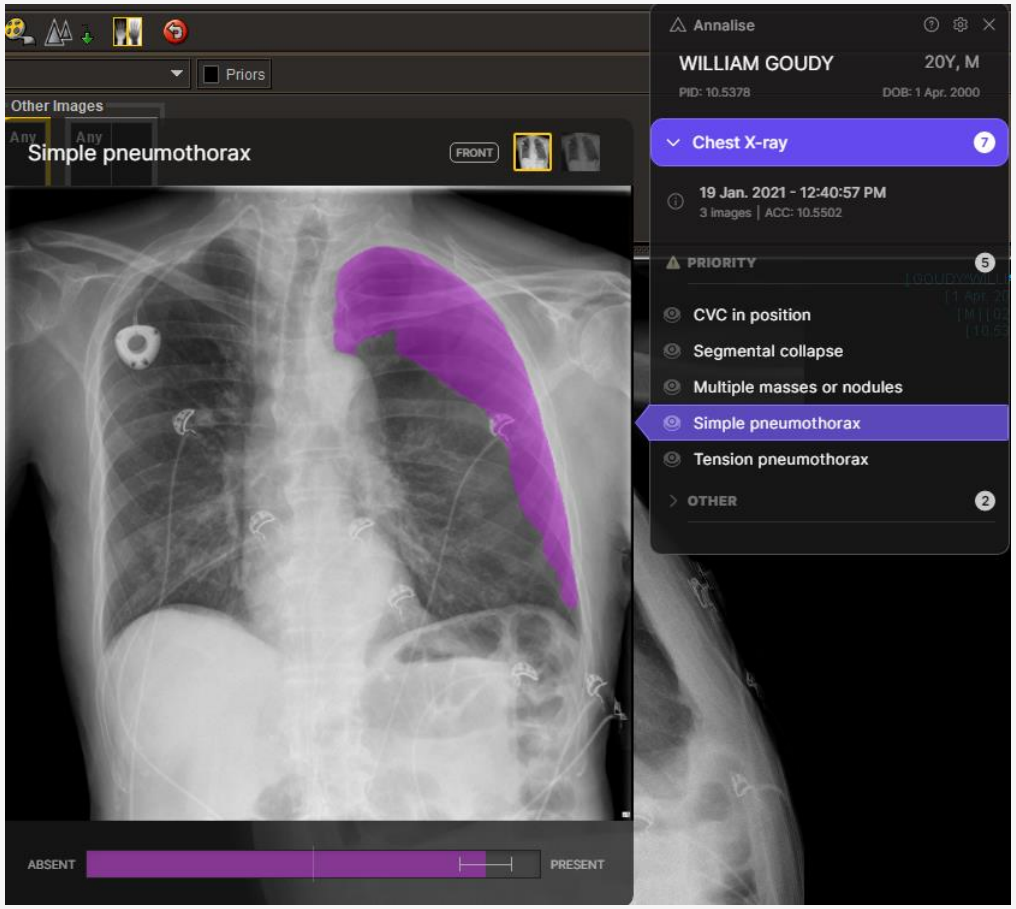
Automatically Expand Groups: When enabled, all groups are expanded in the findings panel when the findings panel is displayed. When disabled only the Priority findings group is expanded when the findings panel is displayed;

Language: allows user to select the viewer language;

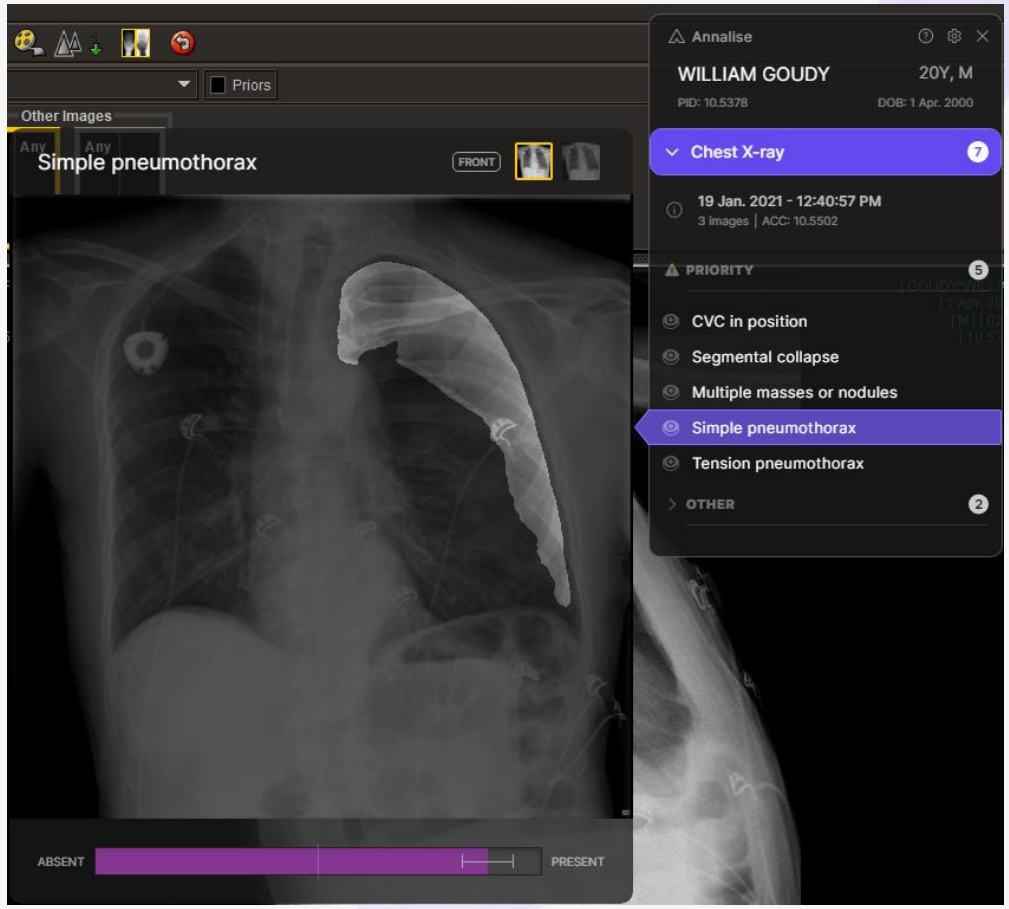
Inactivity: will minimise the viewer after a designated time period.



Module 2 – Configuration Options
Greyscale Interface



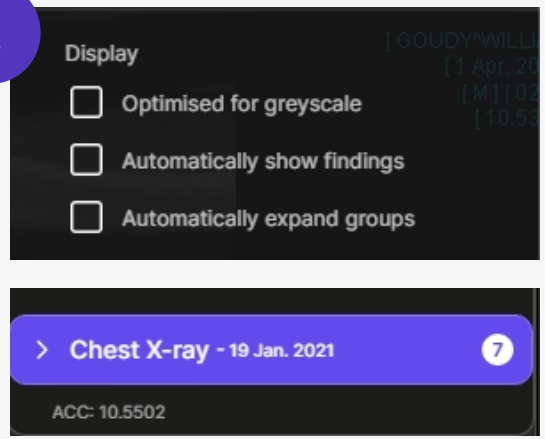
Optimised for colour scale monitors –
Greyscale preference setting deselected



Optimised for greyscale monitors –
Greyscale preference setting selected

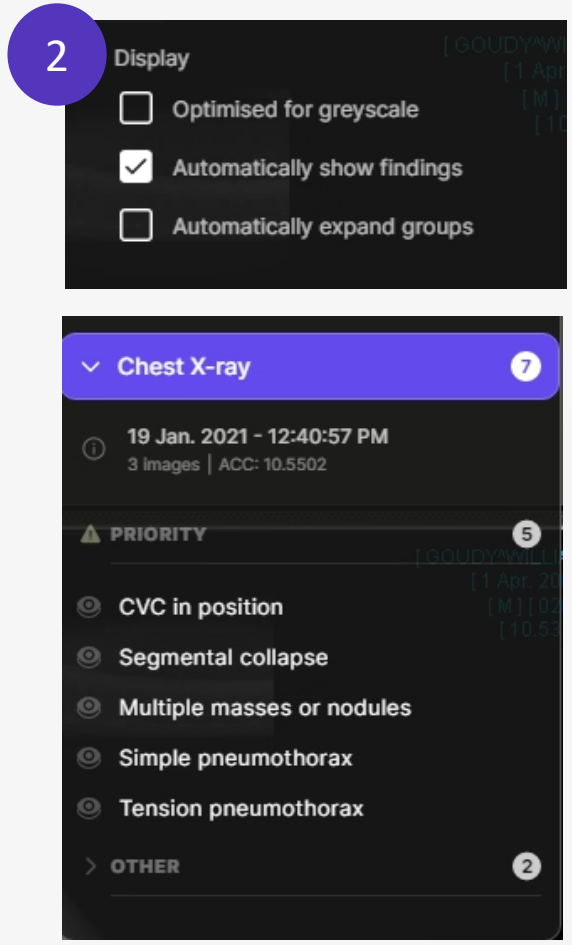
Module 2 – Configuration Options
Display Options

1



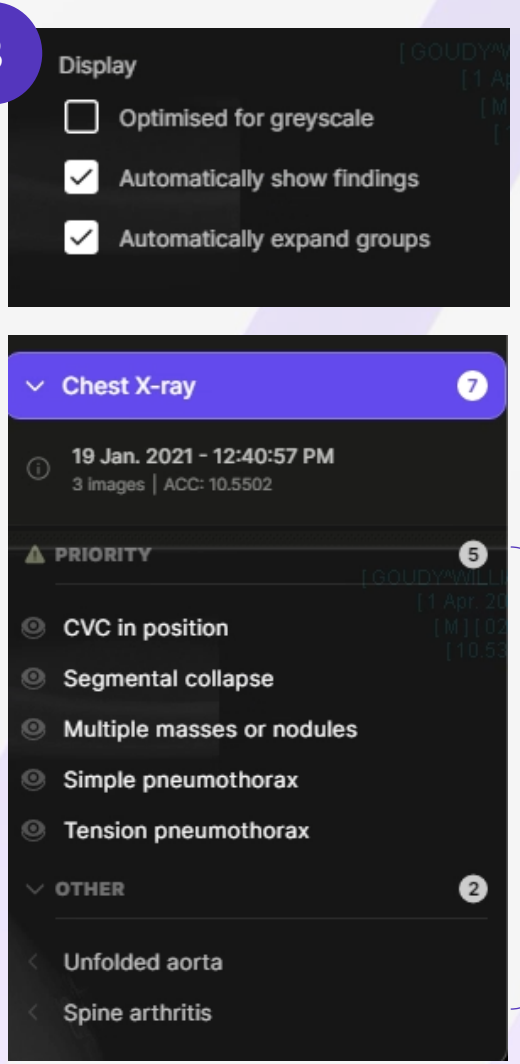
All findings remain collapsed by default and must be expanded manually to view results

2



"Priority" findings are expanded but "Other" findings collapsed

3



Both "Priority" findings and "Other" findings are expanded by default

Module 2 – Configuration Options
Findings

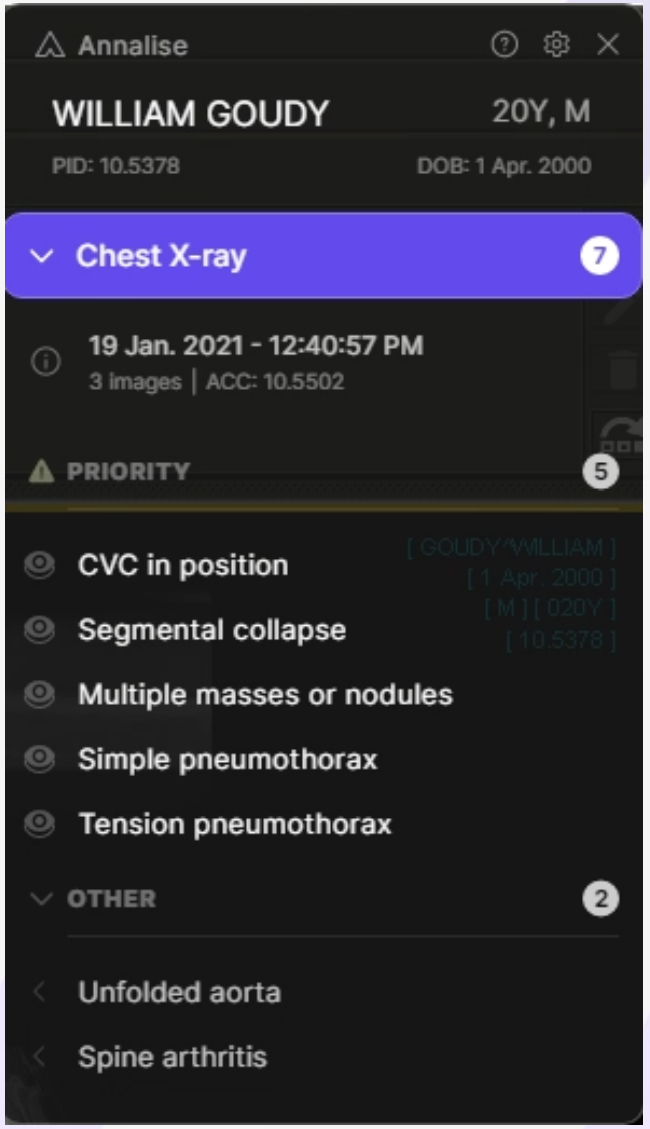
An important feature of the Annalise CXR Viewer is that the findings can be configured at an **organisational level**.

