

CT Coronary Artery Calcium Scoring Workflow

VPMC-15837 E

CACS

Overview:

- ▶ This application allows the user to analyze coronary artery calcification and provide quantitative analysis. It does not correspond directly to the percentage of narrowing in the artery but does correlate with the severity of underlying coronary atherosclerosis.
- ▶ Select protocol or Application V-Score and load selected cardiac phase
- ▶ Perform 2D Overview
- ▶ Review Study Quality
- ▶ Quantify calcium burden based on artery
- ▶ Create snapshots and batch reformats
- ▶ Export Findings

CT CACS - Load the Study

Select the Patient.

Double click to select the application or single click on thumbnail and click on the open button.

OR

The series are located below the applications. Choose the desired series. Double click the **VScore** Application.

The screenshot displays the CT CACS software interface. At the top, a table lists patients. A red arrow points to the patient 'CARDIAC CACS 550'. Below the table, the 'Applications' tab is active, showing a grid of application thumbnails. The 'VScore' application is highlighted with a red box. Below the applications, a row of image series is shown, including 'Axial//FC12/ 24/47', 'SHARP//FC05/ 157/313', and 'STENT//FC50/ 157/313'. A red arrow points to the 'Open' button at the bottom right.

Patient	Gender	Study	Modality	Series	Date	Time	Analysis	Age	Actions	
CARDIAC CACS	M	UMP80-CUH-148	CT, OT	212	14 Mar 2018	...	PRIMESP_CAR...	CANON CACS ANALYSIS	38y	[Link]
CARDIAC CACS 550	M	IM80-CUH-128	CT, SR	676	12 May 2016	...	PRIME_CARDIAC	RSNA 2019 CANON CACS ANALYSIS	36y	[Link]
CARDIAC CACS CTA	F	CA1V-CV-181	CT	563	10 Jul 2018	...	ONEV_CARDIAC	CANON CACS & CARDIAC ANALYSIS LAD	38y	[Link]
CARDIAC CACS PROSP PLAQUE	M	UA1G-CV-382	CT	54	28 Sep 2018	...	GEN_CHEST	RSNA 2019		[Link]
CARDIAC CFA 15YO FIRST	F	UA1G-PCV-137	CT, SR	7046	05 Feb 2018	...	GEN_PEDS	RSNA 2019 CANON CFA MINOR EDITS TO SEGMENTATION	38y	[Link]
CARDIAC CFA PIQE	O	IA1P-CV-500	CT	8046	01 Jan 2000	...	PRISM_CARDIAC	PIQE		[Link]
Cardiac Coronary Subtraction	M	EA1G-CV-017	CT	847	14 Jun 2016	...	GEN_CARDIAC		66v	[Link]

Applications: Results Study Algorithm Processing

Pinned: Carotid, Multi Modality Viewer, Gallery, **VScore** (47), Cardiac Analysis Multi Vessel, Cardiac Analysis, Cardiac Functional Analysis, Multi Chamber Functional Analysis, TAVR Planning, EP Planning, Myocardial Perfusion, Coronary Subtraction, Coronary CTA, Lung Nodule Analysis, Lung CT

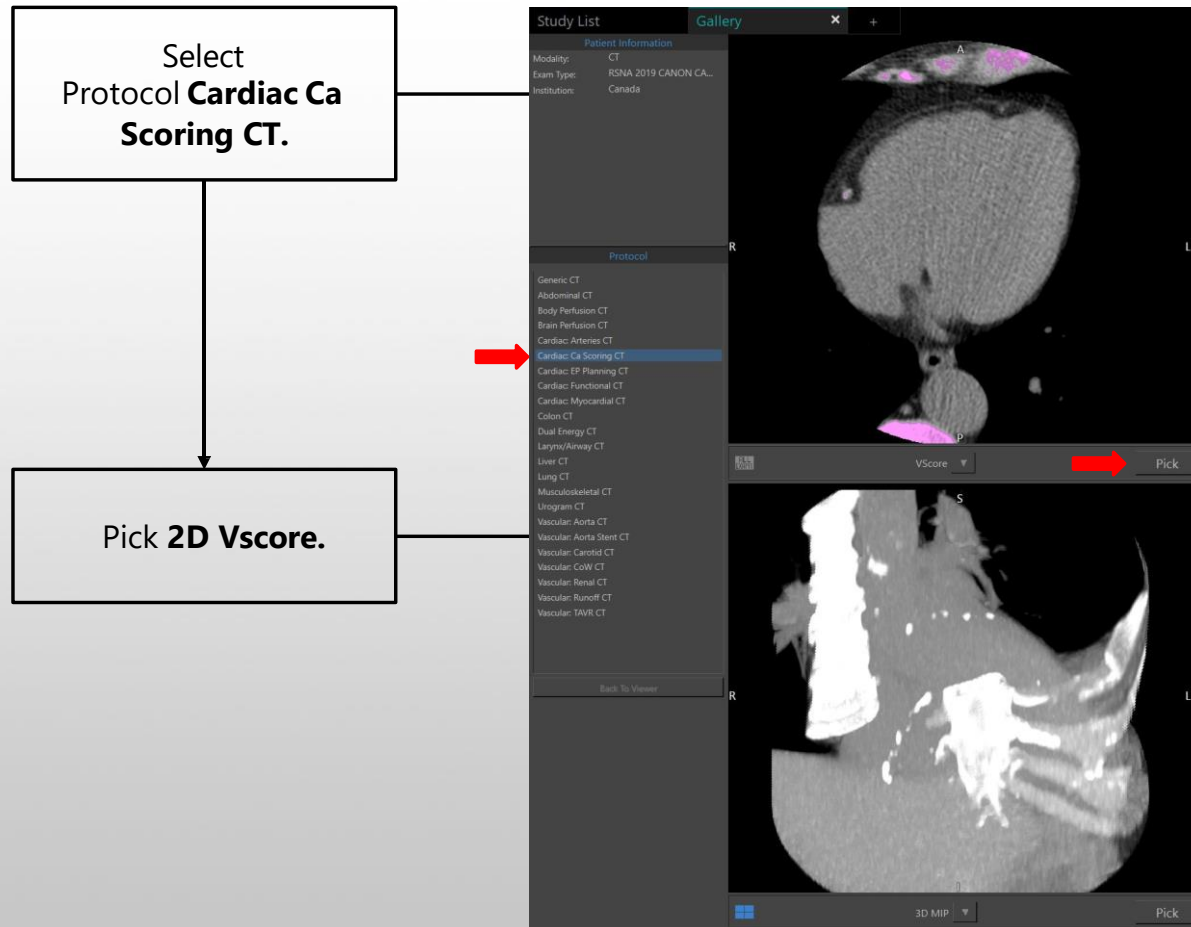
CARDIAC CACS 550 IM80-CUH-128 (M 36y) **CT,SR** 12 May 2016 10:08 RSNA 2019 CANON CACS ANALYSIS

