

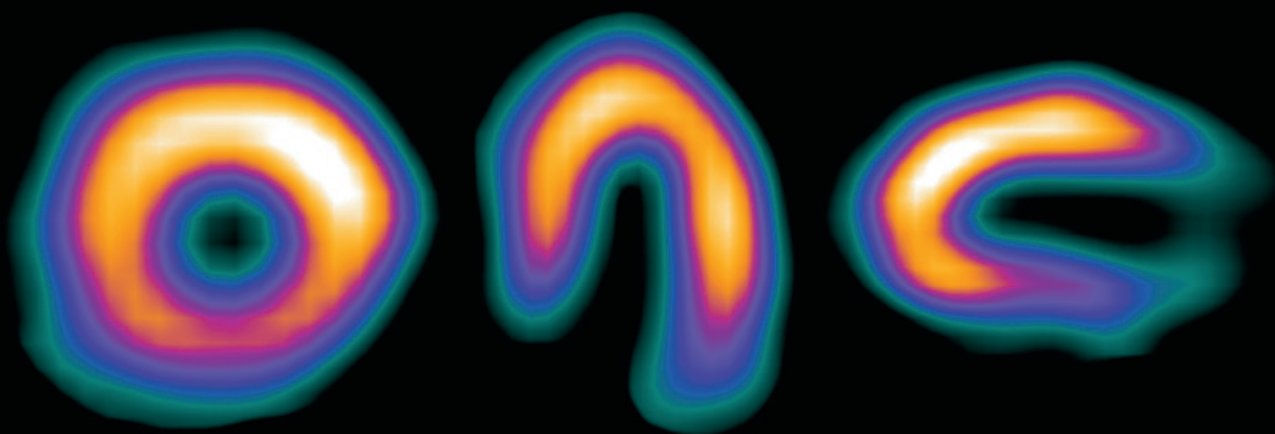


# IQ·SPECT

The art of minimizing dose  
while maximizing speed

[siemens-healthineers.com/iqspect](https://siemens-healthineers.com/iqspect)





## Minimum dose and maximum speed

In nuclear medicine studies, image quality is determined by the number of detected photons, patient motion, and truncation. When imaging a small organ, such as the heart, with a conventional parallel hole collimator, much of the detector is not used.

As a result, to achieve the desired image quality, routine cardiac studies can take up to 16 minutes.

IQ•SPECT™ maximizes detected counts from the heart without truncation. It offers fast cardiac imaging at the lowest possible dose, all while maintaining high image quality.

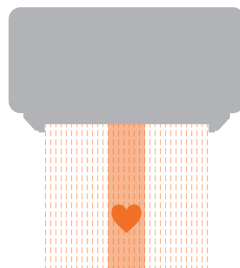
Featuring a selection of cardiac-specific protocols, with IQ•SPECT, you have the ability to optimize your myocardial perfusion imaging (MPI) studies.

# Unique IQ•SPECT technology

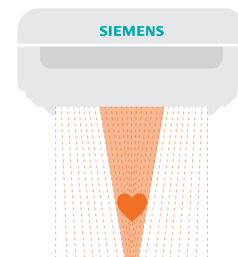
A key trend in nuclear medicine is the ever-increasing demand for faster MPI exams. IQ•SPECT is a cardiac imaging solution that uses a combination of converging collimators, modified cardio-centric acquisition, and special reconstruction methods to deliver ultrafast cardiac imaging that is four times faster than conventional SPECT acquisition.

This unique approach can be combined with a general-purpose Symbia™ SPECT<sup>[a]</sup> or SPECT/CT so the system is able to perform all routine clinical applications, as well as ultrafast cardiac scans, with just a change in collimator and acquisition mode. This adds flexibility and versatility to your department, enabling you to perform a larger volume and a wider range of procedures without additional dedicated equipment and space requirements.

