

The Philips logo is displayed in a white rounded rectangle with a purple gradient at the bottom. The background of the entire page is a blurred photograph of a medical professional in blue scrubs standing next to a patient lying on a CT scanner table. The scanner is a large, light-colored machine with the Philips logo on it. A monitor in the foreground shows a blurred image of a CT scan.

**PHILIPS**

Computed tomography

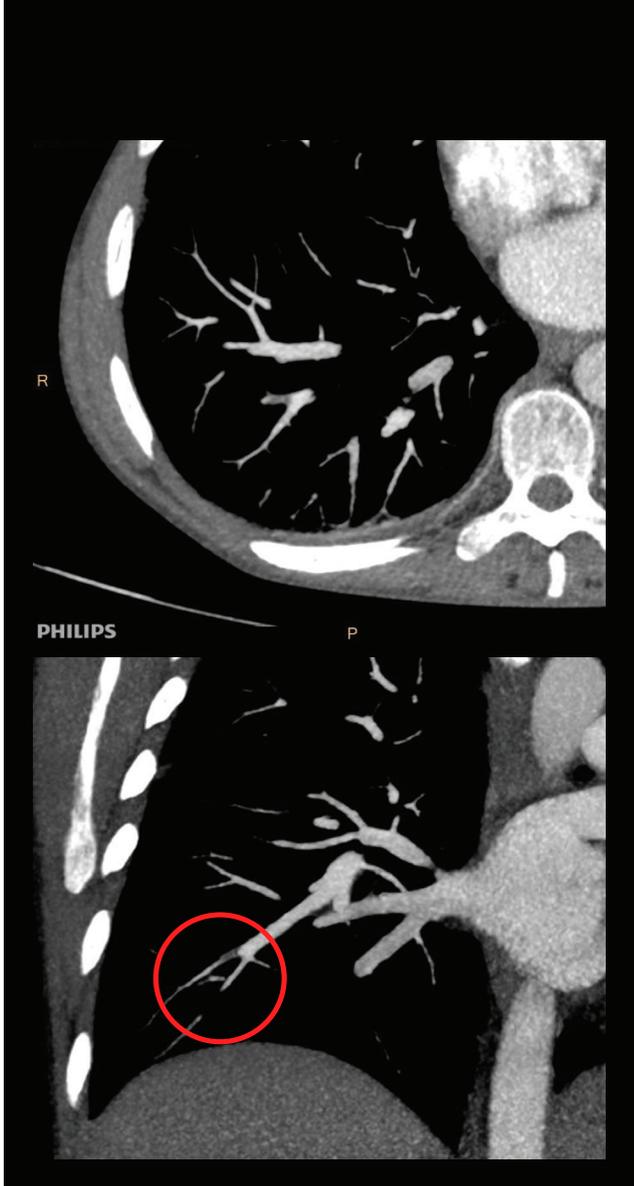
Case studies

# **Pulmonary embolism** and the clinical utility of the IQon Spectral CT

Pulmonary embolism (PE) is a condition that occurs when a clot migrates into a pulmonary artery, blocking the perfusion within the territory of the affected lung. The blockage can be caused by one or more clots that travel to the lungs from different parts of the body.

CT is the primary method for identifying a PE, however small PEs are often difficult to identify on a conventional CT scan. A perfusion map of the lungs can add valuable diagnostic insight to a PE scan.

The spectral perfusion map, using results such as iodine-based images and Z effective, can help assess the hemodynamic significance of the PE, thereby adding additional clinical insights to aid in the diagnosis of the PE. Because spectral data is always on with every scan on the IQon Spectral CT, these results are always available to the clinician, providing a significant opportunity to positively impact the treatment path for the patient.