Axial//FC12/ 24/47 SHARP//FC05/ 157/313 STENT//FC50/ 157/313

Tools | List | Images

Open

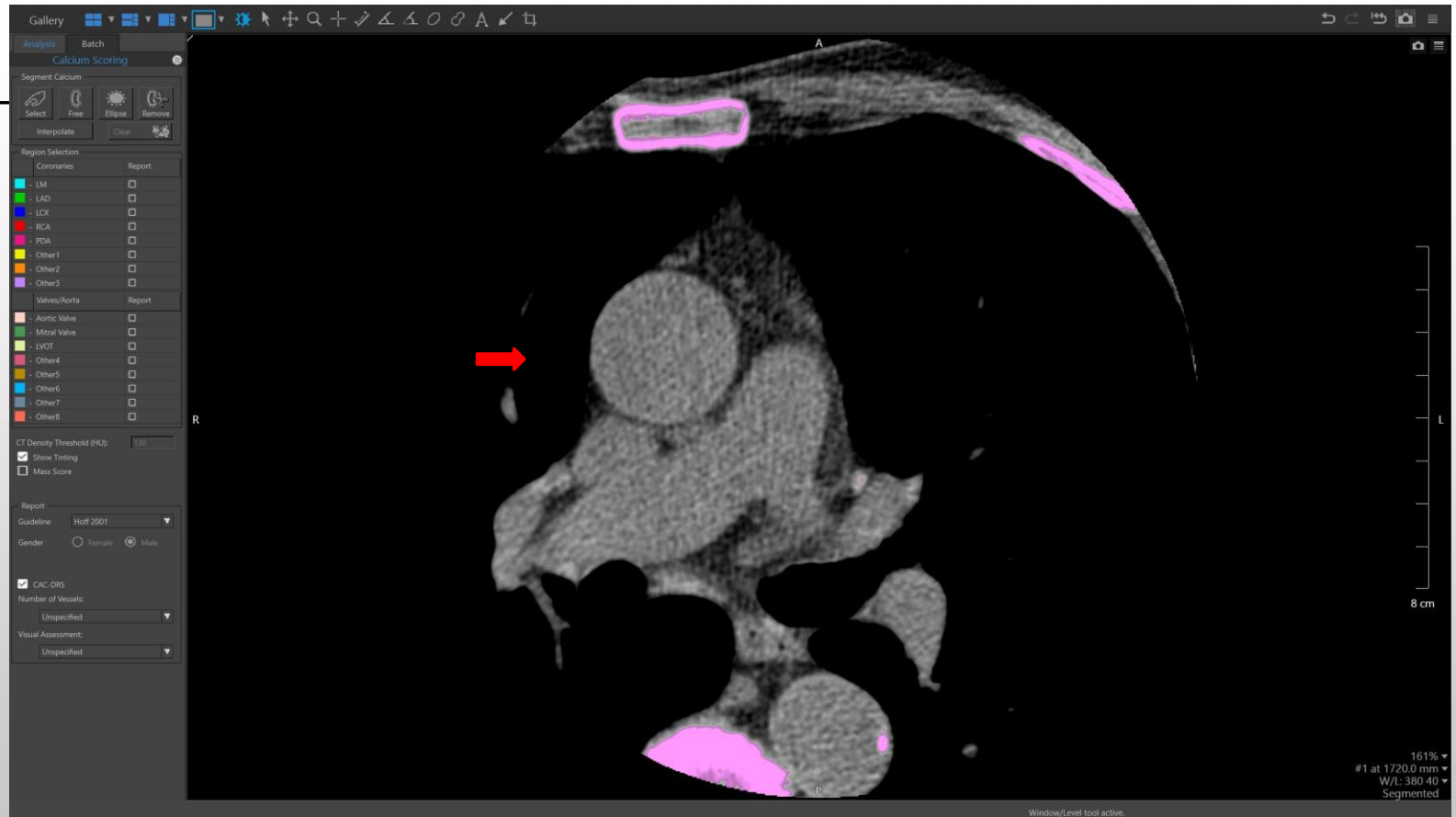
CACS - Load the study from Gallery



CACS - Review the study

Right Click and drag the mouse up and down to review the 2D images.