The application may be configured in consultation with your Department prior to go-live. The findings may be configured to:

- Only include certain findings
- Configure the groupings, including adding another group eg Technical Factors
- Determine which findings should sit within each group

In this example, the findings have been configured to display in one of two groups, either as **“Priority”** or **“Other”.**

How the findings are displayed is also configurable in the Preference Settings, depending on user preference (see previous slide)



Module 3 – Review Findings Learning Outcomes

At the conclusion of this training module, you should be able to demonstrate a satisfactory understanding of:

- ✓ Review the 124 findings that may be covered by the Annalise CXR Solution
- ✓ How to review the findings including the difference between groupings;
- ✓ The different types of ROIs and how to switch between views with ROI;
- ✓ The Synchronisation feature and when to use it.

Radiological Findings covered by Annalise CXR

Technical Factors
- Patient rotation
- Cervical flexion
- Underinflation
- Underexposed
- Overexposed
- Chest incompletely imaged
- Image obscured

Lines and Tubes
- Central venous catheter
- Endotracheal tube
- Nasogastric tube
- Pulmonary arterial catheter
- Intercostal drain
- Suboptimal central line
- Suboptimal endotracheal tube (ETT)
- Suboptimal nasogastric tube (NGT)
- Suboptimal pulmonary arterial catheter (PAC)

Cardiac Devices
- Electronic cardiac devices
- Cardiac valve prosthesis
- Sternotomy wires

Orthopaedic Implants
- Rib fixation
- Shoulder fixation
- Shoulder replacement
- Rotator cuff anchor
- Clavicle fixation
- Spinal fixation

Surgical Clips and Stents
- Mediastinal clips
- Neck clips
- Axillary clips
- Abdominal clips
- Lung sutures
- Aortic stent
- Coronary stent
- Airway stent
- Oesophageal stent
- Biliary stent

Cardiomediastinum
- Widened cardiac silhouette
- Inferior mediastinal mass
- Superior mediastinal mass
- Hilar lymphadenopathy
- Calcified hilar lymphadenopathy
- Pneumomediastinum
- Unfolded aorta
- Widened aortic contour
- Aortic arch calcification
- Pulmonary congestion
- Pulmonary artery enlargement
- Pericardial fat pad

Airspace Opacity
- Focal airspace opacity
- Air Space Opacity - multifocal
- Diffuse lower airspace opacity
- Diffuse upper airspace opacity
- Perihilar airspace opacity
- Diffuse airspace opacity

Interstitial
- Upper zone fibrotic volume loss
- Lower zone fibrotic volume loss
- Diffuse interstitial
- Upper predominant interstitial
- Basal predominant interstitial
- Diffuse fibrotic volume loss
- Diffuse nodular / miliary lesions
- Bullae upper
- Bullae lower
- Bullae diffuse

Collapse
- Atelectasis
- Segmental collapse
- Lung collapse
- Post resection volume loss

Pulmonary Lesion
- Solitary lung nodule
- Solitary lung mass
- Multiple masses or nodules
- Cavitating mass(es)
- Cavitating mass with content
- Calcified granuloma (< 5mm)
- Calcified mass (> 5mm)
- Nipple shadow

Airways
- Reduced lung markings
- Peribronchial cuffing
- Hyperinflation
- Bronchiectasis
- Tracheal deviation

Pneumothorax
- Simple pneumothorax
- Tension pneumothorax

Pleural Effusion
- Simple effusion
- Loculated effusion

Pleural Thickening
- Calcified pleural plaques
- Pleural mass
- Diffuse Pleural Thickening

Diaphragmatic Contour
- Diaphragmatic elevation
- Diaphragmatic eventration

Chest Wall Contour
- Pectus carinatum
- Pectus excavatum

Soft Tissues
- Subcutaneous emphysema
- Mastectomy
- Breast implant
- Calcified axillary nodes
- Calcified neck nodes

Abdomen
- Subdiaphragmatic gas
- Distended bowel
- Hiatus Hernia
- Gallstones
- Gastric band
- Suboptimal gastric band

Non-surgical Foreign Body
- Internal foreign body

Ribs
- Acute rib fracture
- Chronic rib fracture
- Rib resection

Humerus
- Acute humerus fracture
- Chronic humerus fracture
- Shoulder dislocation
- Shoulder arthritis

Scapular
- Scapular fracture

Clavicle
- Acute clavicle fracture
- Chronic clavicle fracture

Spine
- Kyphosis
- Scoliosis
- Spine wedge fracture
- Spine arthritis
- Diffuse spinal osteophytes
- Osteopaenia

Bone Lesion
- Spine lesion
- Scapular lesion
- Humeral lesion
- Rib lesion
- Clavicle lesion

Module 3 – Review Findings
Findings List

A full list of all 124 findings, including Definition, can be found in the User Guide on page 12.

It is recommended that you review each of the findings and become familiar with where you can find this information.

The User Guide can be accessed from the About icon from the Annalise CXR Viewer.

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10 Appendix A – Technical Specification

10.1 Annalise CXR Ontology Tree

The following table specifies the CXR ontology tree that is supported by the Annalise CXR device.

Finding	Localisation Available	Definition	Caveat
Abdominal clips	No	Surgical clips in the abdomen.	
Acute clavicle fracture	Yes	Cortical breach of a clavicle. May be difficult to see if nondisplaced. No callus formation for acute fractures.	
Acute humerus fracture	Yes	Cortical breach of the humerus, usually at the surgical neck of humerus.	
Acute rib fracture	Yes	Cortical breach of a rib without callus formation or union, does not include surgical rib resection or thoracotomy.	
Multifocal Air Space Opacity	Yes	Multiple area of ill-defined airspace / ground glass opacity or consolidation.	
Airway stent	No	Stents within the trachea or bronchi.	
Aortic arch calcification	No	Calcification of the aortic arch.	Does not include mitral valve calcification, descending aortic or pericardial calcification. Only includes Grade 2 or 3 calcification i.e. thick calcification
Aortic stent	No	Stent / graft in the aorta.	
Atelectasis	Yes	Includes subsegmental collapse, linear and bibasal atelectasis.	If the abnormality is not basal consider interstitial thickening instead of atelectasis
Axillary clips	Yes	Surgical clips in the axilla.	
Basal predominant interstitial	Yes	Opacities within pulmonary lobules in a linear / branching fashion affecting predominantly lower zones of one or both lungs. This also includes thickened chronic fibrotic changes from lung scarring.	This finding may still be predicted if there are upper zone changes as long as the pattern is lower zone predominant.
Biliary stent	No	Stents within the biliary tree.	
Breast implant	No	Breast prosthesis usually of gel like material implanted behind or in place of the female breast as cosmetic or reconstructive surgery.	

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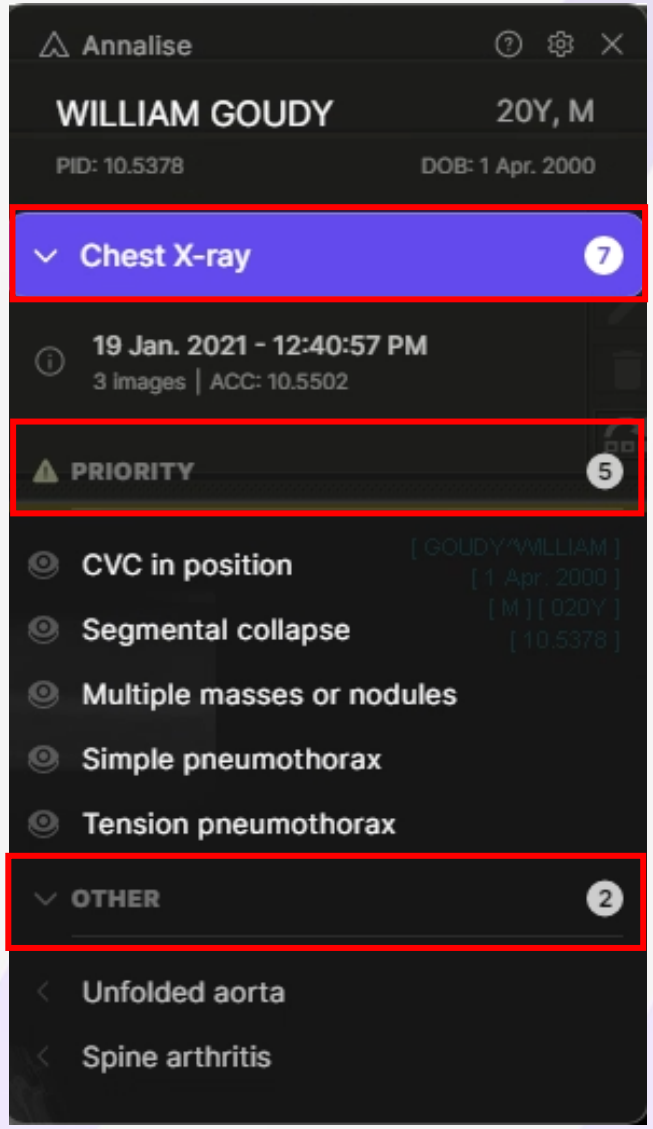
Module 3 – Review Findings
Findings List

Having checked the patient details are correct, you are now ready to review the findings.

You can identify how many findings are present by viewing the number to the right of the purple Chest X-ray bar. In this example we see **7 findings in total**.