## Case study 1

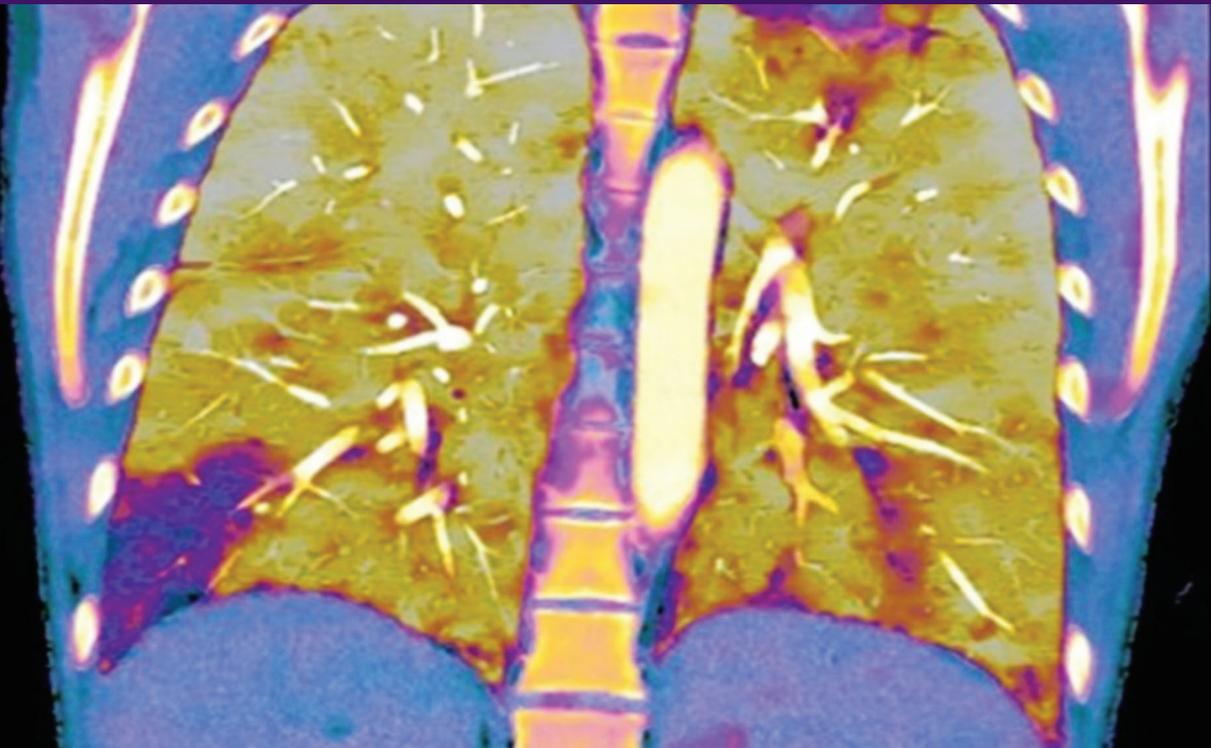
University of Cologne  
Cologne, Germany

A contrast-enhanced chest exam using 60 cc of iodinated contrast (350 mg/cc) at 120 kVp was performed on a patient with chronic renal insufficiency and hepatitis. In addition to standard CT-angiography images, spectral data was reconstructed for the patient. While CT-angiography showed the clot in a sub-segmental artery, fused iodine density images demonstrated a perfusion defect in the right lower lung demonstrating the hemodynamic significance of the embolism in the right lower lung.

**Scan data** CTDI = 3.4 mGy • DLP = 128 mGy\*cm

**Axial and coronal conventional CT images of the patient with PE in the right lower lung.**

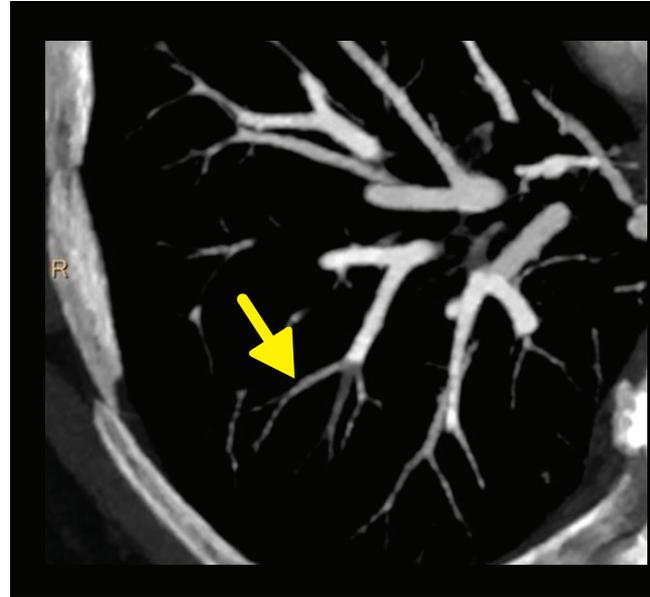
**Fused iodine density image demonstrating the perfusion defect indicative of the PE in the right lower lung.**



## Case study 2

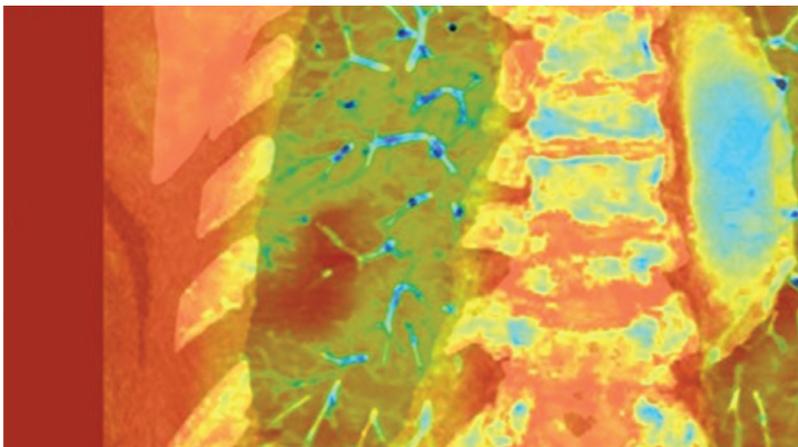
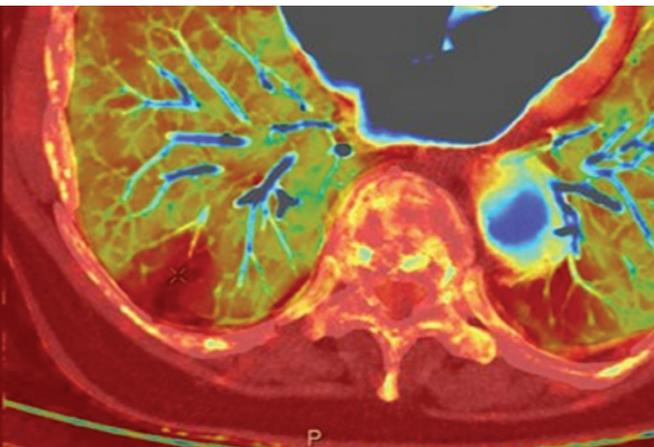
University Clinique Louvain (UCL)  
Brussels, Belgium