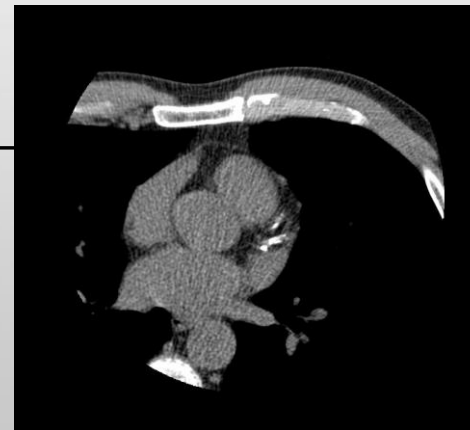
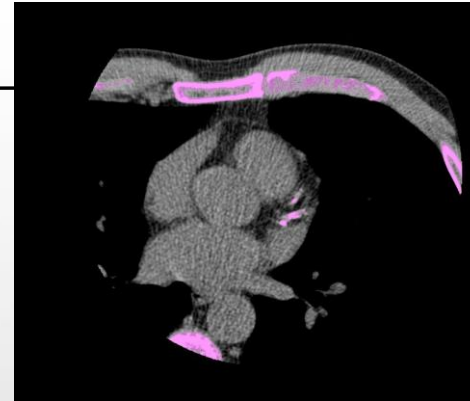
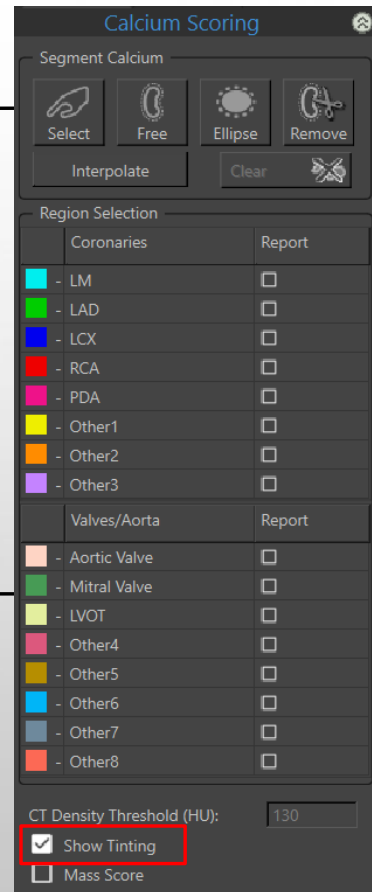
Tip: Review 2D anatomy and image quality.



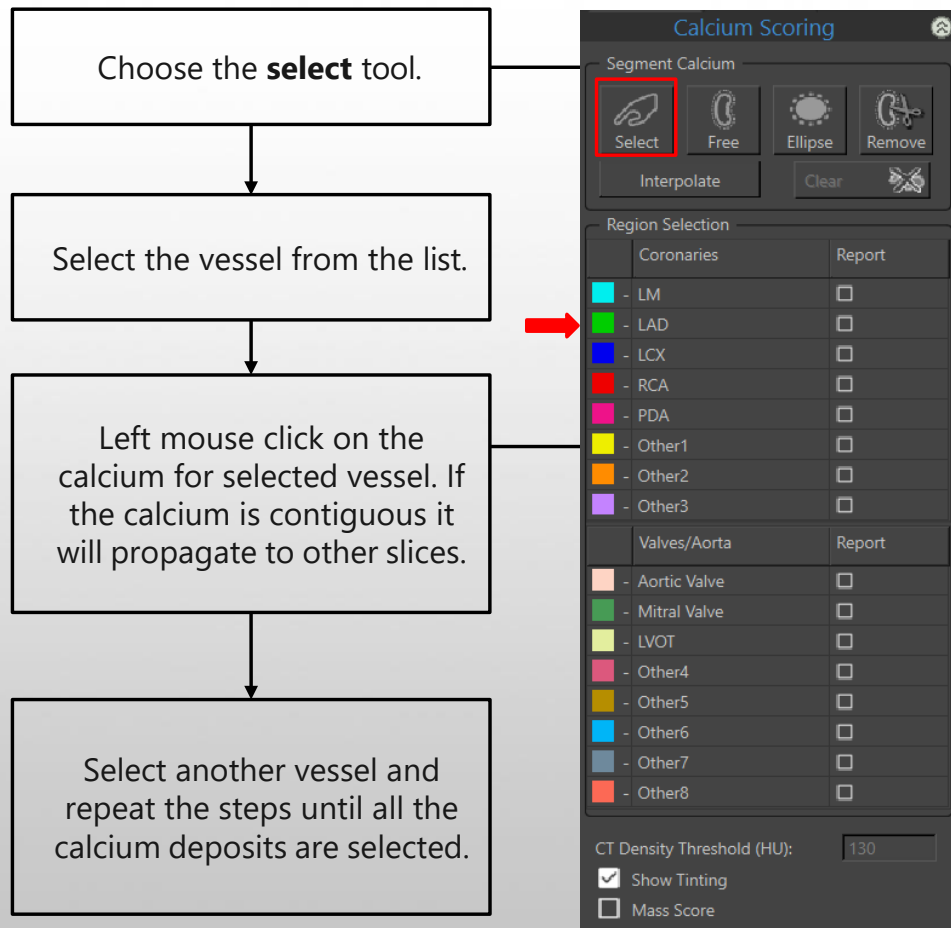
CACS - Show tinting

Locate the **Show Tinting** option. If this is checked, the pink overlay will show.

Uncheck the box to remove the tint.



