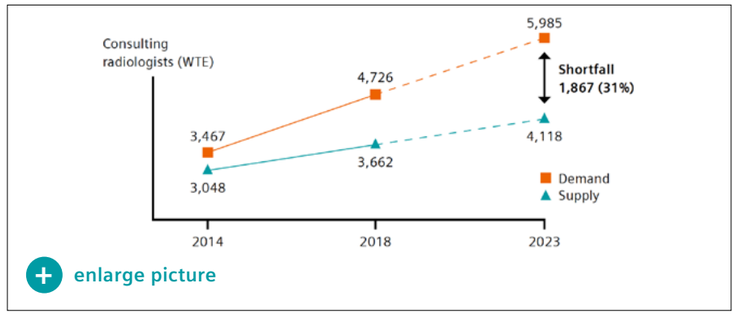
AI in lung screening and beyond



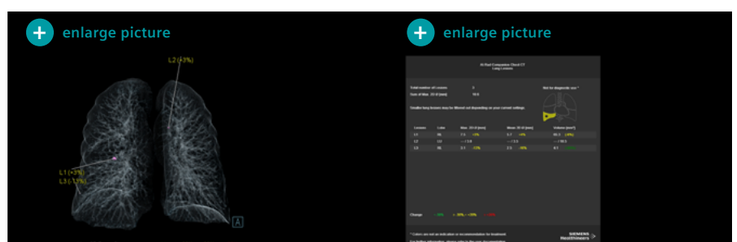
Artificial intelligence – a second pair of eyes for the radiologist
Lung screening using low-dose CT has been shown to reduce lung cancer-specific mortality. Various countries have already implemented or are currently considering the implementation of lung screening programs.

These programs often result in additional workload for medical experts[1] in a world where this already a shortfall of radiologists. Artificial intelligence (AI) can potentially increase the efficiency of lung screening.[2]

The most recent algorithms have similar performance or are close to double reading by radiologists. AI algorithms that provide a second reading for lung nodule detection and simultaneous assessment of smoking-related comorbidities could increase radiologist confidence, shorten turnaround time, provide better patient outcomes, and eventually reduce costs by improving disease prevention in this high-risk population.[1]

AI-Rad Companion Chest CT in screening for lung cancer ...
The AI-Rad Companion Chest CT[3] is a decision support tool for the radiological assessment of (low-dose) CT images of the chest. It offers an assessment of the lung, to support the radiologist in the main tasks of screening for lung cancer, including:

- Detection of lung nodules (Lung CAD)
- Segmentation and measurements of solid and sub-solid lung nodules
- Correlation of segmented lung nodules of current scan with known priors and quantitative assessment of changes of the correlated data e.g. volume doubling time



3D visualization of the lungs with 3 detected nodules and their progression compared to the prior CT examination.

Human and machine-readable summary overview with the details of all findings.

Courtesy: Case delivered by data broker. (check the official disclaimer when data is purchased by SHS)

... and beyond
At the same time, algorithms have been developed to detect and quantify on chest CT scans other smoking related diseases, including coronary artery calcifications, emphysema, and osteoporosis, that have an impact on morbidity and mortality.[1]

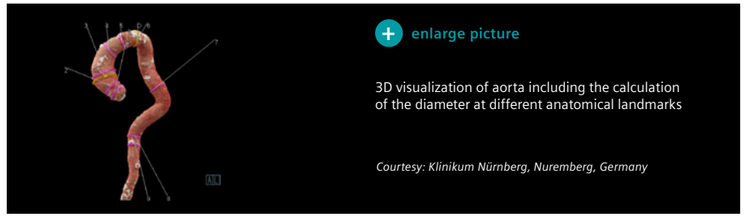
Therefore, the assessment of the lung includes also:

- Identification of areas with lower Hounsfield units in comparison to a predefined threshold for complete lung and lung lobes.