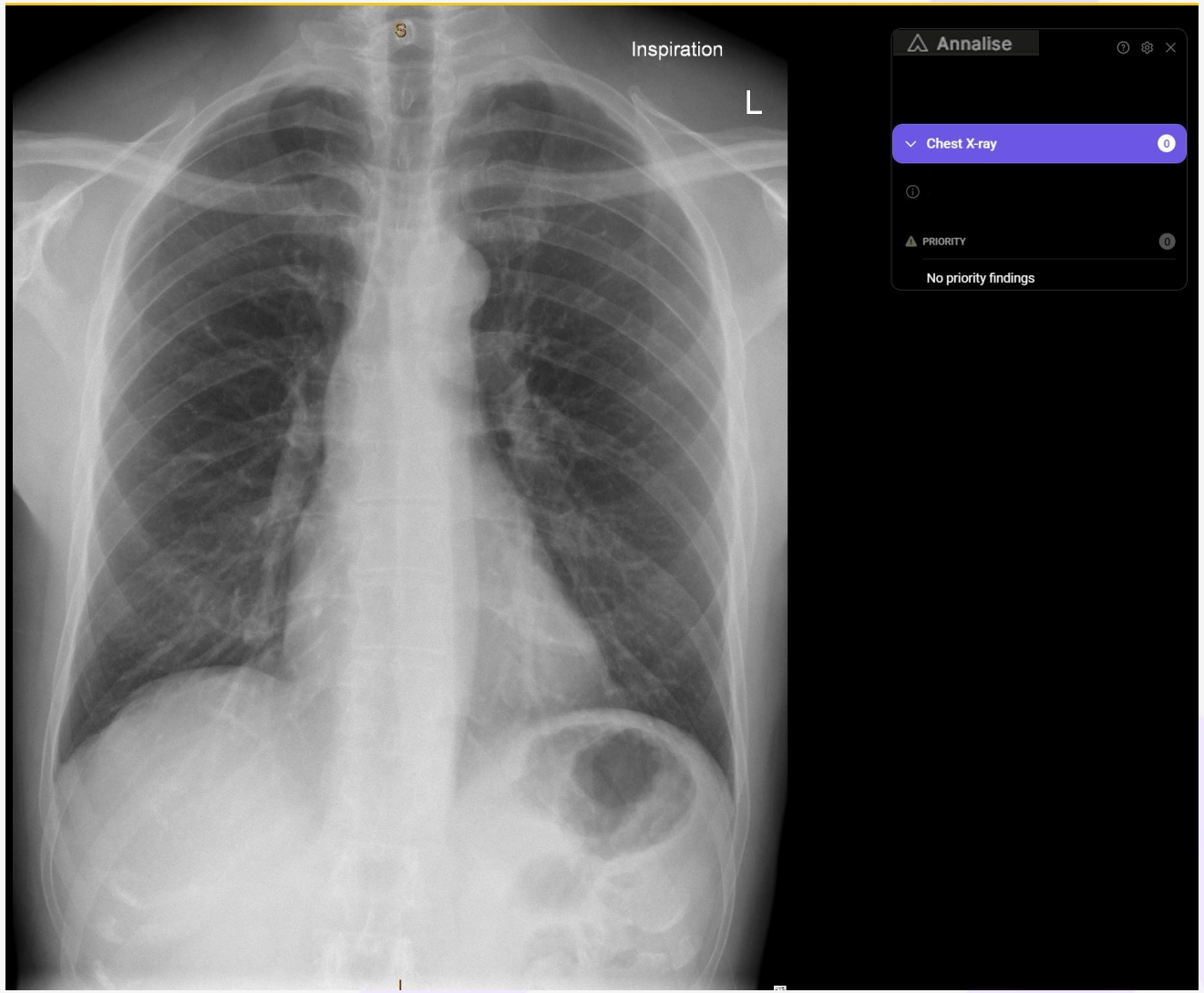
In this example, the findings have been configured to display as either **“Priority”** or **“Other”.** The number of each finding is also displayed to the right, in this case 5 and 2 respectively.



Module 3 – Review Findings
No Findings

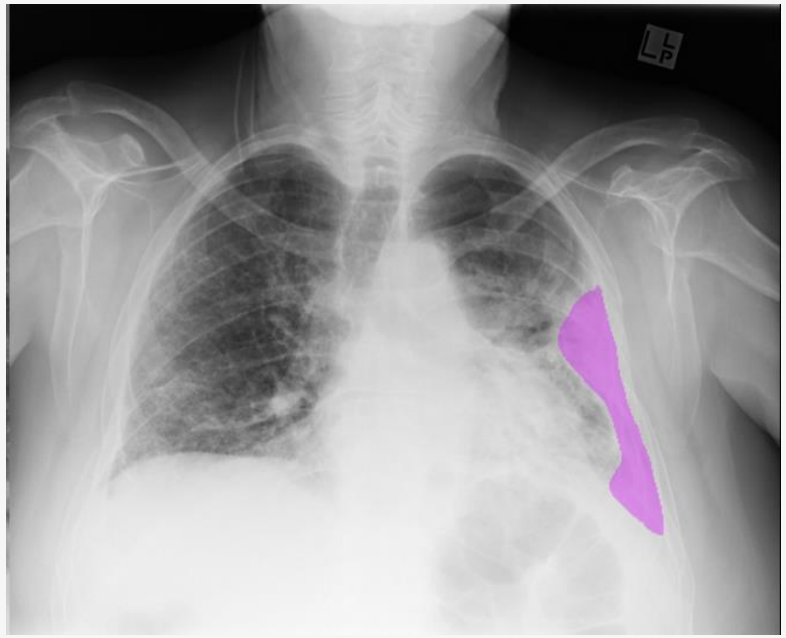
In some instances where the Annalise CXR Solution detects that no findings are present, the Annalise CXR Viewer will contain no results.

In these cases, the CXR Viewer will also display a message, “No Priority Findings”.



Module 3 – Review Findings
Understanding the ROI

On some findings, you will notice a Region of Interest  icon which indicates that the model has localised this specific finding on the image(s). There are three types of ROIs, each look slightly different depending on where the finding is localised



ROI demonstrating that the clinical finding is localised within a specific area, indicated by a purple overlay on the image

In this instance, the ROI was not localised to a specific area. The purple bar indicates that the finding can be found on the left side

The ROI demonstrates that the finding is not localised to a specific area but can be found on both the left and right side of the patient

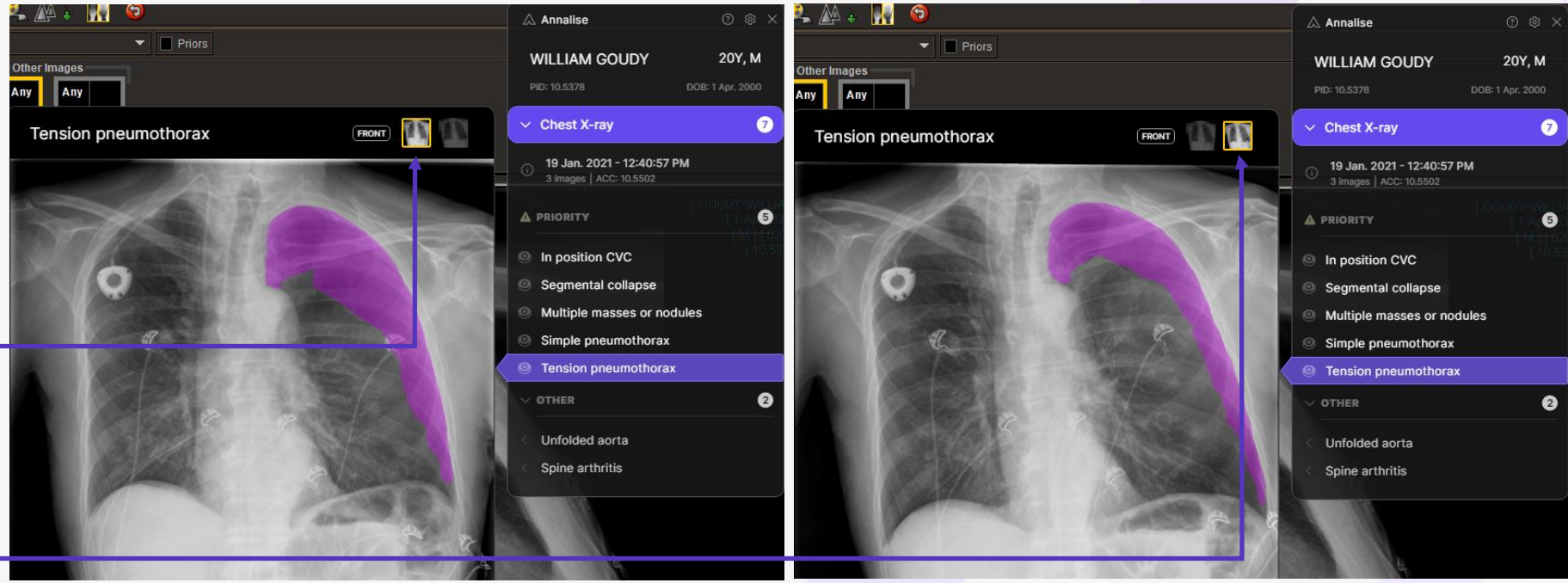
Module 3 – Review Findings
Switching between views with ROI

On some clinical findings, the ROI may be highlighted on multiple views.

The Annalise CXR Viewer can process and display examinations with up to 3 CXR images.

To switch between views, navigate to the other view displayed as the ROI for a clinical finding.

Select the new view to highlight the ROIs for that view.



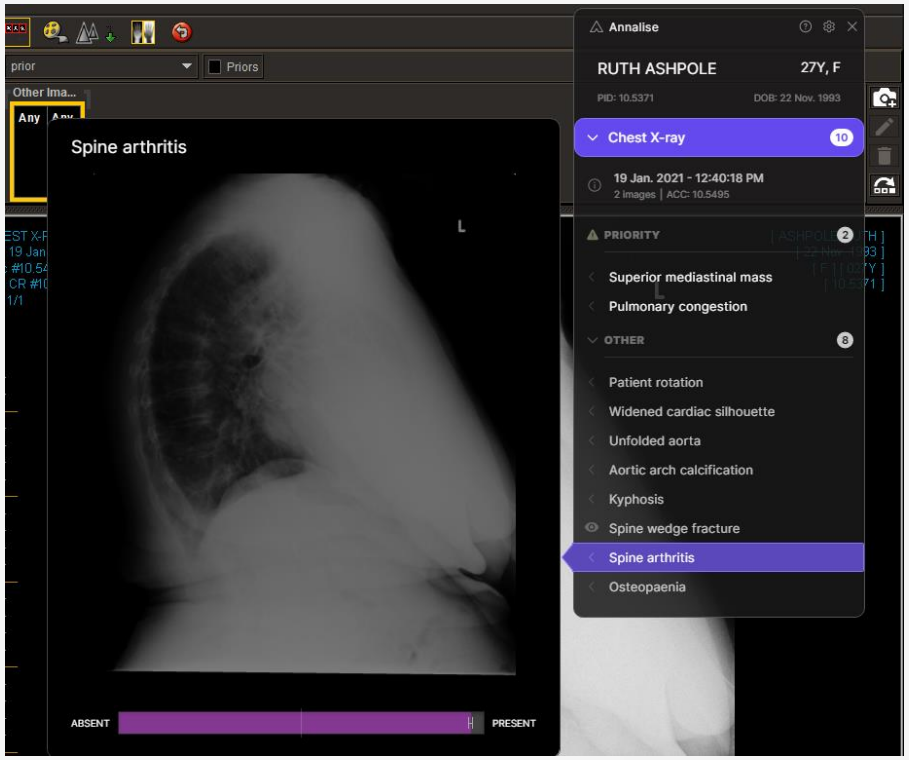
In this example, switching between views highlights the clinical finding and the change in appearance of the ROI for Expiration and Inspiration views.

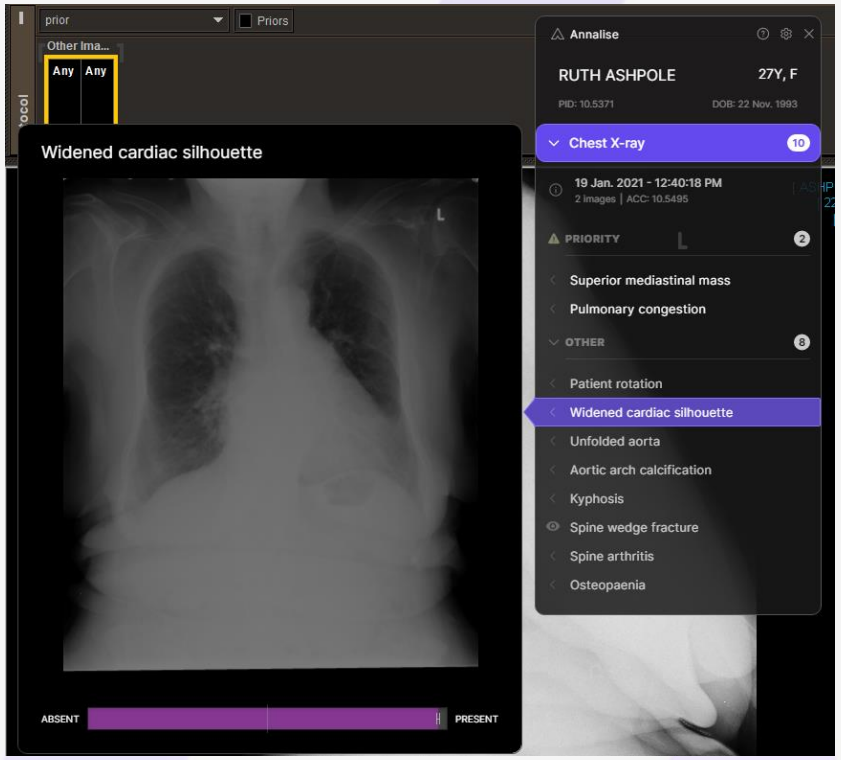
Module 3 – Review Findings
Some findings have no ROI

Not all findings will have an ROI. For some findings, a ROI will not be present. In these cases, the icon will not be displayed.