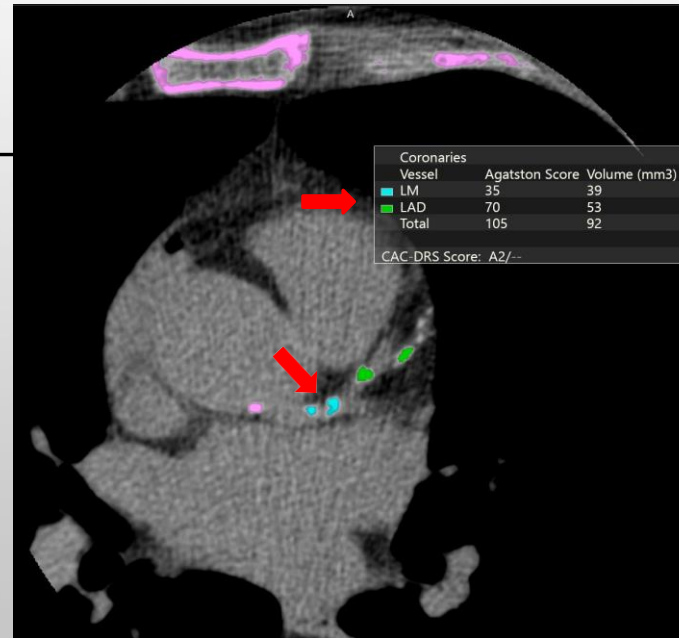
CACS - Quantify Calcium with Select



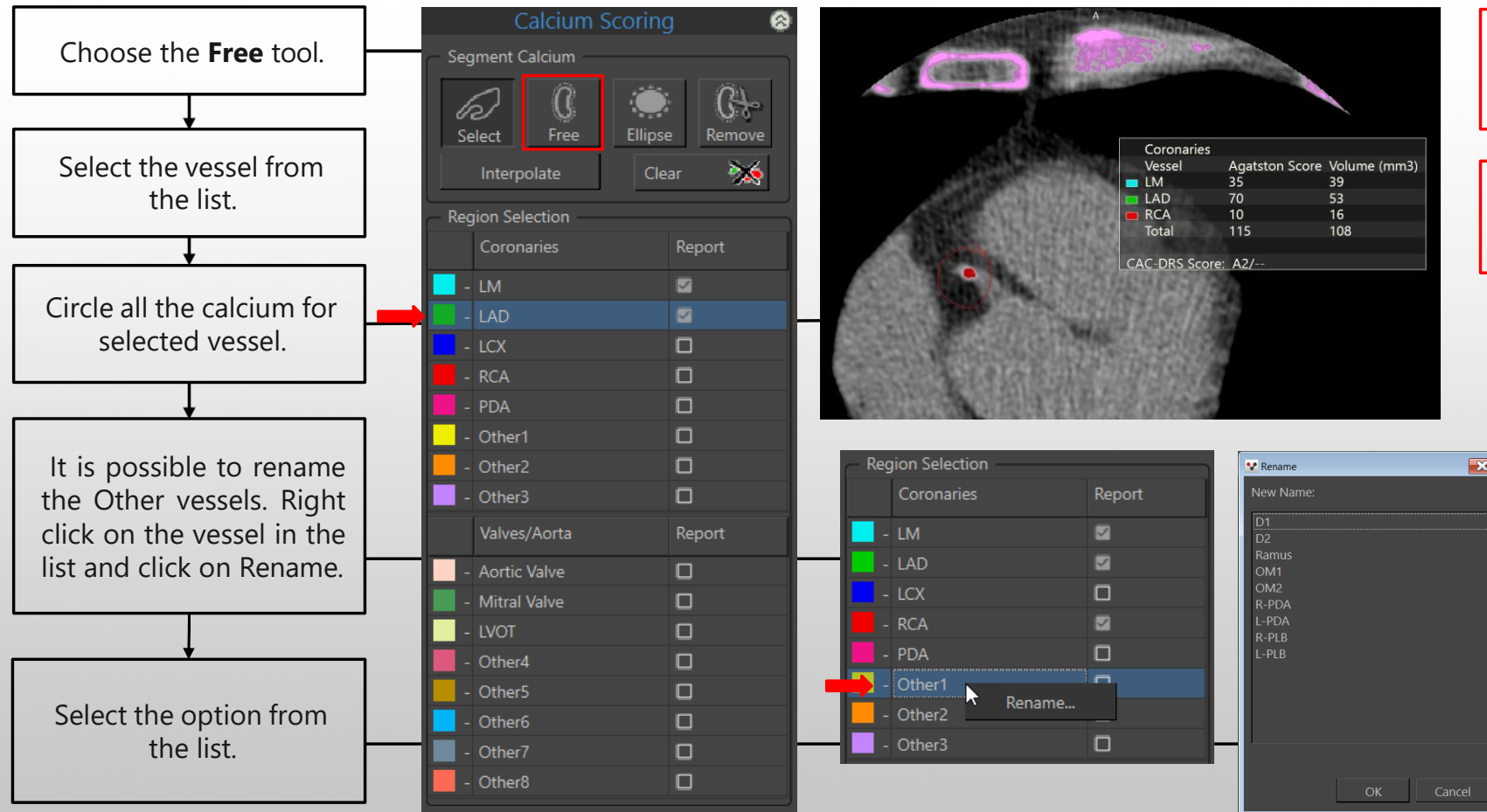
Tip: Use the select tool to identify a continuous cluster of calcium on multiple slices.

Note: The vessel order is more conducive to user workup for efficiency. The Pick Select tool is available by default.

Note: From V7.15.7 onwards it is possible to rename the "Other" vessels. Right click on the vessel name, click on rename, and select a vessel name from the list.



CACS - Quantify Calcium with Free ROI

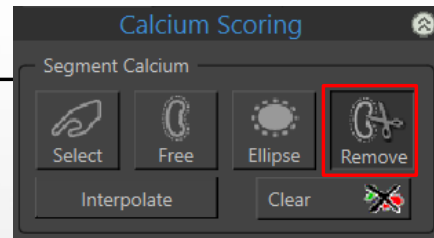


Tip: Circle calcium on each slice for all vessels.

Note: From V7.14 contours are visible on snapshots.