## SMARTZOOM collimation

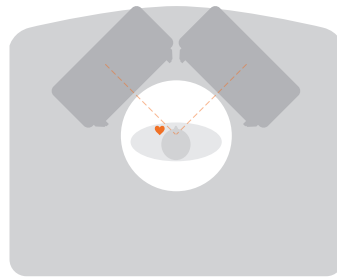


Conventional parallel-hole collimators are not ideal for small organs, as they require longer scan times or higher injected dose to acquire the necessary number of counts for optimal cardiac image quality.



**SMARTZOOM™** collimators employ the magnifying properties of a focusing collimator near the center of the field of view (FoV) and behave like a parallel hole collimator toward the edge of the FoV, reducing truncation. This enables the detectors to zoom in on the heart for four times more sensitivity.

## Cardio-centric acquisition

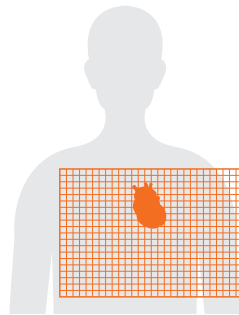


Conventional scanners use parallel-hole collimators and orbit around the center of the gantry. Detectors rotate in close proximity to the patient, often causing feelings of claustrophobia.

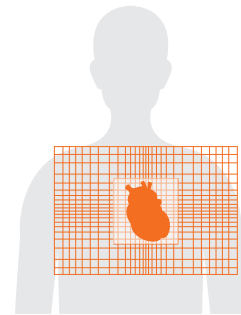


IQ•SPECT positions the heart in the center of the collimator FoV and aligns the detectors at a 28 cm radius, establishing a cardio-centric orbit. IQ•SPECT uses the flexibility of the Symbia gantry to position each detector at an optimal distance to maximize sensitivity.

## Advanced reconstruction



Most conventional reconstruction algorithms do not fully account for detector motion, deflections of the gantry, collimator hole size, nor the shape and distance from the patient to the detectors. This may result in artifacts that affect image quality.



Advanced IQ•SPECT reconstruction accurately incorporates the measured geometry of the **SMARTZOOM** collimators and the cardio-centric orbit of the detectors. Measurements of size, shape, and pointing direction for all 48,000 holes in the **SMARTZOOM** collimator enable accurate image reconstruction.

# The value of IQ•SPECT






## Clinical

To achieve optimal image quality, conventional cardiac imaging entails a longer exam time or high injected dose. From a patient perspective, both can be unpleasant and unsatisfactory.

MPI exams require that patients remain still for the total duration of the scan to avoid motion artifacts that ultimately impact image quality. The alternative is to reduce the exam time by increasing the amount of injected dose. This is not only undesirable, but potentially harmful to the patient, as it increases radiation exposure over time.

With IQ•SPECT, you not only have the ability to reduce scan time but, most importantly, reduce patient radiation exposure without jeopardizing image quality.

By acquiring four times more counts than conventional scans, IQ•SPECT delivers a complete cardiac workup in less than 5 minutes, improving patient comfort and satisfaction. The short scan time helps the patient remain still during the duration of the exam, reducing motion artifacts and potentially improving image quality. There is also the opportunity to reduce injected dose by up to 75%<sup>[b]</sup> without degrading image quality.

		Conventional <sup>[b]</sup>			IQ•SPECT		
		Dose	Time	Image quality	Dose	Time	Image quality
Standard		Standard	16-minute	Excellent	Standard	4-minute	Excellent
Pediatric		Half	16-minute	Sub-optimal	Half	8-minute	Excellent
Bariatric		Standard	16-minute	Sub-optimal	Standard	8-minute	Excellent



## Operational

Time affects all aspects of daily imaging, from patient comfort to staff productivity. With increasing patient demand and decreasing reimbursement levels, efficiency is essential.

IQ•SPECT helps clinicians achieve previously unattainable imaging speeds to support faster patient studies, resulting in significant time savings and improved staff efficiency.