This is the intention of the software since Annalise CXR feels the location of this specific finding is obvious to the clinician.

Whilst no ROI is displayed, the Annalise CXR solution recommends that this finding is still present within the examination.





Module 3 – Review Findings
Some findings have no ROI

The list of findings can be found in Appendix A of the User Guide starting at page 12.

For some findings, a ROI will not be present. Appendix A details whether localisation or a ROI is available for that particular finding.

The User Guide can be accessed by navigating to the About icon from the Annalise CXR Viewer.

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10 Appendix A – Technical Specification

10.1 Annalise CXR Ontology Tree

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Biliary stent	No	Stents within the biliary tree.	
Breast implant	No	Breast prosthesis usually of gel like material implanted behind or in place of the female breast as cosmetic or reconstructive surgery.	

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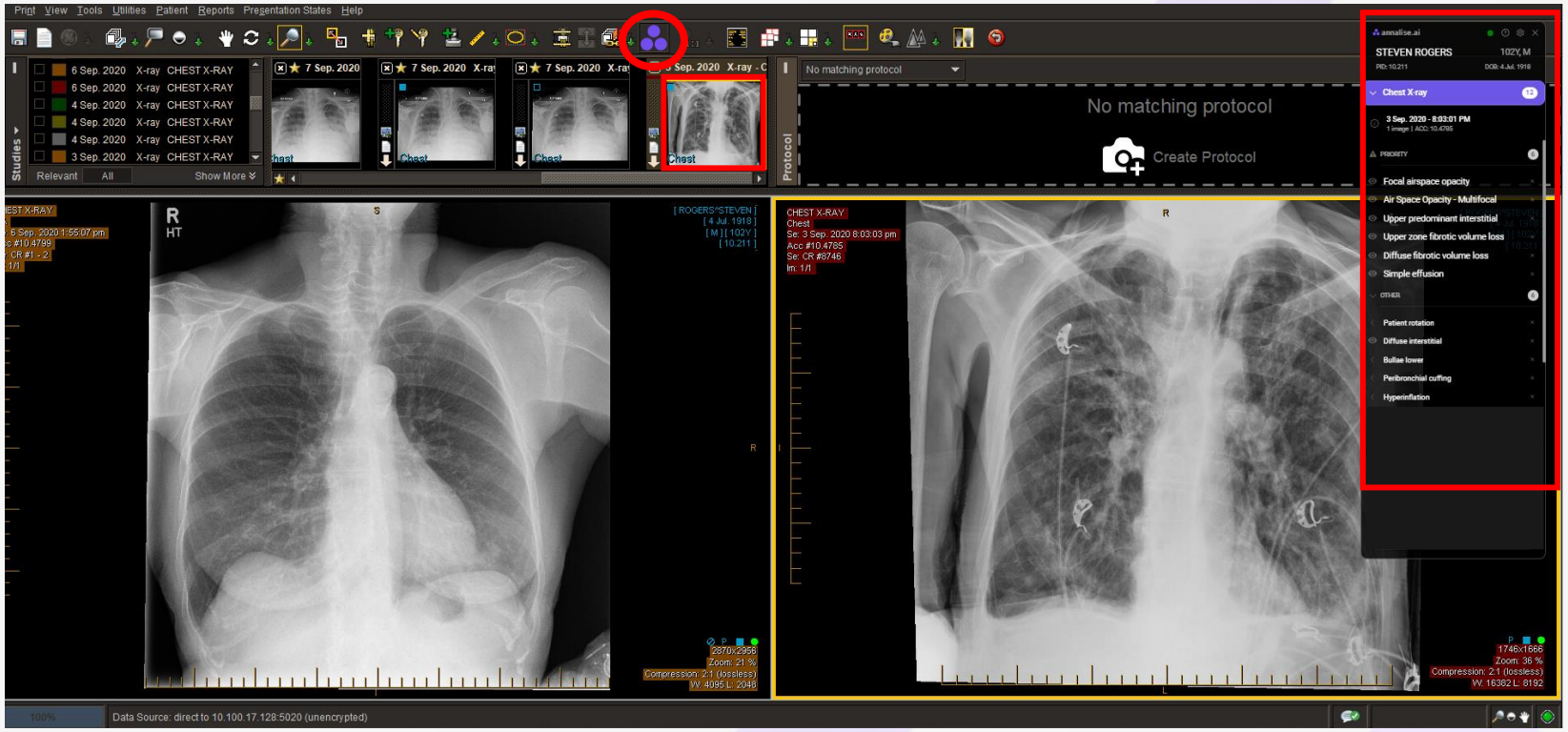
Module 3 – Review Findings Synchronisation Feature

The Synchronisation button should be used when **loading other cases for the same patient**. When switching between different cases, the application will **not** automatically update with the new AI findings.

Once you have selected the other case, click the synchronisation button in the PACS toolbar to update the Annalise CXR results.

The Annalise CXR Viewer will then update the AI findings for the other CXR study.



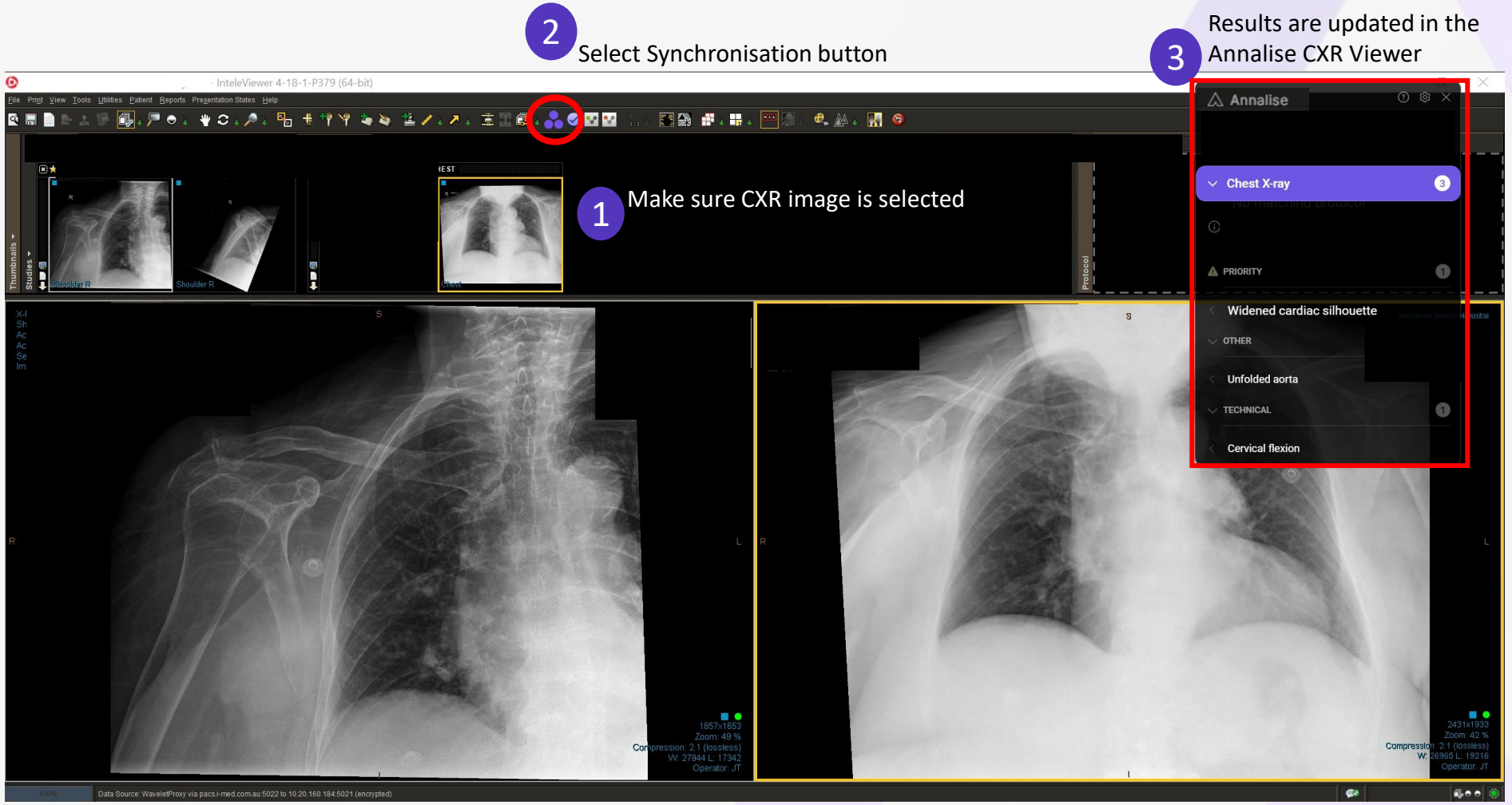
Module 3 – Review Findings
Multiple Studies

The Synchronisation button should be used when **loading other cases for the same patient**. This includes when you have a CXR and another body part or modality.

In this case, the application will **not** automatically update with the CXR AI findings if it is not the first series displayed.

Once you have selected the CXR, click the synchronisation button  in the PACS toolbar to update the Annalise CXR results.

The Annalise CXR Viewer will then update the AI findings for the CXR study.



Module 4 – Interpreting Findings Learning Outcomes

At the conclusion of this training module, you should be able to demonstrate a satisfactory understanding of:

- ✓ How the operating point threshold adjusts for sensitivity and specificity for each finding;
- ✓ How the operating point threshold is adjusted for findings to deliberately overall certain critical findings;
- ✓ How to interpret the Confidence Bar for each finding;
- ✓ How to use Annalise CXR in a differential diagnosis.

Module 4 – Interpreting Findings
Operating Point Threshold

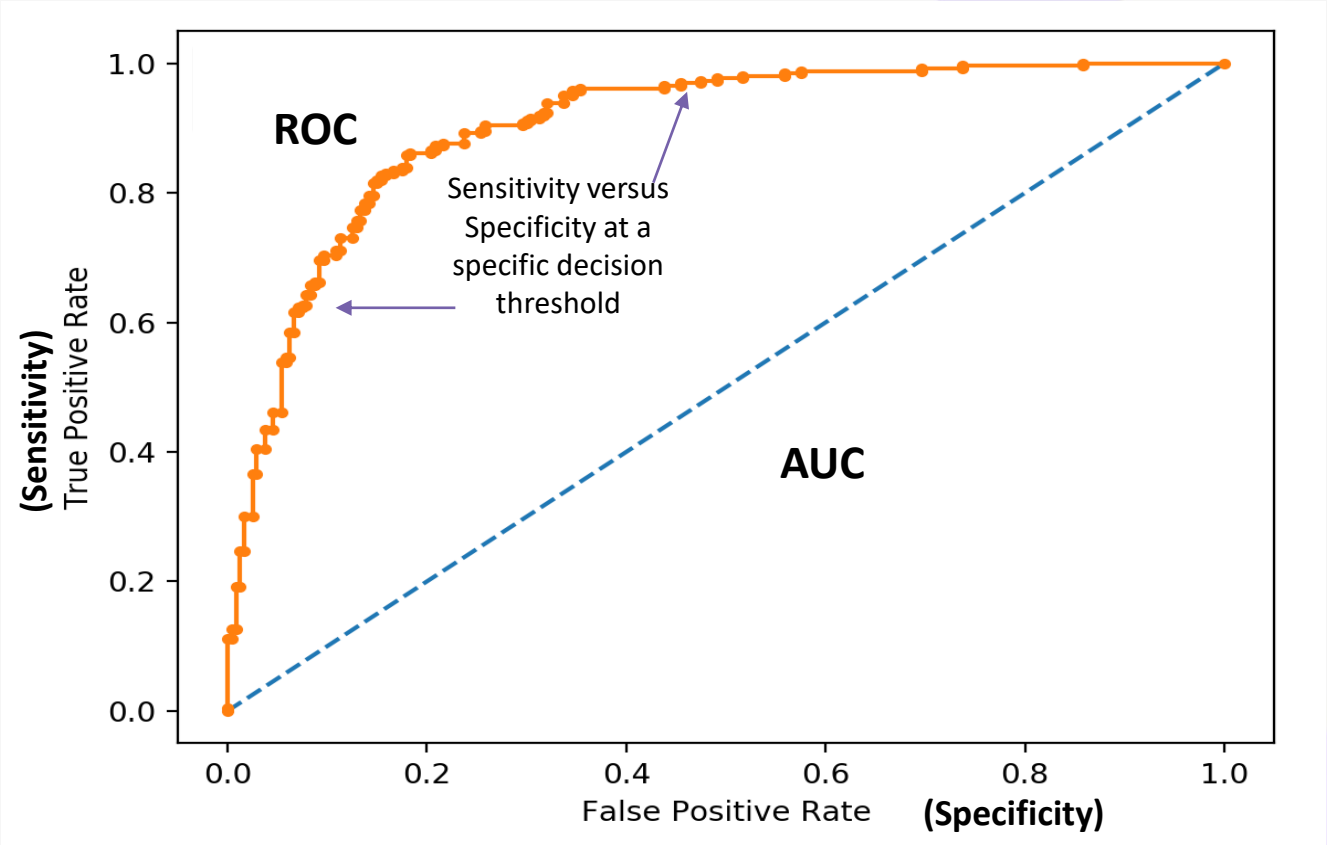
Receiver Operating Characteristic Curve (ROC) is a performance measurement of an algorithm at various threshold settings

ROC curve plots two parameters – True Positive Rate (Sensitivity) v False Positive Rate (Specificity) for each individual finding

Each point on an ROC curve is termed an operating point. This represents one particular threshold and a corresponding tradeoff between **sensitivity** and **specificity**.