CACS - Remove Stents

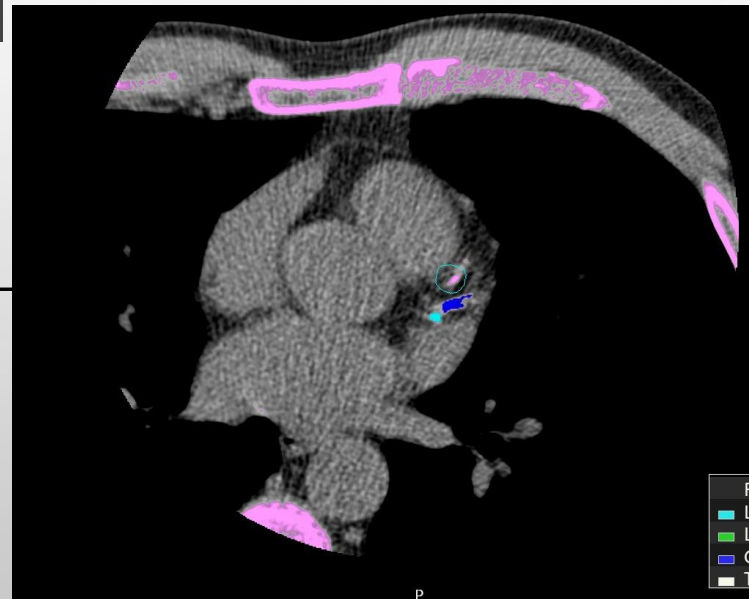
Choose the **Remove** tool.



Tip: Add labels with annotation tool for clarification.

A

Contour around the stent. The area within in ROI will be removed from the calculations.



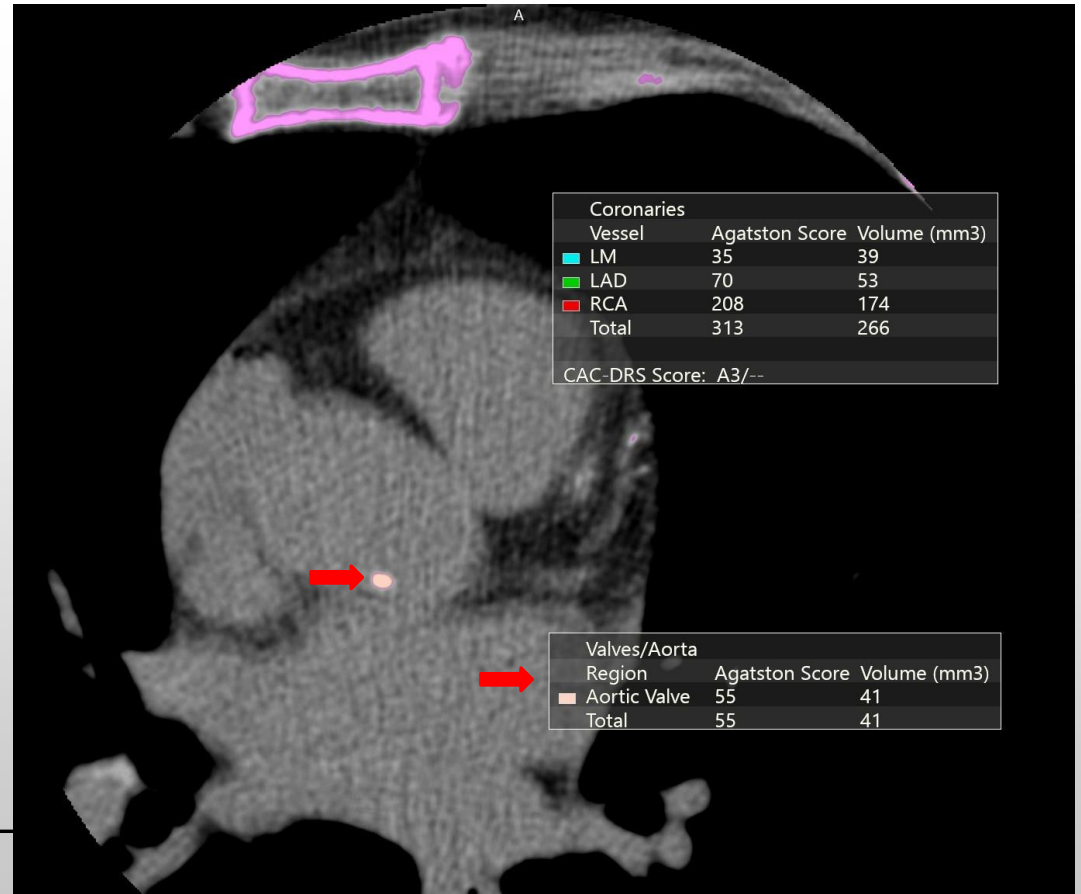
CACS - Quantify Calcium in the Valves or Aorta

Select the area to investigate from the list. If one of the Other options is selected, right click to rename the area.

	Valves/Aorta	Report
	- Aortic Valve	☐
	- Mitral Valve	☐
	- LVOT	☐
	- Other4	☐
	- Other5	☐
	- Other6	☐
	- Other7	☐
	- Other8	☐

With the Select tool active, click on the calcium in the valve/aorta to score.

A separate table, with the valve/aorta scores will populate.



CACS – Mass score

For mass score, check the box to activate.