For the assessment of the function of the heart and the vascular system around the heart, the AI-Rad Companion Chest CT includes:

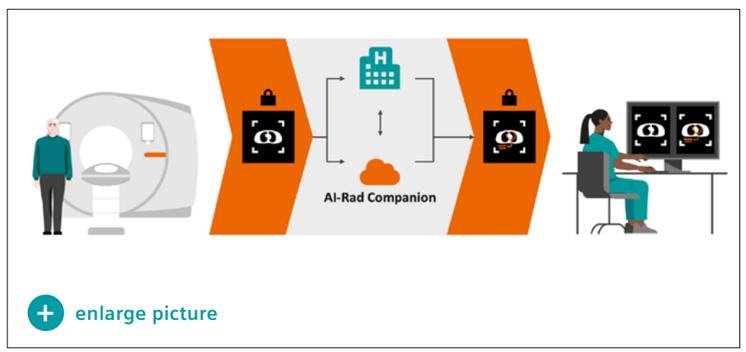
- Segmentation and measurement of the volume of the heart
- Quantification of the total calcium volume in the coronary arteries
- Segmentation of the Aorta and measurement of maximum diameters at 9 landmarks according AHA guidelines andat the location of maximum diameter of the ascending and descending aorta.This even works on native scans.

And the AI-Rad Companion Chest CT offers also an assessment of the thoracic spine health.



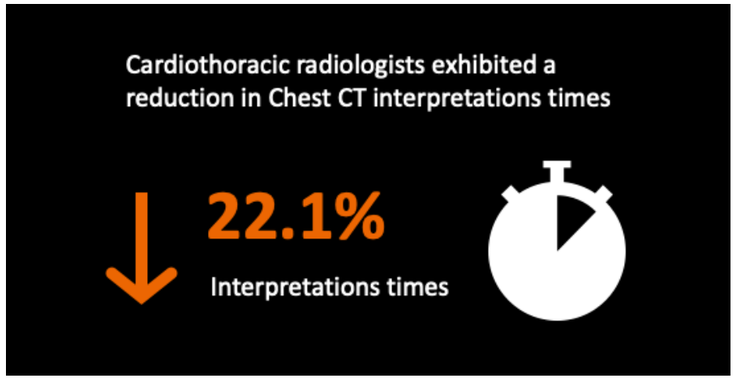
Smooth integration of artificial intelligence into the radiology environment
AI-Rad Companion Chest CT can be fully integrated into the image interpretation workflow and the results will be delivered at the radiologist's workplace.

Seamless integration in the reading and reporting workflow including automated measurements and DICOM structured reports may help to drive productivity.



Puplished by Siemens Healthineers AG · PDF only · ©Siemens Healthineers AG, 2023

Impact on interpretation times
A scientific study shows that cardiothoracic radiologists exhibited a reduction in Chest CT interpretation times of 22.1% when using the AI-Rad Companion Chest CT. [3,4,5]



Next steps
For more info, ↗ download the Whitepaper or ↗ contact your local sales representative from Siemens Healthineers.

> siemens-healthineers.com/ai-rad-companion

[1] The Royal College of Radiologists. Clinical radiology, UK workforce census 2018 report. London: The Royal College of Radiologists, 2019.
[2] P.A. Grenier, A.L. Brun & F.Mellot (2022), The potential role of artificial intelligence in lung cancer screening using low-dose computed tomography. Diagnostics, 2022, 12(20), 2435.
[3] AI-Rad Companion Chest CT consists of several medical devices and is not commercially available in all countries. Its future availability cannot be ensured.
[4] B.Yacoub, A. Varga-Szemes, et.al. (2022). Impact of Artificial Intelligence Assistance on Chest CT Interpretation Times: A Prospective Randomized Study. American Journal of Roentgenology, 2022, 219(5), 743-751.
[5] The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Because there is no "typical" hospital or laboratory and many variables exist (e.g., hospital size, samples mix, case mix, level of IT and/or automation adoption) there can be no guarantee that other customers will achieve the same results.

Siemens Healthineers Headquarters
Siemens Healthineers AG
Siemensstr. 3
91301 Forchheim, Germany
Phone: +49 9191 18-0
siemens-healthineers.com

siemens-healthineers.com/digital-health-solutions