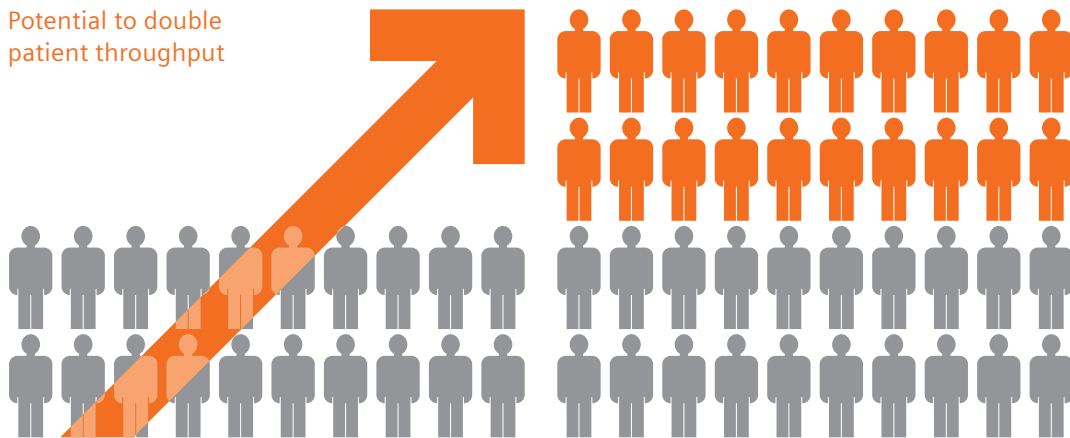


## Financial

Two challenges in healthcare today are the mandates to improve patient safety and increase productivity. From a patient care and economic perspective, each is critically important. With conventional systems, clinicians have to choose between minimum dose to protect patients or faster scanning for greater productivity.

IQ•SPECT addresses these challenges and enables the lowest dose to be used, while scanning patients faster than ever before. By imaging up to 75%<sup>(b)</sup> faster, you have the ability to see more patients daily without purchasing a secondary scanner.

Potential to double patient throughput



# 30% more patients, 40% less dose

Hôpital de la Cité-de-la-Santé

Laval, Québec, Canada



## Profile

- Regional hospital with 500+ beds located in a fast-growing metropolitan area
- Nuclear medicine department comprised of 4 physicians and 15 technologists
- Annually performs 3,500+ MPI studies, using 2-day protocols
- 2 Symbia SPECT/CT systems

## Challenge

- Large patient demand for cardiac studies
- Cardiac studies were performed on both cameras
- 30 patients scanned daily (rest and stress studies)
- Scan time: 12 minutes; rest injected dose: 25 mCi
- Long waiting list for bone scans required patients to be referred to other centers
- Patient waiting list for MPI studies was more than 3 months and 6-9 months for external referrals

## Solution

- IQ•SPECT installed on a Symbia SPECT/CT system
- Cardiac studies are performed on one camera and general SPECT/CT exams on the other
- 40+ patients scanned daily (rest and stress studies)
- Scan time: 4 minutes; rest injected dose: 15 mCi
- Bone scans no longer referred elsewhere
- Cardiac patient wait time is less than 2 months





## Clinical

*"We were looking to decrease the dose from 25 mCi to 15 mCi of Sestamibi in our facility... As far as acquisition goes, IQ•SPECT is four times faster than a conventional study."*

Guillaume Bouchard, MD,  
Department of Nuclear Medicine



## Operational

*"This [Symbia with IQ•SPECT] freed up four to five hours of camera time. It allowed us to simplify our schedule and see more patients."*

Marie-Josée Haeck, Manager,  
Diagnostic Imaging



## Financial

*"Now, we have reduced our wait time and we can perform more patient scans."*

Marie-Josée Haeck, Manager,  
Diagnostic Imaging

*"One day, we performed 56 cardiac SPECT tests."*

Jean-Paul Bernier, Technologist,  
Department of Nuclear Medicine

# 80% faster scans, increased patient satisfaction

University of Michigan Health System  
Ann Arbor, Michigan, USA



## Profile

- Wholly owned academic medical center of the University of Michigan
- Nuclear medicine department is comprised of approximately 30 physicians and scientists
- 6 SPECT and 3 SPECT/CT systems

## Challenge

- Scan times were 15-20 minutes
- Patients suffering from a history of heart failure or lung disease had difficulties laying flat for more than a few minutes
- Some severely ill patients could not be referred for a SPECT scan due to their inability to tolerate a 15-20-minute nuclear cardiology exam