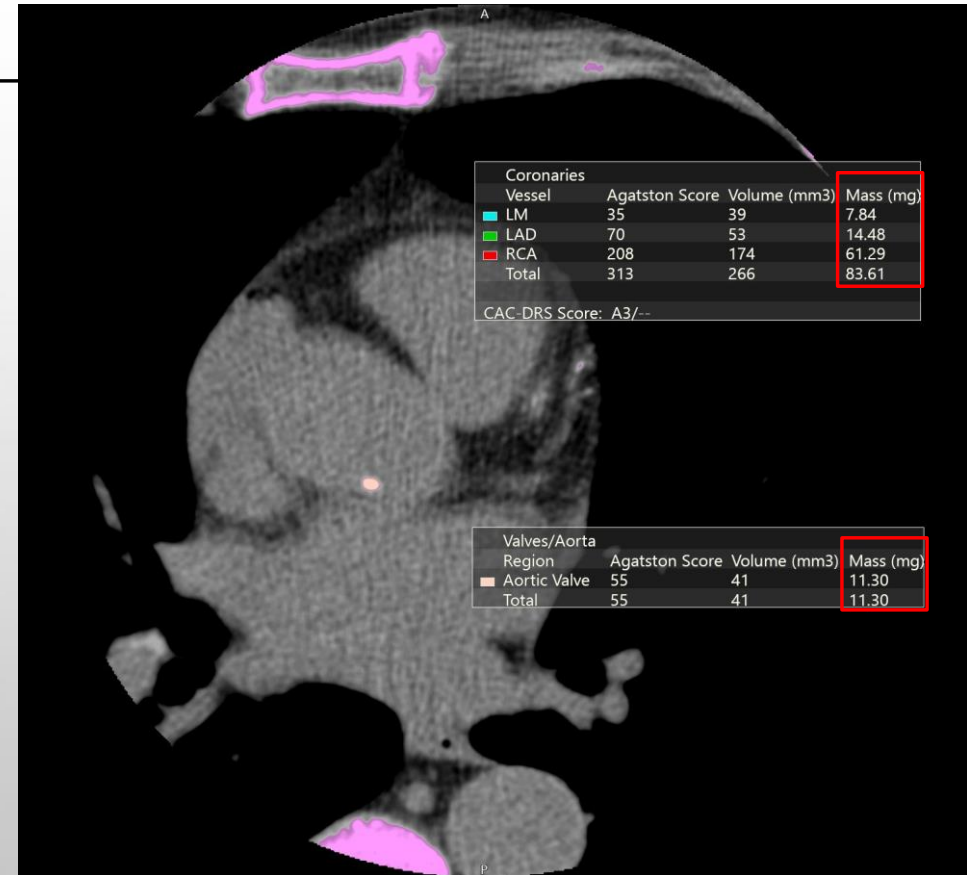
A box will populate to enter the calibration factor, determined with phantom scanning.

CT Density Threshold (HU):

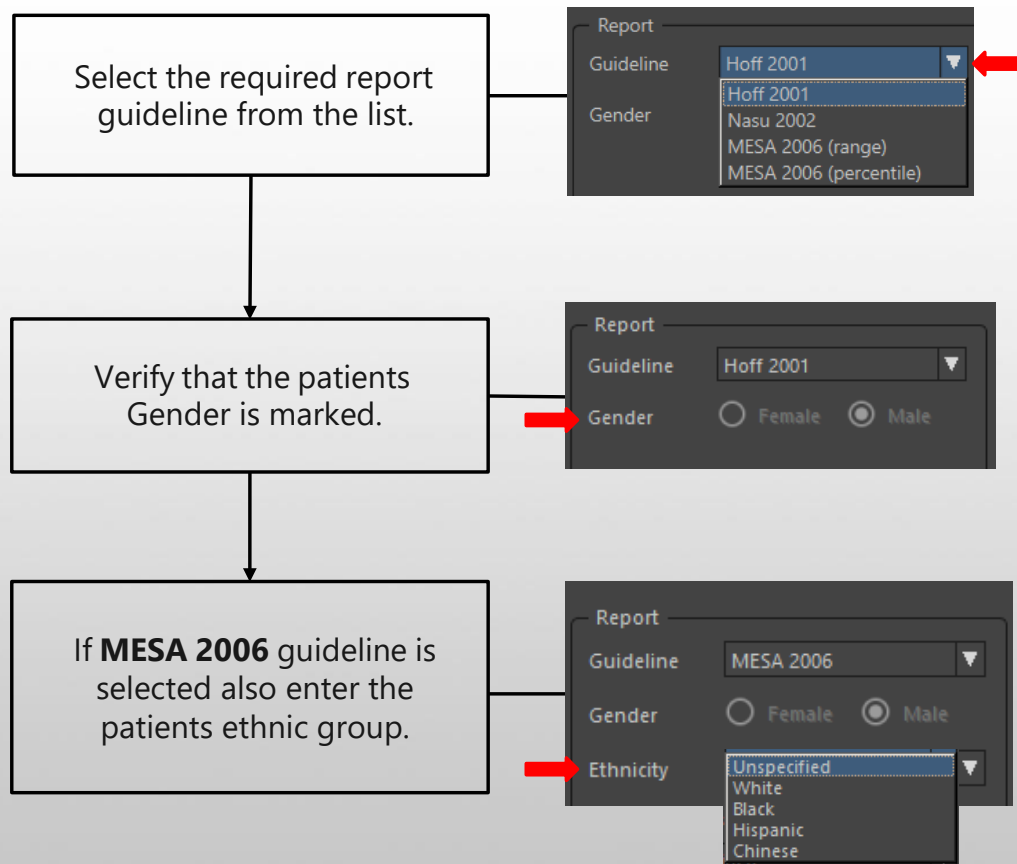
☒ Show Tinting

☒ Mass Score

 Calibration Factor:



CACS - Select a report guideline



Vessel Selection		
	Vessel	Report
☒	- LM	☒
☒	- LAD	☒
☒	- CX	☒
☐	- RCA	☐
☐	- PDA	☐
☐	- Other1	☐
☐	- Other2	☐
☐	- Other3	☐

Tip: If there is no calcium in the artery, check box under Report to mark as zero.