An elderly patient complaining of chest pain and dyspnea (shortness of breath) was scanned using the IQon Spectral CT. Scans showed a PE in the right lower lung not originally identified prospectively by radiologists and the PE CAD. Radiologists then reviewed the fused Z effective spectral results, which demonstrated a perfusion defect in the right lower lung. This allowed radiologists to retrospectively identify the small PE on the MonoE 40 keV in the right lower lung corresponding to the perfusion defect.



**Conventional CT axial image of the small PE in the right lung corresponding to the perfusion defect.**

**Scan data CTDI = 4.4 mGy • DLP = 122.3 mGy\*cm**



**Fused Z effective images demonstrating the perfusion defect in the right lower lung.**

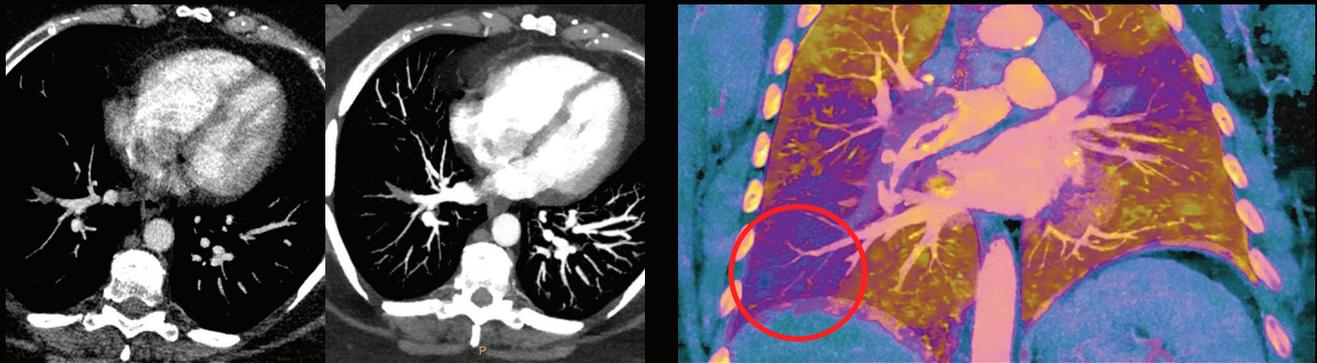
# Case study 3

University of Cologne  
Cologne, Germany

A middle-aged male with lung cancer had a follow-up scan on the IQon Spectral CT to evaluate tumor size. The conventional image and the 48 keV MonoE image showed an incidental large PE in the right middle lung.

Fused Z effective spectral results helped the clinician identify not only the perfusion deficit from the PE, but also a perfusion defect near the left lung lesion post-therapy.

**Scan data** CTDI = 9.1 mGy • DLP = 652.6 mGy\*cm



**Conventional CT and MonoE 48 keV images show a PE in the right lung.**

**The fused Z effective image demonstrated two perfusion defects corresponding to the PE in the right lung and the tumor in left lung.**

## Conclusion

Spectral results of the IQon Spectral CT provide the opportunity to utilize additional clinical insights for identification of a pulmonary embolism (PE). Because a PE is not always visible on conventional CT scans, the ability to visualize perfusion defects can help lead to a clinical diagnosis of a PE. Iodine-based and Z effective fused spectral results can help the clinician visualize the perfusion defect in lung parenchyma to evaluate the hemodynamic significance of a PE. Additionally, the low mono-energetic images can boost contrast enhancement to help the clinician identify subtle

and small pulmonary emboli in segmental and sub-segmental arteries. These PE cases help to demonstrate the unique capabilities of the IQon Spectral CT, including the ability to prospectively or retrospectively provide clinical results to assist in a clinical diagnosis.

## Clinical relevance

In patients with suspicion of pulmonary embolism, the Philips IQon Spectral CT improves diagnostic confidence by allowing assessment of hemodynamic significance of a PE.

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