For each finding, a specific threshold value must balance the sensitivity and specificity of accurately detecting the finding. This is known as the **Operating Point Threshold**

Modification of the Threshold will occur prior to first clinical use and will be done in consultation with the Annalise CXR Lead in your organisation.



Module 4 – Interpreting Findings
Overcalling Findings

In some instances, you may notice a particular findings is being overcalled.

This depends on where the operating point has been set for certain findings which, can be adjusted at any time.

In certain critical findings, the operating point has been deliberately set with a higher sensitivity to ensure these findings are not missed in clinical practice. However, this may result in some false positive findings. Examples of those findings that have been set with a greater sensitive threshold include:

- ✓ Pneumothorax
- ✓ Long Nodules
- ✓ Pleural effusions

If you think certain findings are being overcalled, please consult your Annalise CXR Lead Radiologist inside your organisation.

Some findings have a greater sensitive threshold to ensure these findings are not missed eg pneumothorax. This may result in some false positives though.

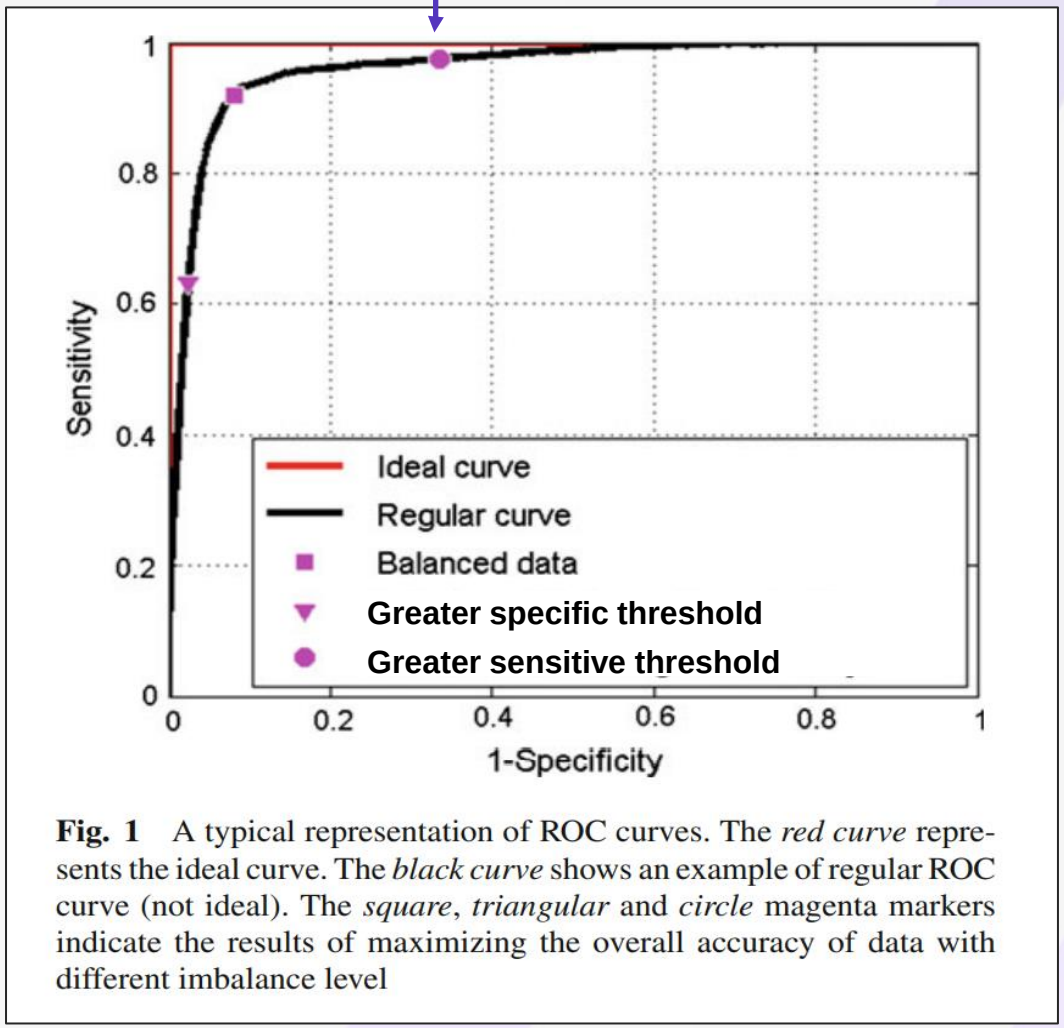
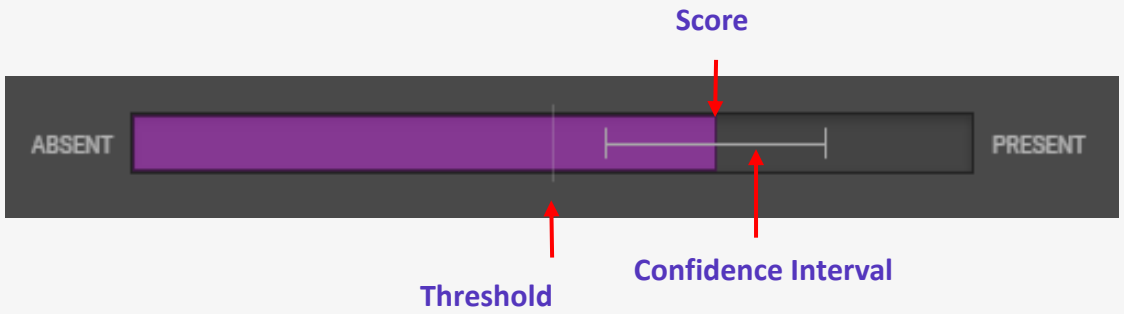


Fig. 1 A typical representation of ROC curves. The *red curve* represents the ideal curve. The *black curve* shows an example of regular ROC curve (not ideal). The *square*, *triangular* and *circle* magenta markers indicate the results of maximizing the overall accuracy of data with different imbalance level

Module 4 – Interpreting Findings
Confidence Bar

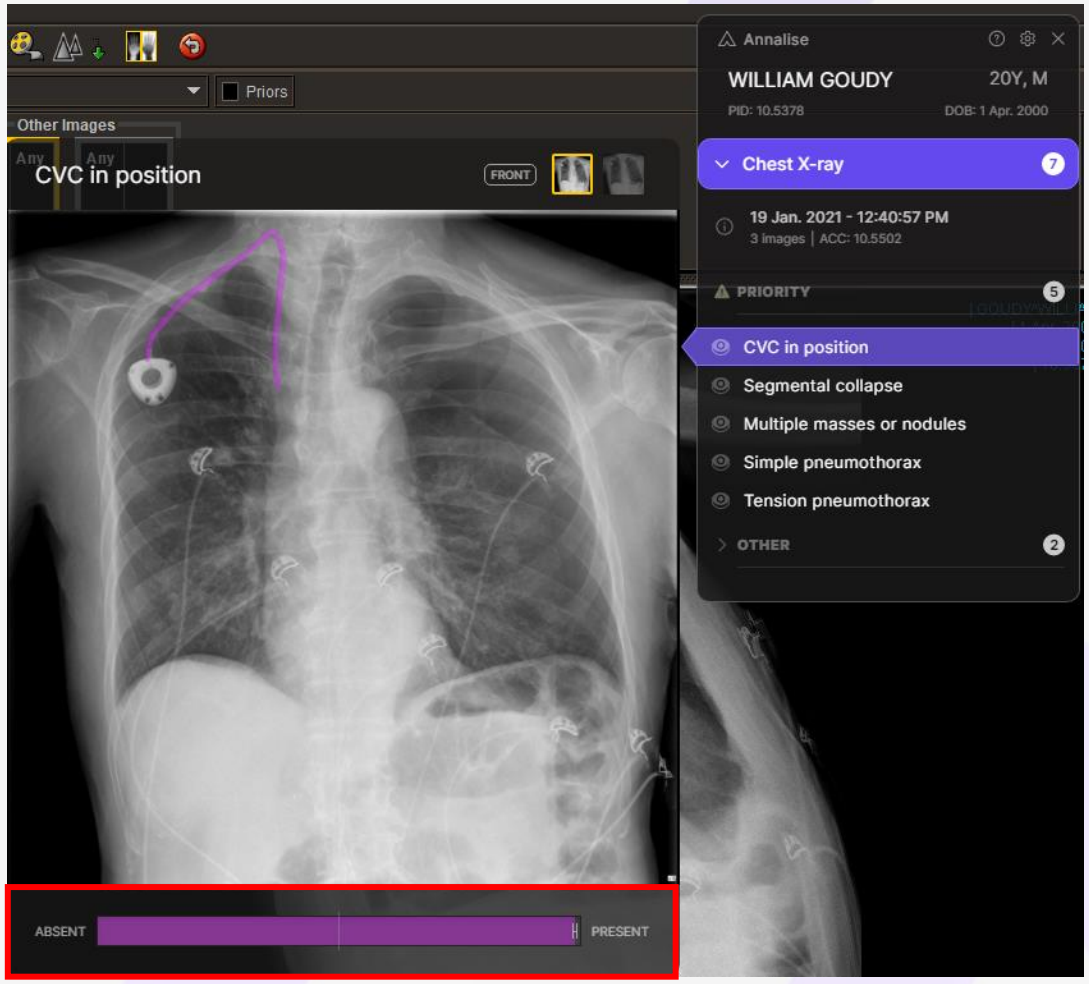


For each finding, a confidence bar is displayed at the bottom of the primary image. The confidence bar is a visual indication of the likelihood that a particular finding is present.

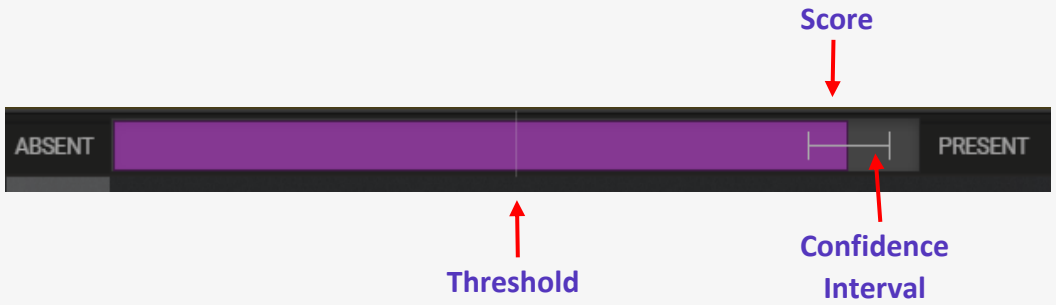
Each finding will have a confidence score if present. For a finding to be present, it must sit above a pre-defined organisational threshold.

Each AI finding will have a 95% confidence interval which gives an indication of the probability that the finding reported is a false positive ie not actually present in the image.