CACS – CAC DRS Score

Verify that the CAC-DRS box is selected. Agatston Score automatically populates when CAC-DRS option is selected, as indicated by the letter A.

Select the number of vessels containing calcium.

For non-gated CT chest scans, the user can set a visual score, by selecting an option from the dropdown list.

CT Density Threshold (HU): 130

☒ Show Tinting

☒ Mass Score

Calibration Factor: 1

Report

Guideline: Hoff 2001

Gender: ☐ Female ☒ Male

☒ CAC-DRS

Number of Vessels: Unspecified

Visual Assessment: Unspecified

☒ CAC-DRS

Number of Vessels: Unspecified

Visual Assessment: Unspecified

Absent = V0
Mild = V1
Moderate = V2
Severe = V3

Coronaries			
Vessel	Agatston Score	Volume (mm3)	Mass (mg)
LM	35	39	7.84
LAD	70	53	14.48
RCA	208	174	61.29
Total	313	266	83.61
CAC-DRS Score: A3/N3			

☒ CAC-DRS

Number of Vessels: Unspecified

Visual: Unspecified

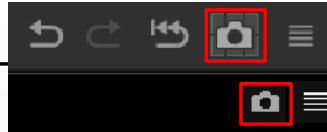
0 Vessels
1 Vessel = N1
2 Vessels = N2
3 Vessels = N3
4 Vessels = N4

Tip: The number of vessels selected will display next to the letter N.

Note: When the visual score method is used, the letter A will change to a V.

CACS - Snapshot

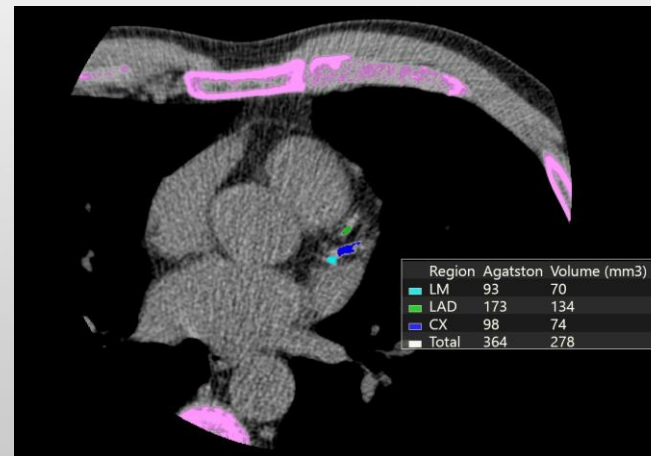
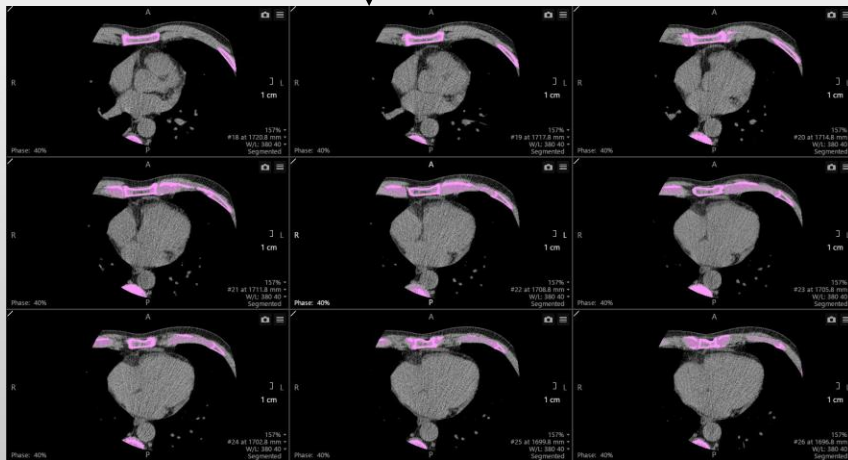
Select one of the Camera options at upper right of viewport or page to take a snapshot.



Full screen capture

Individual viewport

Tip: It is important to remember to take a snapshot. Only a snapshot can be restored at a later date. Once a snapshot is restored you will be able to continue post processing your image.



CACS - Create Report

Click on + **Report** to open report editor.

+ Report ?

Tip: User has ability to Edit Name and address at top of report.