## Solution

- IQ•SPECT installed on a Symbia SPECT/CT
- The site initiated a clinical study to evaluate the benefits of IQ•SPECT versus conventional scans
- Conventional 15-20-minute scans were performed with LEHR on 54 patients, who were then scanned again on the same system using the 4-minute IQ/SPECT exam
- The study concluded that 4-minute MPI with IQ•SPECT provides image quality comparable to conventional 15-20-minute scans using LEHR collimators, with a significant potential for dose savings



## Clinical

*"If you use half the radionuclide dose and increase the image acquisition time to a 6-minute scan, you would have the same image statistics as a full-dose exam."*

James Corbett, MD, Director,  
Cardiovascular Nuclear Medicine Division



## Operational

*"Symbia with IQ•SPECT permits the use of the same imaging system to perform SPECT/CT nuclear medicine exams, and in a matter of a couple of minutes, transform into a quick cardiac imaging system. IQ•SPECT option offers a nice degree of flexibility."*

James Corbett, MD, Director,  
Cardiovascular Nuclear Medicine Division



## Financial

*"The patients like it a lot and it opens up the possibility of referring patients who were unable to tolerate a conventional SPECT scan simply because they were too sick."*

James Corbett, MD, Director,  
Cardiovascular Nuclear Medicine Division

# 100% more patients, lowest possible dose

Amphia Hospital, Molengracht Campus  
Breda, The Netherlands



## Profile

- Teaching and research institution
- One of the largest general hospitals in the Netherlands
- 837 patient beds
- Symbia SPECT/CT system

## Challenge

- Scan times were 18 minutes
- Patients often complained about having to remain still for the duration of the scan
- Re-scans were often needed due to patient motion during the exam
- Cardiac cases were the majority of studies performed. Stress studies were performed in the morning, while the afternoon was dedicated to rest studies.

## Solution

- IQ•SPECT installed on a Symbia SPECT/CT
- Total scan time per patient was reduced by 50%
- Patients satisfaction increased and the number of re-scans decreased
- 15 MPI scans are performed each morning, leaving the afternoon free for other SPECT/CT studies



## Clinical

*"We are working at the lowest possible dose that we can, and we allow just 15 minutes per patient."*

Jan Akkermans, Manager,  
Nuclear Medicine Department



## Operational

*"Patient complaints and movements during acquisition were common before IQ•SPECT, sometimes causing us to stop before completing acquisition."*

Jan Akkermans, Manager,  
Nuclear Medicine Department



## Financial

*"Since the upgrade, the department has doubled the number of myocardial perfusion scans, performing up to 15 per morning."*

Jan Akkermans, Manager,  
Nuclear Medicine Department

# 5-minute exams, cost-effective service

Ballarat Health Services

Victoria, Australia



## Profile

- Largest regional hospital in the Grampians region
- 782 patient beds
- 15 nuclear medicine exams per day
- Symbia SPECT/CT system

## Challenge

- Scan times were 15 minutes
- Patients were uncomfortable during conventional MPI exams
- Clinical and financial need to provide high-end, self-sufficient, in-house nuclear medicine services

## Solution

- IQ•SPECT installed on the Symbia SPECT/CT
- Total scan time per patient was reduced by 67% to just 5 minutes
- Patients feel more comfortable and the likelihood of motion artifacts has decreased
- As part of the introduction of IQ•SPECT, a number of patients were scanned using both IQ•SPECT and the traditional method, demonstrating to clinicians that the IQ•SPECT images were comparable, yet acquired in far less time



## Clinical

*"The combination of getting more photons from the heart during exams, and the ability to make better use of the photons, results in reduced scanning time and reduced radiation dose."*

Greg Wilton,  
Chief Nuclear Medicine Technologist



## Operational

*"IQ•SPECT, has helped expedite cardiac exams."*

Greg Wilton,  
Chief Nuclear Medicine Technologist



## Financial

*"It is an extremely cost-effective service; the system itself is easy to use and offers excellent images."*

