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NUCLARITY CASE STUDY

Pilot at CHU de Liège

Deploying NUCLARITY® in a real-world setting

Key takeaways

- Rising PET volumes demand faster, cost-efficient solutions
- NUCLARITY® deployed in <4 hours
- Scan times reduced by up to 50%
- Lesion detectability maintained for F-18 & Ga-68 labeled tracers

CHU de Liège - A leading nuclear medicine center

With over 11000 PET/CT studies performed annually, CHU de Liège is one of the foremost nuclear medicine centers in Belgium and Europe. Under the leadership of Prof. Roland Hustinx, MD — former board member of the European Association of Nuclear Medicine (EANM) — and Prof. Nadia Withofs, MD — current President of the Belgian Society of Nuclear Medicine (BELNUC) — the department is at the forefront of adopting and evaluating cutting-edge nuclear medicine technologies, both in clinical care and research.

Prof. Roland Hustinx, MD
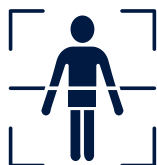**Head of Nuclear Medicine**
Department CHU de Liège

"The high operational costs make PET scans expensive, highlighting significant room for optimization. NUCLARITY® has the potential to optimize both patient safety and departmental efficiency significantly."
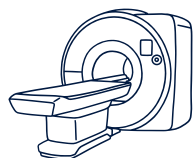
Tested with two Siemens' Biograph Vision 600

50 scans per day
2 months

1650 scans

^{18}F-FDG , ^{68}Ga-PSMA-11, and ^{68}Ga-DOTA-TATE

Recently, the institution reaffirmed its leadership in nuclear medicine through new infrastructure developments and international accreditations, reinforcing its role in the adoption of radioligand therapies and in advancing innovation for the benefit of patients across Belgium. Like many others, the center has experienced a sustained annual increase of 15% in PET scan volume in recent years and is therefore actively exploring solutions to manage this growing demand. In this context, CHU de Liège piloted the research version of NUCLARITY® over a two-month period to evaluate its potential for workflow optimization.

Straightforward installation and fully automated PACS integration

NUCLARITY® was deployed in close collaboration with the IT department at CHU de Liège. Following our installation guidelines, the software was successfully integrated with the hospital's on-site PACS and workstations, ensuring access across the clinical team. In this configuration, NUCLARITY®'s local Gateway performed GDPR-compliant DICOM anonymization and routing, securely transferring de-identified PET images to our EU-hosted cloud instance. Image anonymization, enhancement, and secure routing were conducted seamlessly, with the average additional processing time from PACS to cloud and back to PACS remaining below 1.5 minutes per study. Image enhancement was conducted in the cloud, after which the enhanced DICOM images were automatically routed back to the hospital's PACS (Agfa HealthCare) for clinical review on the nuclear imaging workstation, Syngo.via (Siemens Healthineers).
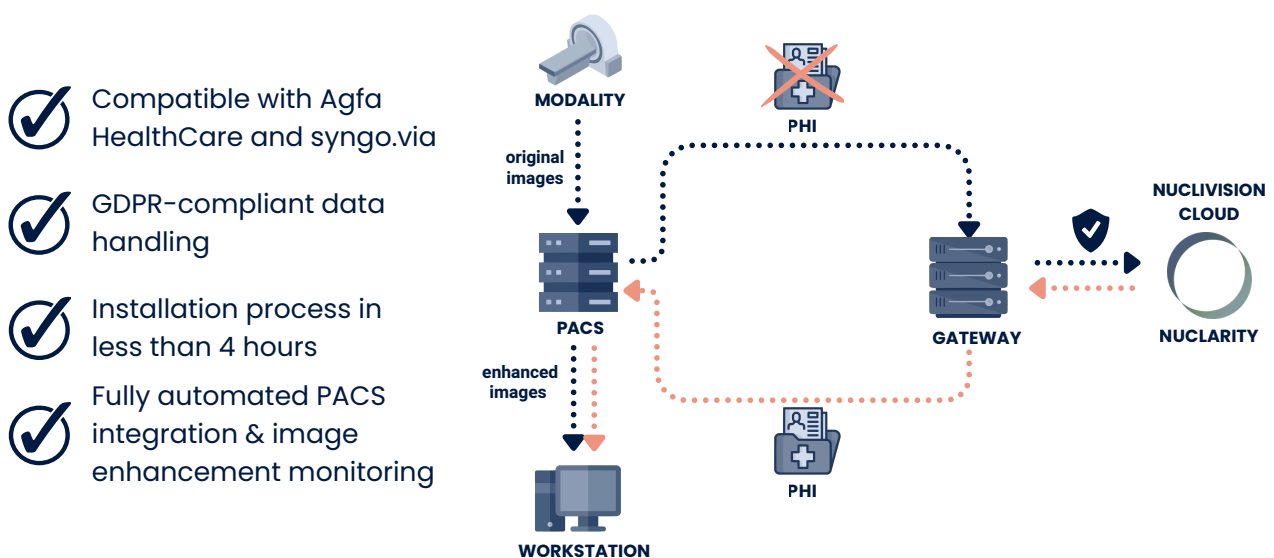
✓ Compatible with Agfa HealthCare and syngo.via