The confidence bar allows the user to graphically see the relationship between the score, the threshold and the 95% confidence interval.



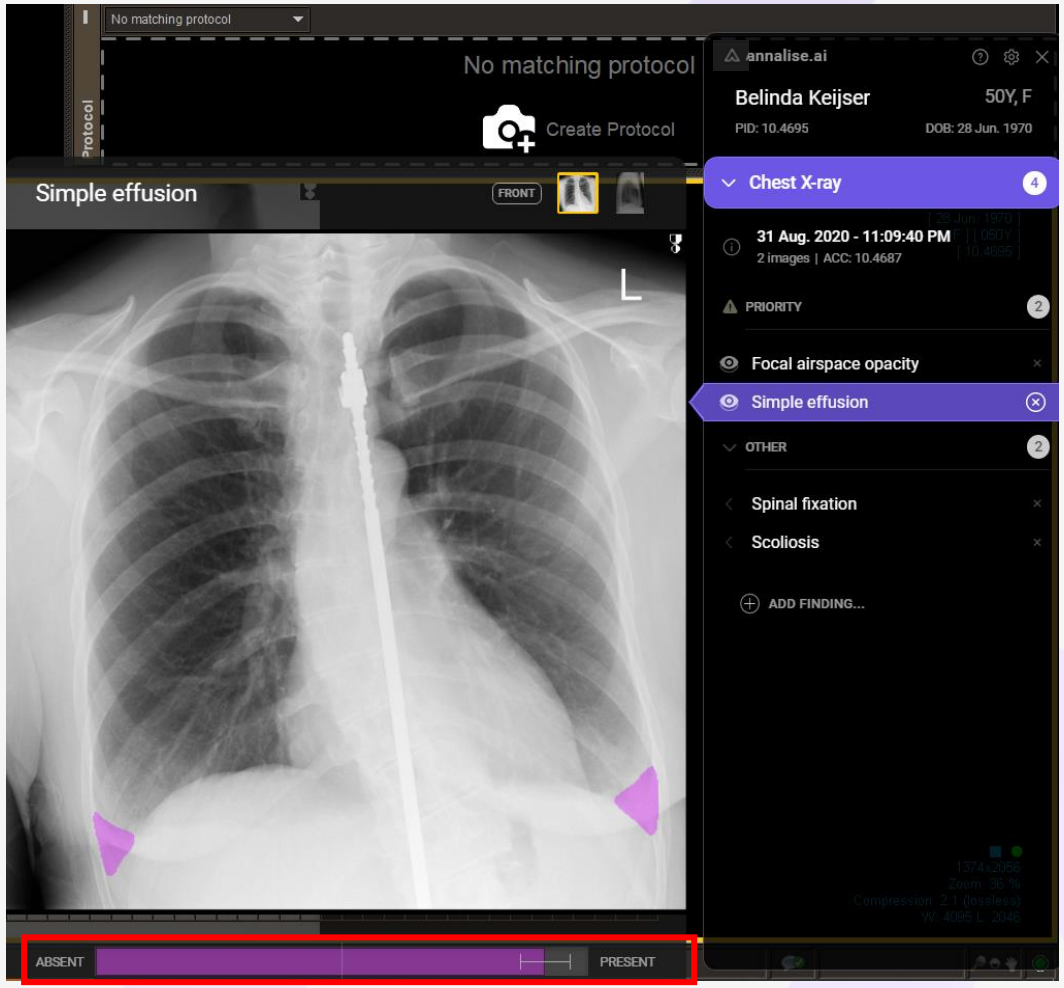
Module 4 – Interpreting Findings
Confidence Bar



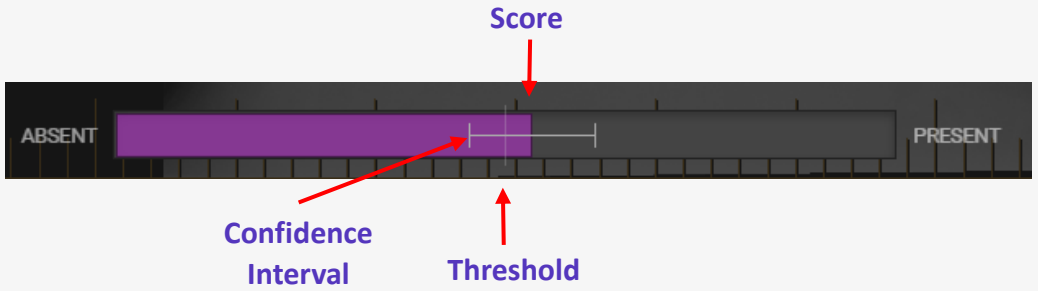
In this example, there is High Confidence that a Simple effusion is present within the image because:

- The Score is **above the Threshold**
- The **Confidence Interval** is above the Threshold

Therefore, the finding of “Simple Effusion” is most likely present in the image.



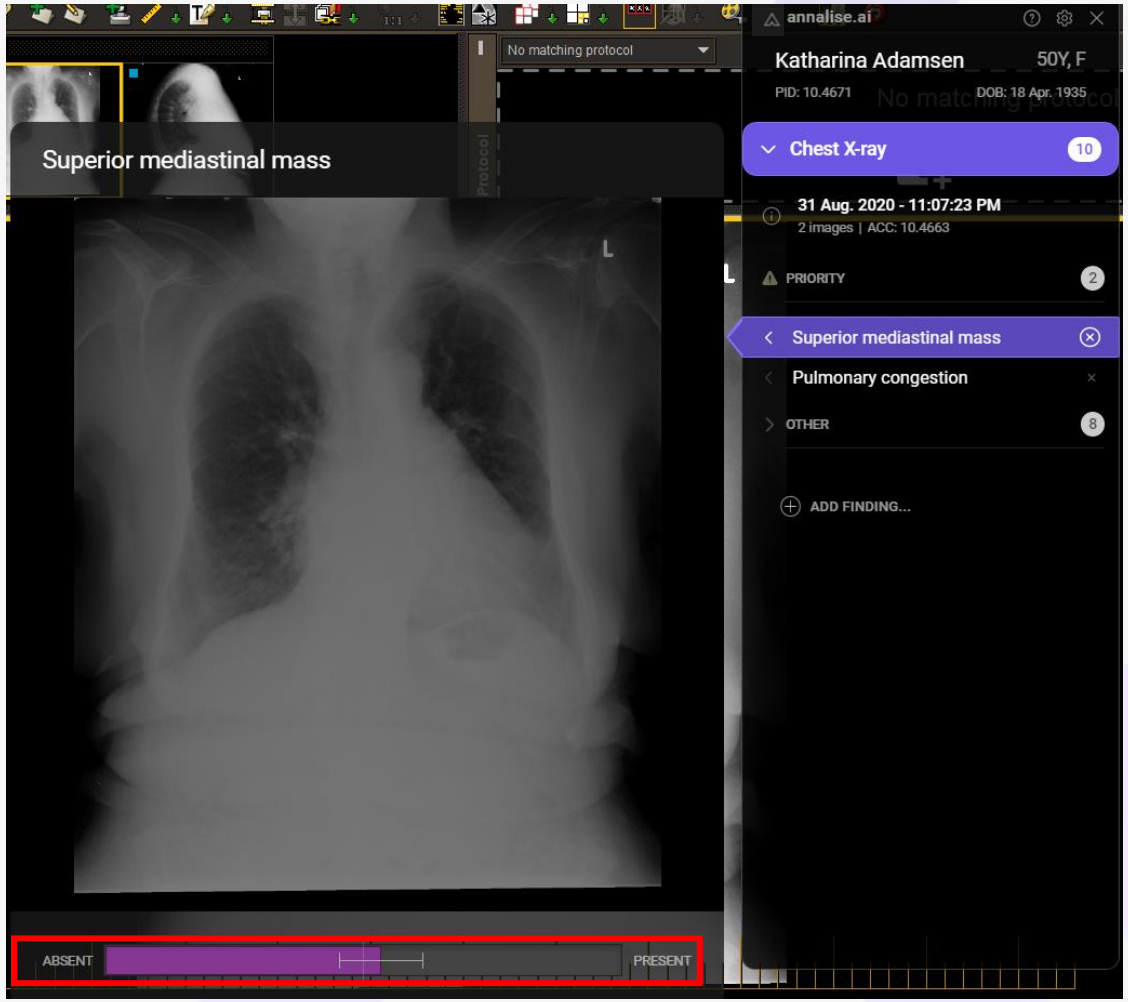
Module 4 – Interpreting Findings
Confidence Bar



In this example, there is **Lower Confidence** that a Superior mediastinal mass is present within the image because:

- The Score is slightly **above the Threshold**
- The lower border of the confidence interval is **below the finding threshold**

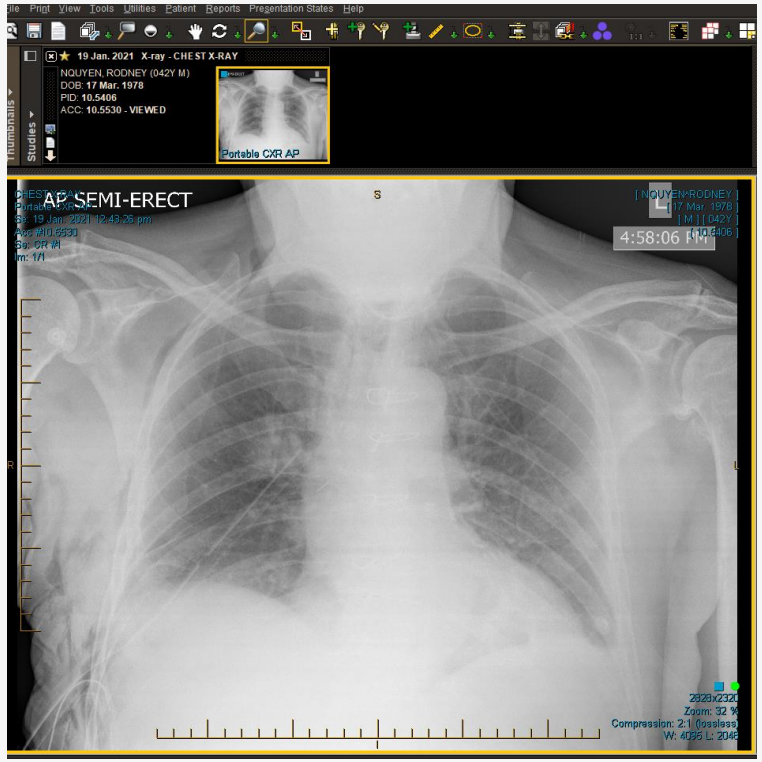
Therefore, the finding of “Superior mediastinal mass” may be present within the image ie there is more uncertainty as to whether this finding is in fact present



Module 4 – Interpreting Findings
Differential Diagnosis

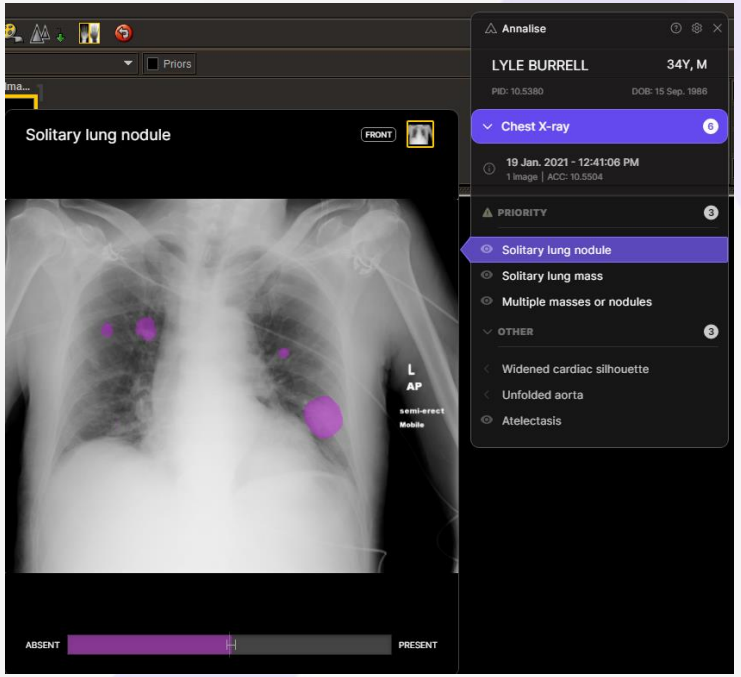
The Annalise CXR Viewer may display multiple findings with varying degrees of confidence for the same ROI. This is no different to clinical practice where a differential diagnosis is required.