Greg Wilton,  
Chief Nuclear Medicine Technologist

# Up to 88% more scans, better image quality

Halifax Health Medical Center  
Daytona Beach, Florida, USA



## Profile

- The largest healthcare provider with a tertiary and community hospital in the Daytona Beach region
- 60% of all nuclear medicine studies are cardiac
- 678 patient beds
- 2 Symbia SPECT/CT systems

## Challenge

- Scan times were 20 minutes
- Total patients per day: 8
- Need to offer cardiac imaging solutions that accommodate patients of varying sizes
- Issues with claustrophobic patients due to close detector range
- Frequent patient motion during scans produced low-quality images

## Solution

- IQ•SPECT installed on a Symbia SPECT/CT
- Total scan time per patient was reduced by 75% to just 5 minutes
- Total patients per day: 15
- Now able to schedule more patients with claustrophobia
- Image quality has improved due to less patient motion





## Clinical

*“Our 5-minute cardiac scans are better than those that used to take 20 minutes. The attenuation correction feature is particularly helpful for heart scans; it allows us to compensate for varying patient body size. It also helps correct for attenuation caused by the diaphragm, breasts, and pectoral muscles.”*

Thomas Yuschok, MD,  
Nuclear Medicine Department



## Operational

*“The quality of the scans means there is less need for rescanning. The turnaround time is so much shorter with IQ•SPECT.”*