✓ GDPR-compliant data handling

✓ Installation process in less than 4 hours

✓ Fully automated PACS integration & image enhancement monitoring

> *"The whole installation was relatively straightforward and took less than 4 hours in total, including testing. Moreover, the prompt support and clear communication during the process was great. The necessary data protection and cybersecurity controls are in place."*
>
> **Gregory Canivet, computer scientist & PACS manager at CHU Liège**

Potential clinical impact

No dose or acquisition time reduction was applied during this pilot, as NUCLARITY® was installed for evaluation purposes only and had not yet received CE certification. Consequently, no modifications were made to the clinical imaging protocols. Nonetheless, the software demonstrated that a 50% count reduction appears feasible within the existing PET imaging infrastructure at CHU de Liège. To further investigate this potential, a blinded reader study was conducted using list-mode reconstructions at 50% of the original counts, subsequently enhanced by NUCLARITY®.

Learn more about the study *here*

Acquisition Time: 12 min
Injected activity: 192 MBq

Acquisition Time: 9 min
Injected activity: 144 MBq
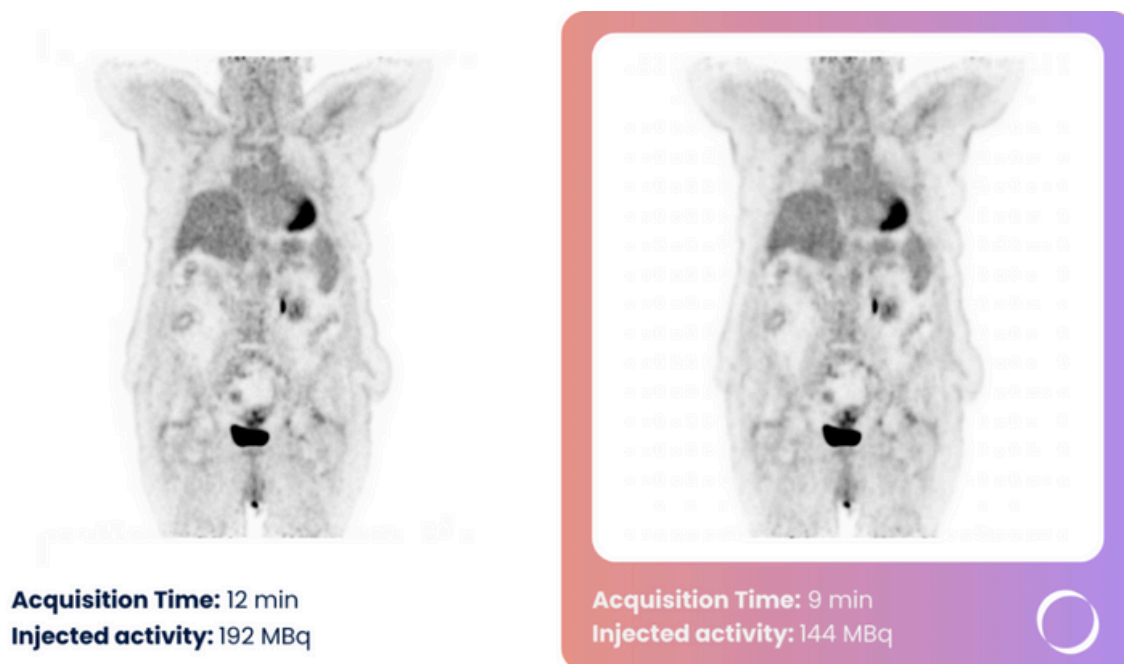
Figure 1. Example of a clinical whole body PET scan acquired during the pilot at CHU de Liège. The image on the left was acquired with standard parameters (12-minute acquisition, 192 MBq [F-18]-FDG injected activity). The image on the right shows the same scan after a 50% count reduction (list-mode downsampled, corresponding to 9-minute acquisition, 144 MBq activity), enhanced using NUCLARITY®. Despite the reduced counts, the image quality remains diagnostically comparable.

As part of the clinical evaluation study for NUCLARITY®, Dr. Camille Steenhout, nuclear medicine resident at CHU de Liège, took part in a blinded and randomized lesion detectability assessment on scans from three different centers. The study involved seven certified nuclear medicine physicians, each independently reviewing six anatomical regions per scan.

When reducing the number of measured radioactive events with 50%, across all readers the average lesion detectability:

Accuracy	Sensitivity	Specificity
99.0%	93.5%	99.7%

Figure 3. Application of NUCLARITY® on a whole-body [Ga-68]-PSMA PET scan acquired at CHU de Liège. From left to right: the low-count (50%) reconstructed image, the image enhanced using NUCLARITY®, and the clinically acquired full-count reference image.

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