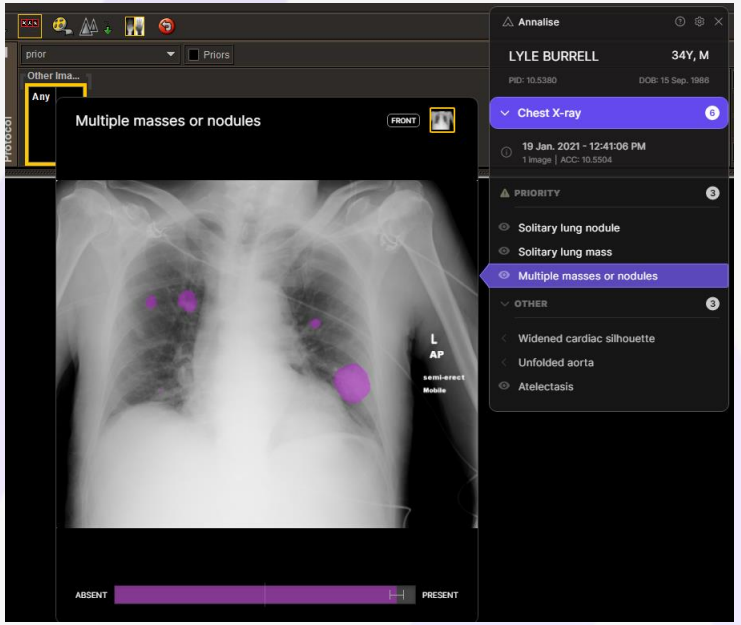
In these instances, it is important to **use your clinical judgement combined with the findings to determine a differential diagnosis.**



In this example, the Viewer displays a number of findings for the same ROI. In this example, the findings show to be either a solitary long nodule, solitary lung mass or multiple masses or nodules, with the latter showing a high degree of confidence.

Clinical judgment should be combined with the findings to determine which is the most accurate finding

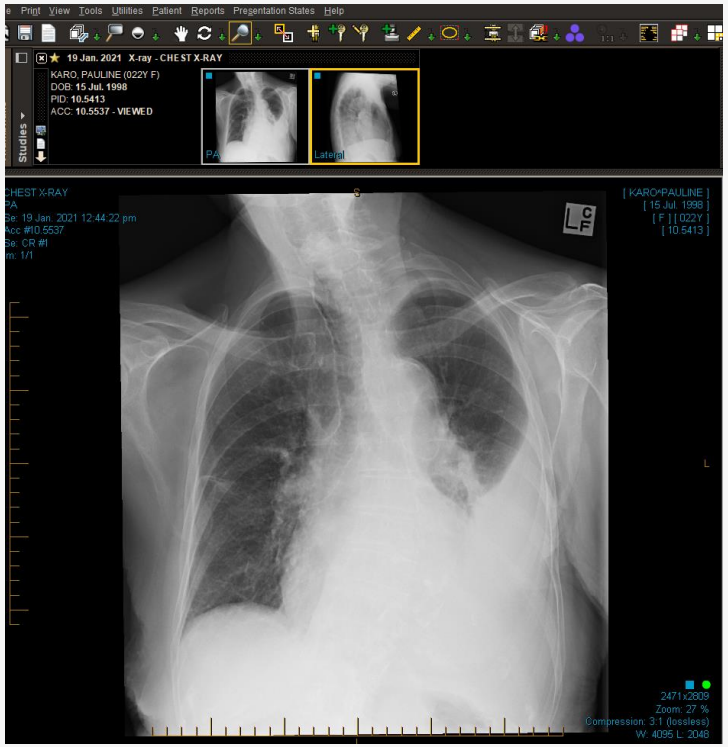




Module 4 – Interpreting Findings
Differential Diagnosis

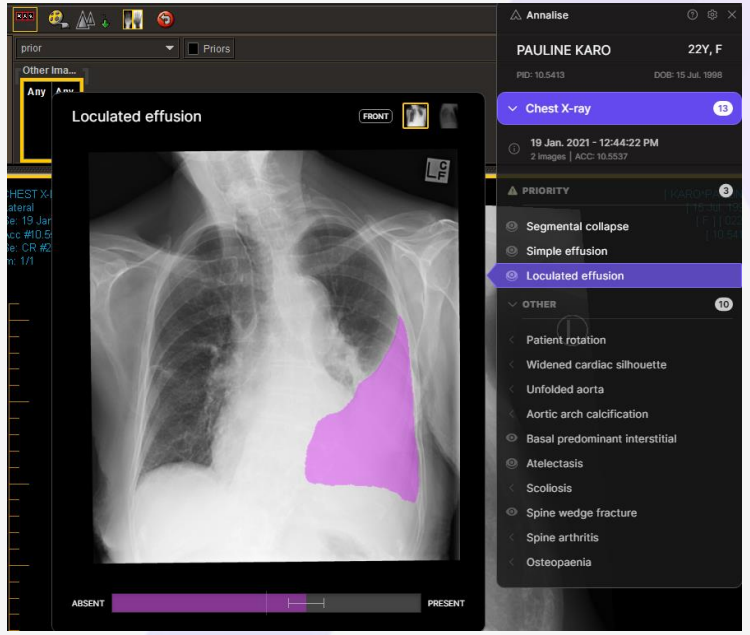
The Annalise CXR Viewer may display multiple findings with varying degrees of confidence for the same ROI. This is no different to clinical practice where a differential diagnosis is required.

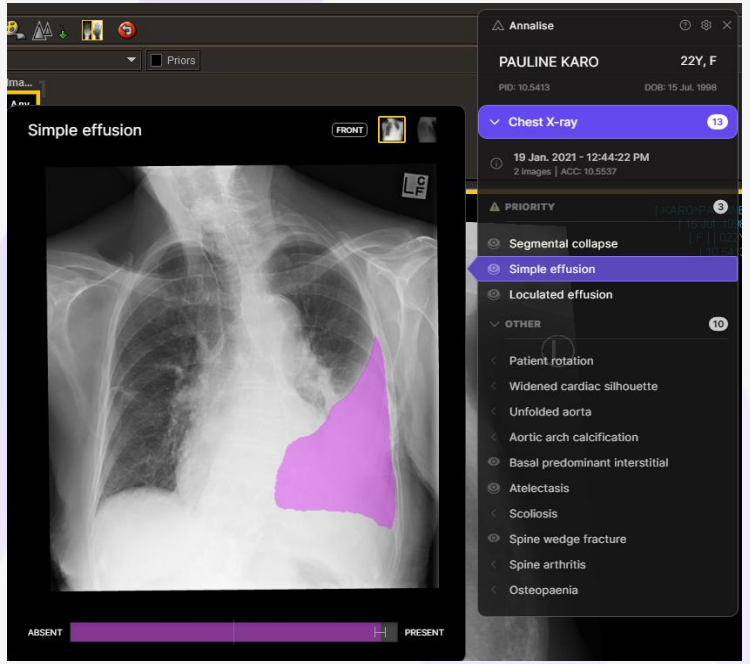
In these instances, it is important to **use your clinical judgement combined with the findings to determine a differential diagnosis.**



In this example, the Viewer displays a Simple Pleural Effusion with a low degree of confidence and a Loculated Effusion with a high degree of confidence.

Clinical judgment, based on patient history should be combined, along with the findings, to determine which is the most accurate finding





Module 5 – Troubleshooting Learning Outcomes

At the conclusion of this training module, you should be able to demonstrate a satisfactory understanding of:

- ✓ Various issues you may encounter using the Annalise CXR Viewer and ways to resolve those issues.

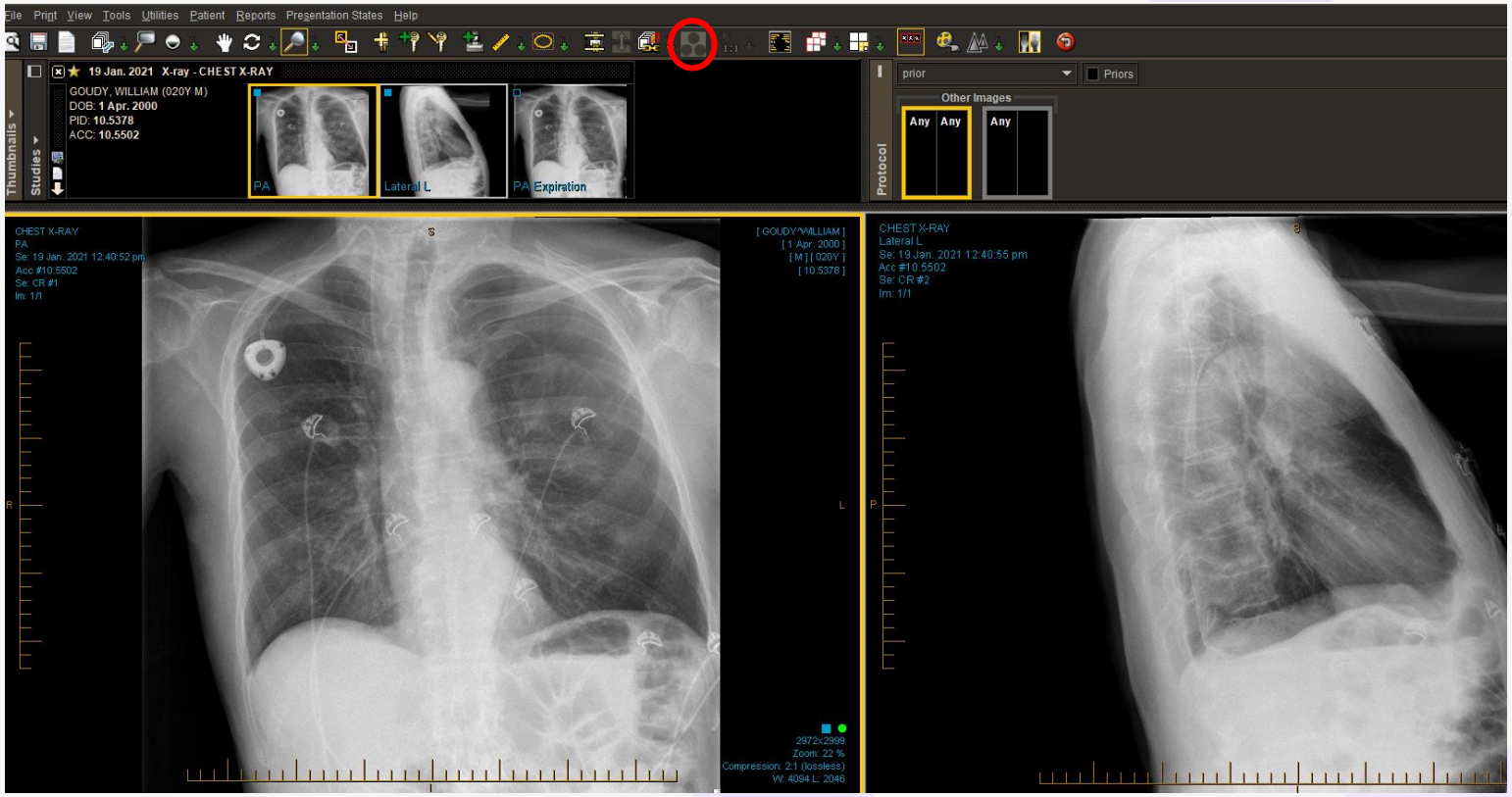
Module 5 – Troubleshooting
Annalise icon is not present

Problem: When you load a CXR study to PACS, the Annalise icon may not be present in the InteleViewer toolbar or it may appear greyed out (example shown).

The Annalise icon may not be present if it has not been installed on a particular workstation.

Alternatively, the icon may appear greyed out if the Annalise application is not enabled for a particular user.

Solution: Please contact your **Internal IT Support Team.** A PACS Administrator may need to enable your user profile or investigate any configuration issues.