Andrea Huffman, Coordinator,  
Nuclear Medicine Department

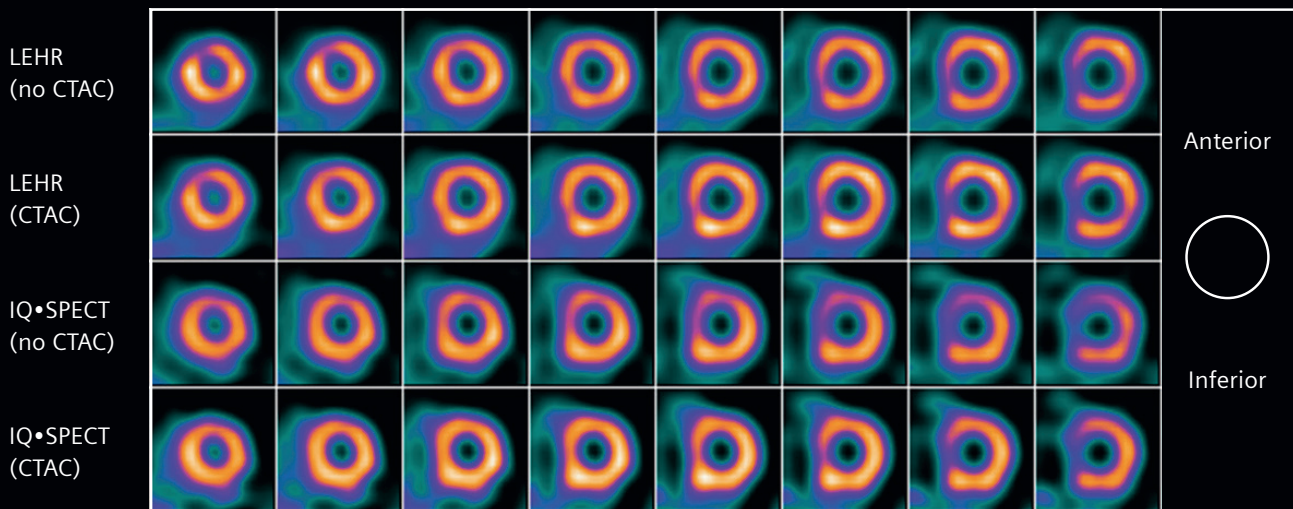


## Financial

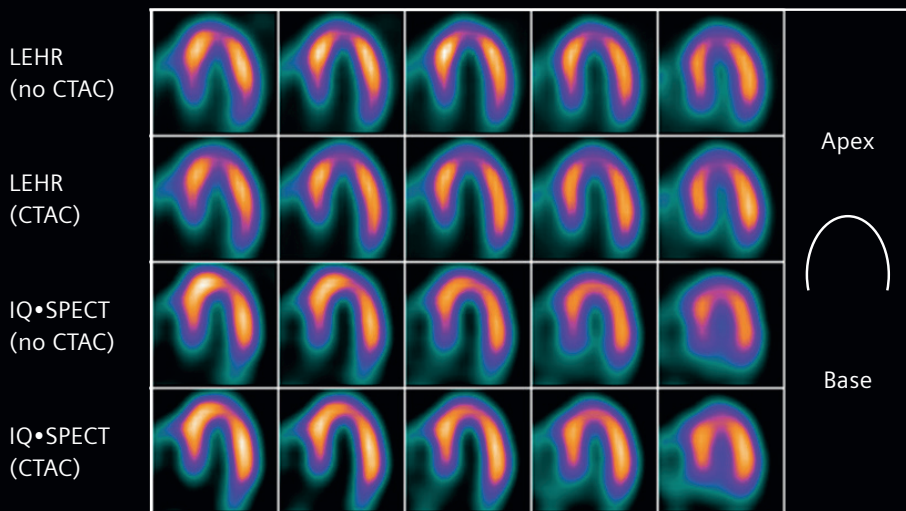
*“Slow scan time limited us to no more than 8 cardiac scans a day. Now, we do up to 15 with IQ•SPECT.”*

Andrea Huffman, Coordinator,  
Nuclear Medicine Department

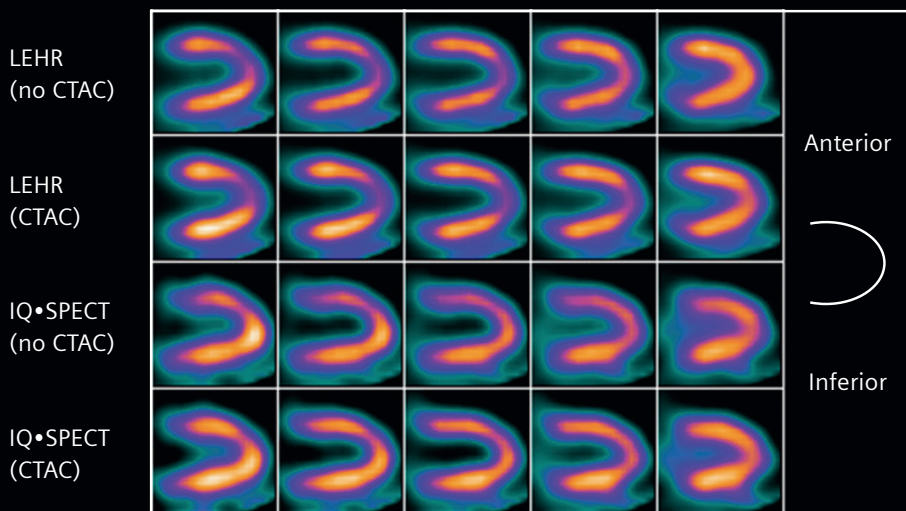
# 4-minute scan versus conventional 16-minute scan



IQ•SPECT images acquired in only 4 minutes versus 16 minutes with LEHR. Post computed tomography attenuation correction (CTAC)  
IQ•SPECT images show correction of anterior wall attenuation effects.



<sup>99m</sup>Tc MIBI stress MPI on a 59-year-old female patient shows normal perfusion at peak stress. LEHR (16 minutes) and IQ•SPECT (4 minutes) images show comparable image quality and tracer distribution.



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<sup>[a]</sup> Available on Symbia Evo™ SPECT systems.

<sup>[b]</sup> Based on competitive literature available at time of publication. Data on file.

The statements by Siemens' Healthineers customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (eg, hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

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**Siemens Healthineers Headquarters**

Siemens Healthcare GmbH  
Henkestr. 127  
91052 Erlangen, Germany  
Phone: +49 9131 84-0  
siemens-healthineers.com

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Molecular Imaging  
2501 North Barrington Road  
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USA  
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