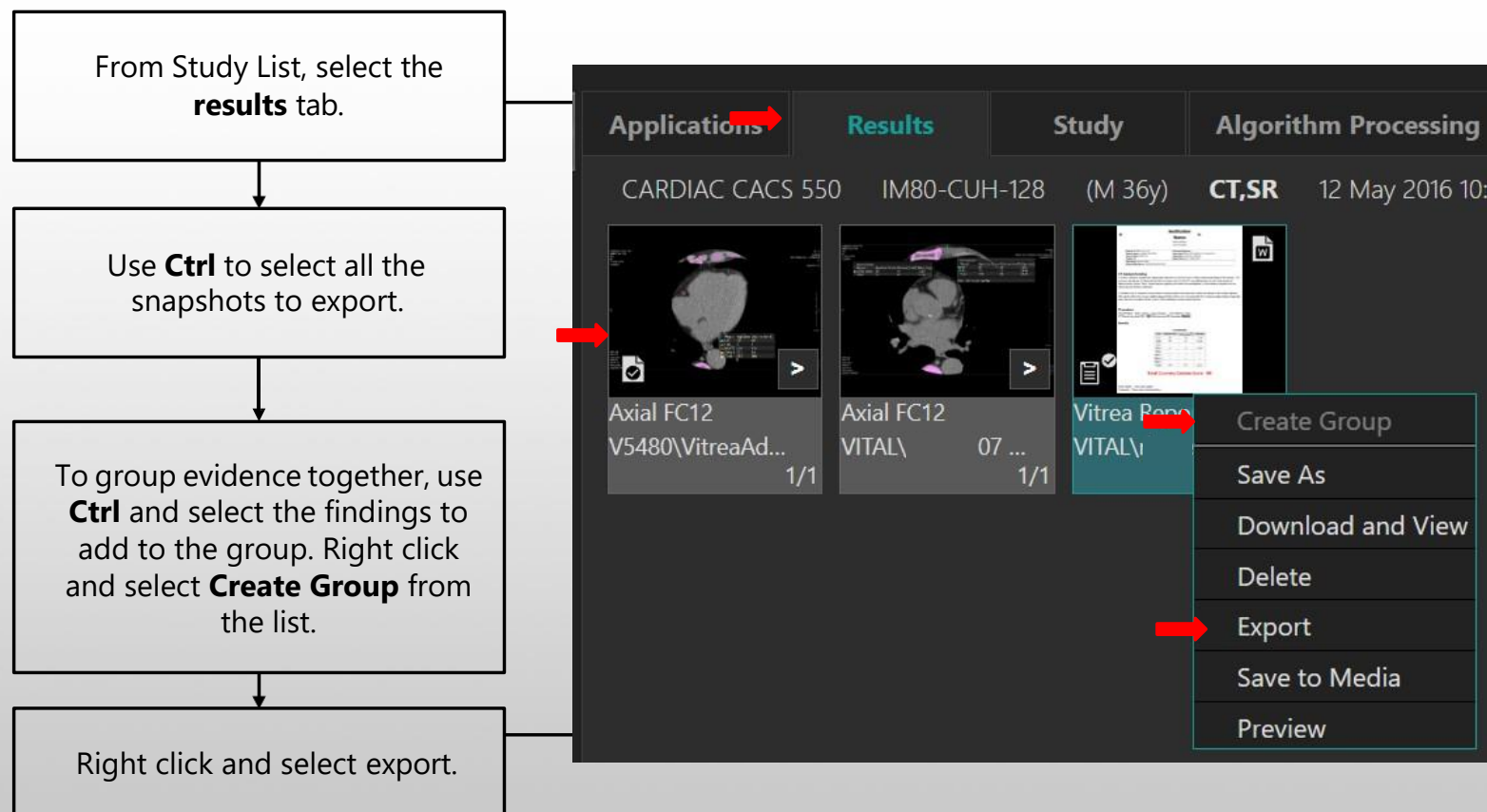
Select the **Ca Score** template report under Full Reports. The results are automatically populated on the report.

Click on Publish Report to send report to study list for export options.

The screenshot shows the CACS software interface. At the top, there are tabs for 'Images', 'Workshe...', and 'Full Reports'. The 'Full Reports' tab is active. Below the tabs, there is a 'Templates' bar with icons for various report types: Full Cardiac, Coronaries, CFA, Aorta, Colon, C-RADS, Nodules, General, Brain Tumor, and Ca Score. The 'Ca Score' icon is highlighted with a red box. To the right of the templates, there is a 'Coronary Calcium Percentile Score' graph showing a percentile distribution. Below the graph, there is a table titled 'Values/Aorta' with columns for Region, Agatston Score, Volume (mm³), and Mass (mg). The table contains data for various regions and a total row. At the bottom of the interface, there is a 'Publish Report' button highlighted with a red arrow.

Region	Agatston Score	Volume (mm³)	Mass (mg)
Aortic Valve	55	41	11.30
Aortic Valve	...	...	...
Other1	...	...	...
Other2	...	...	...
Other3	...	...	...
Other4	...	...	...
Other5	...	...	...
Other6	...	...	...
Other7	...	...	...
Other8	...	...	...
Total	55	41	11.30

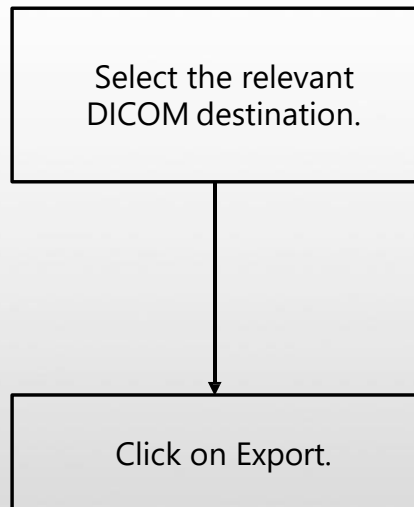
CACS- Distribute Findings: Export



Tip: To delete, rename or edit a group description, right click on the group. Hover the mouse over the arrow and select the option from the list.

Grouping	Edit Group Description
Save As	Ungroup All
Download and View	Remove from Group
Delete	Move Up
Publish	
Export Group	
Save to Media	
Preview	

CACS- Distribute Findings: Export



Export Studies

Content

☒ 1 Results, reports, and groups selected
☐ Add studies
0 Studies | 0 Results | 0 Reports | 1 Groups will be exported

Destination

No destination archives were found in the system configuration

Options

☐ Include annotations on images
☐ Exclude non-dicom results
☐ Exclude all restorable results

☐ Exclude large Vitrea restorable images
☐ Convert to grayscale
Change all series descriptions:

Edit Patient or Anonymize

☐ Edit Patient ☐ Anonymize

Export **Cancel**

CACS

Summary:

CT VScore is a calcium-scoring application that provides the ability to visualize, measure and create a report of coronary calcification and calculate the calcium score using a non-contrast cardiac CT exam.

Review the steps for CACS:

- ▶ Select protocol Cardiac Ca Scoring CT
- ▶ Review the quality of the study
- ▶ Quantify Vessel calcium
- ▶ Capture Snapshots
- ▶ Export to PACS or other destination

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