Module 5 – Troubleshooting
Application does not launch

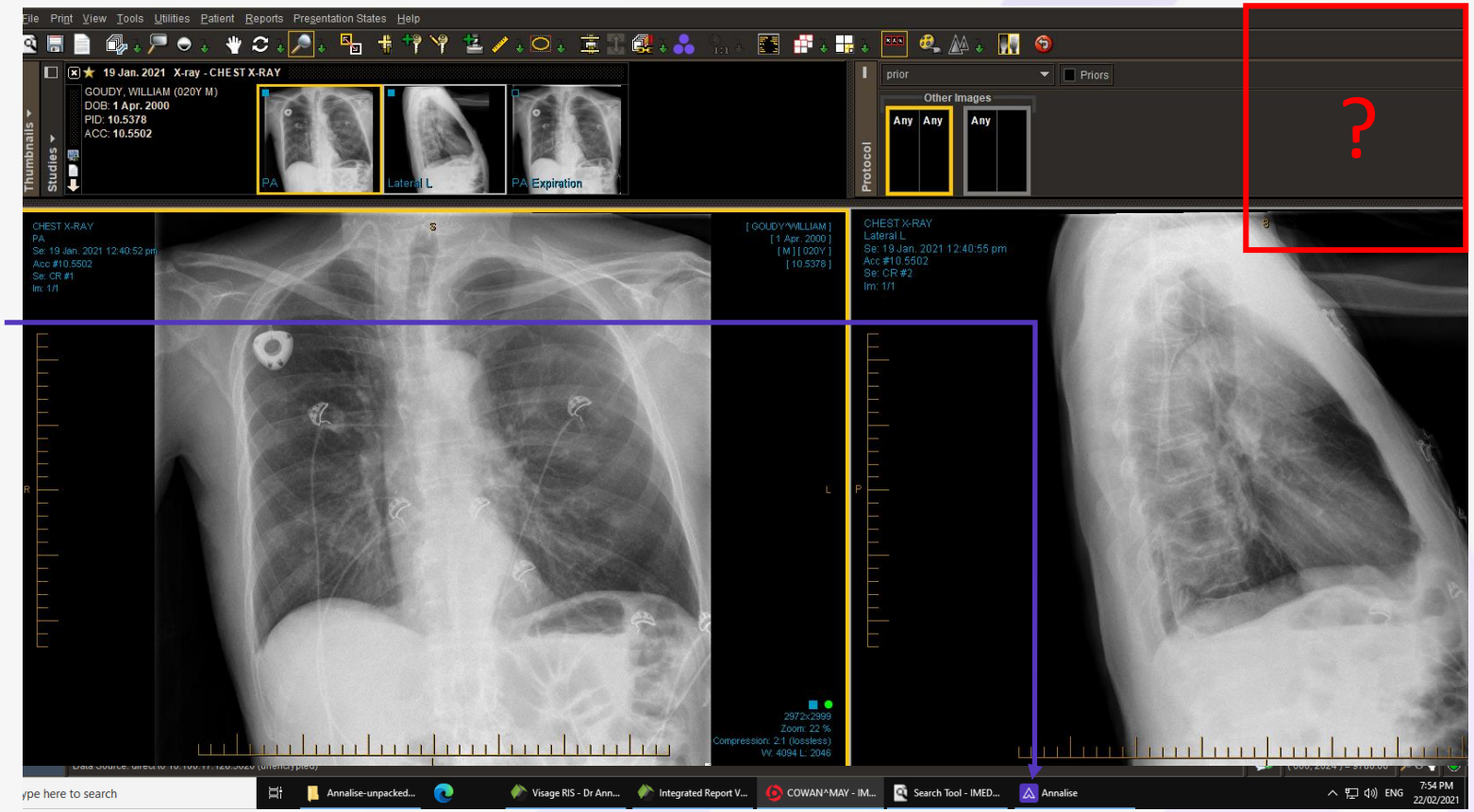
Problem: When you load a CXR study to PACS, the application may not appear or launch.

If you do not see the application launch, when you believe it should have processed the CXR examination, there may be some issues.

Solution:

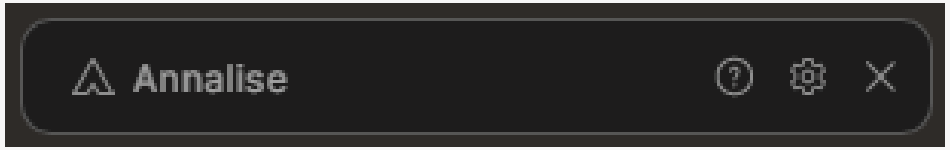
- Check to see if Annalise is open in your Windows toolbar as you may need to click and restore it from there
- Manually select the Annalise icon to try to launch the CXR Viewer.
- Try to launch another CXR examination from a different patient.

If the issue persists, please contact your Internal IT Support Team.



Module 5 – Troubleshooting
Application is Unresponsive

Problem: In some instances, when you load a study into PACS, the application may not respond and simply displays the following image in the Viewer pane:



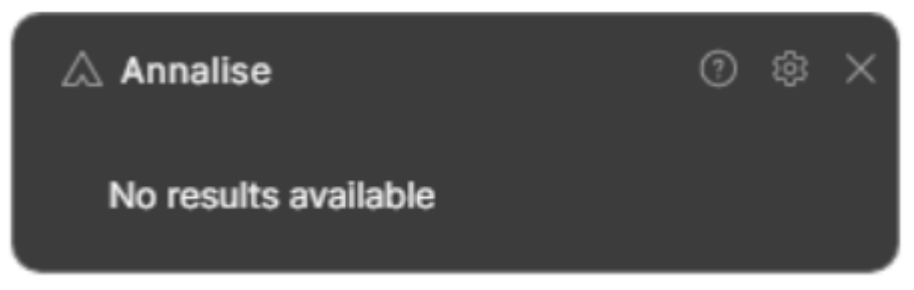
Solution: To resolve this issue, there are a number of different things you can try, including:

1. Check the study is either CR or DX;
2. Check the version of PACs viewer is compatible with the Annalise CXR Viewer (InteleViewer version 4.18.1-P308 or later);
3. Quit the Annalise CXR Viewer, and re-open. Make sure that you have Right clicked and closed any running instances of the Annalise application before attempting to launch the application;
4. Attempt to reload the study from the RIS to PACS.

If you still experience issues, please contact your Internal IT Support Team for additional assistance.

Module 5 – Troubleshooting
No Results Available

Problem: When you load a study in the PACS viewer, the following message may display in the viewer:



Root Cause: There may be 2 reasons for this:

1. Is this a multiple study instance with other examinations other than a CXR? Be sure to select the Synchronisation button when viewing the CXR – refer to page 21 of this training presentation for more information.

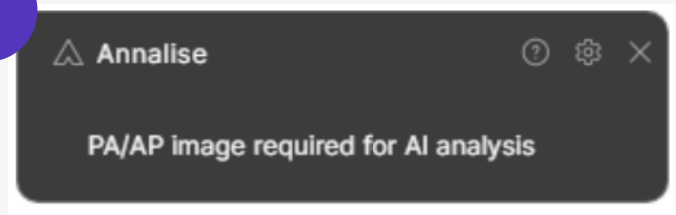
2. If this message remains, this could be an issue connected to the routing of the CXR images from the PACS.

if you believe that the images should have been processed by the application, please contact your **Internal IT Support Team**

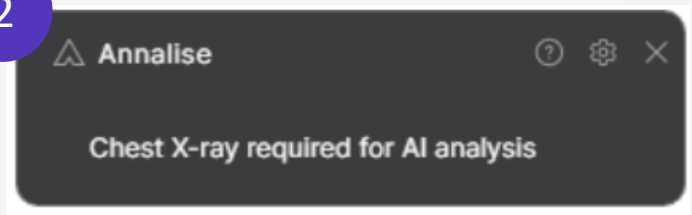
Module 5 – Troubleshooting
Out of Scope Study

Problem: When you load a study in the PACS viewer, in some instances, you may see one of the following errors in the Annalise CXR Viewer.

1



2



Solution: In these instances, the study does not meet the minimum requirements for AI processing:

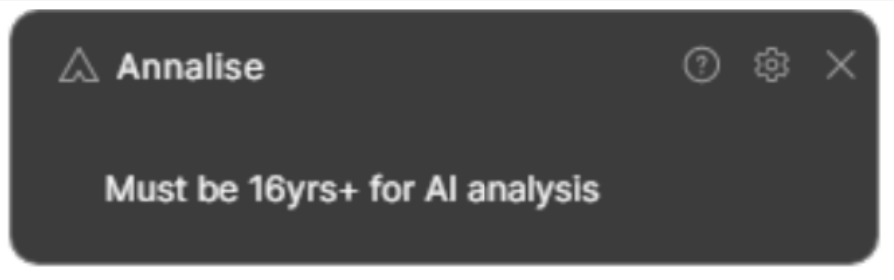
At least one PA or AP image needs to exist in the study.

Annalise CXR only supports studies containing Chest X-Rays;

AI models have some error margin which means on rare occasions, the Annalise CXR Viewer will not recognise a chest x-ray and may also show this error message.

Module 5 – Troubleshooting
Out of Scope Study

Problem: When you load a study in the PACS viewer, in some instances, you may see one of the following errors in the Annalise CXR Viewer.

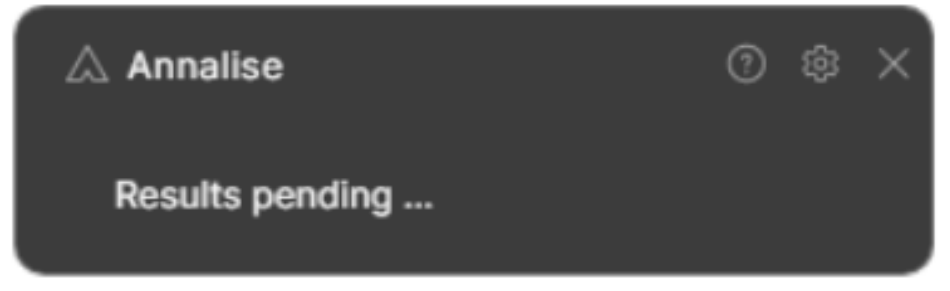


Solution: In these instances, the study does not meet the minimum requirements for AI processing:

Annalise CXR only supports studies for patients at least 16 years of age as determined by the DICOM tags of the study.

Module 5 – Troubleshooting
Not Processing, “Results Pending”

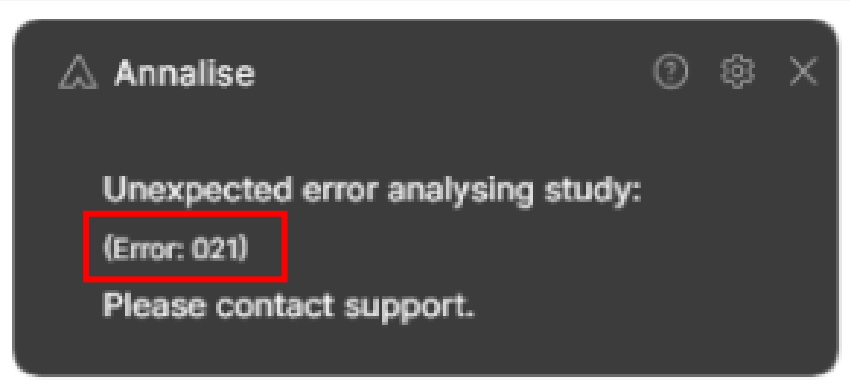
Problem: When you load a study in the PACS viewer, you may see the following messages in the Annalise CXR Viewer.



Solution: The study is currently being analysed. The application will wait for up to 1 minute for results. If problem persists, please contact your Internal IT Support Team .

Module 5 – Troubleshooting
Error Messages

Problem: You may see any one of the following error messages (Error 001, 002, 003, 009, 010, 011, 014, 015, 016, 020, 099) in the Annalise application.



Solution: In this instance, please take note of the Error code and contact your Internal IT Support Team

Customer Support

Please raise the appropriate support request when assistance is required

Technical

For all technical enquiries, please contact your

Internal IT Support Team

This includes technical issues such as:

- Error codes
- No results available
- Network issues

Your **Internal IT Support Team** is best placed to resolve these issues in a timely manner

Applications Support

For applications support & product feedback, contact

Annalise Customer Support

1300 345 141

support@annalise.ai

Customer Support Form
https://annalise.ai/contact/customer-service/

annalise.ai

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