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# Symbia Intevo

xSPECT, the difference between seeing and knowing.

Answers for life.





# Leadership in Molecular Imaging

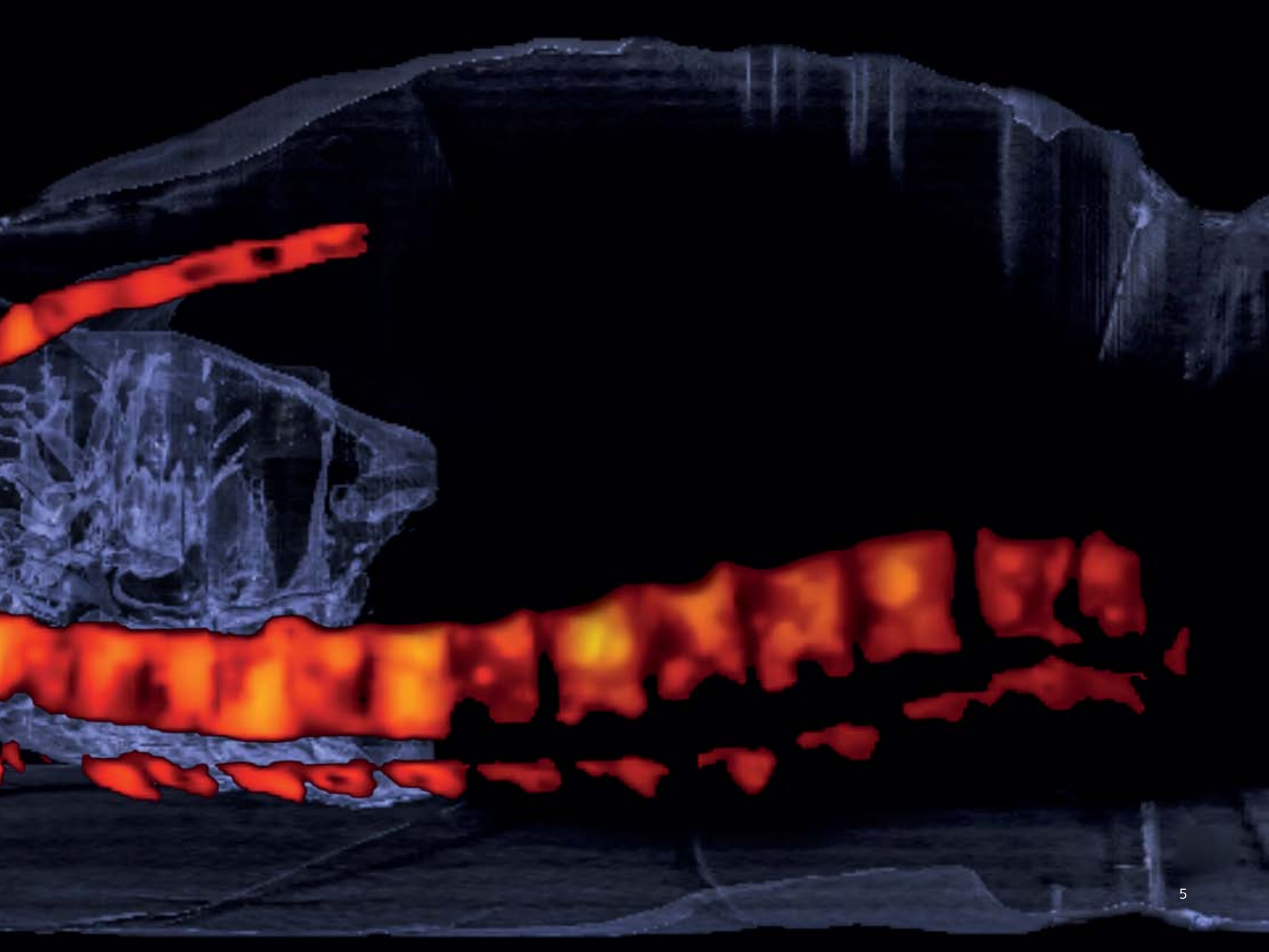
For more than 130 years, Siemens has been a recognized leader in medical innovation, believing that even the most distant technical horizons were temporary and could be surpassed with consistent dedication to improving healthcare. From the first electromedical devices in 1896 to the latest SPECT hybrid technologies, Siemens has a long history of pioneering technological achievements that help make the impossible possible.

Siemens Molecular Imaging was founded on the belief that achieving the highest technical performance is only important when products can deliver clinical outcomes for improved patient health. This visionary approach, backed by the largest research and development budgets in the medical imaging industry,\* has made Siemens an undisputed innovation leader in molecular imaging.

\* Siemens Healthcare – Top 10 Medical Device R&D Budgets. FierceMedical Devices Website.  
<http://www.fiercemedicaldevices.com/special-reports/top-10-medical-device-rd-budgets/siemens-healthcare-top-10-medical-device-rd-budgets>. Accessed May 20, 2013.

Finest image detail can potentially help to initiate earlier treatment decisions and reduce length of stay.





# Symbia Intevo

## xSPECT, the difference between seeing and knowing.

<b>Intro</b>	Diagnostic imaging is expected to deliver definitive and timely answers to clinical questions. And, in today's increasingly competitive and rapidly changing healthcare environment, these answers must also be provided in the safest and most efficient way possible.	Its limited specificity, resulting from the use of mechanically fused images, often requires the need for follow-up procedures that delay patient care and potentially increase costs.	leverage the high resolution to see the unseen and more confidently interpret images. Moreover, Symbia Intevo's unique quantitative capabilities may provide the ability to monitor and adjust treatments earlier by accurately measuring even small differences.
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<a href="#">Quantify the Difference</a>			
<a href="#">Adapt the Lowest Dose</a>			
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Diagnostic imaging is expected to deliver definitive and timely answers to clinical questions. And, in today's increasingly competitive and rapidly changing healthcare environment, these answers must also be provided in the safest and most efficient way possible.

The ability to find these answers sooner than traditional anatomical modalities has made nuclear medicine a cornerstone of diagnostic imaging. However, despite the high sensitivity of today's SPECT/CT scanners that permit early disease detection, the modality is restricted in its ability to provide definitive and timely answers.

Its limited specificity, resulting from the use of mechanically fused images, often requires the need for follow-up procedures that delay patient care and potentially increase costs.

To address these challenges, Siemens is once again pioneering hybrid imaging. Through a new, accurate alignment method and the resulting total integration of SPECT and CT, a revolutionary new modality is emerging: xSPECT\*.

Now, with Symbia Intevo,™\* the world's first xSPECT system, physicians have the potential to not only image disease, but also

leverage the high resolution to see the unseen and more confidently interpret images. Moreover, Symbia Intevo's unique quantitative capabilities may provide the ability to monitor and adjust treatments earlier by accurately measuring even small differences.

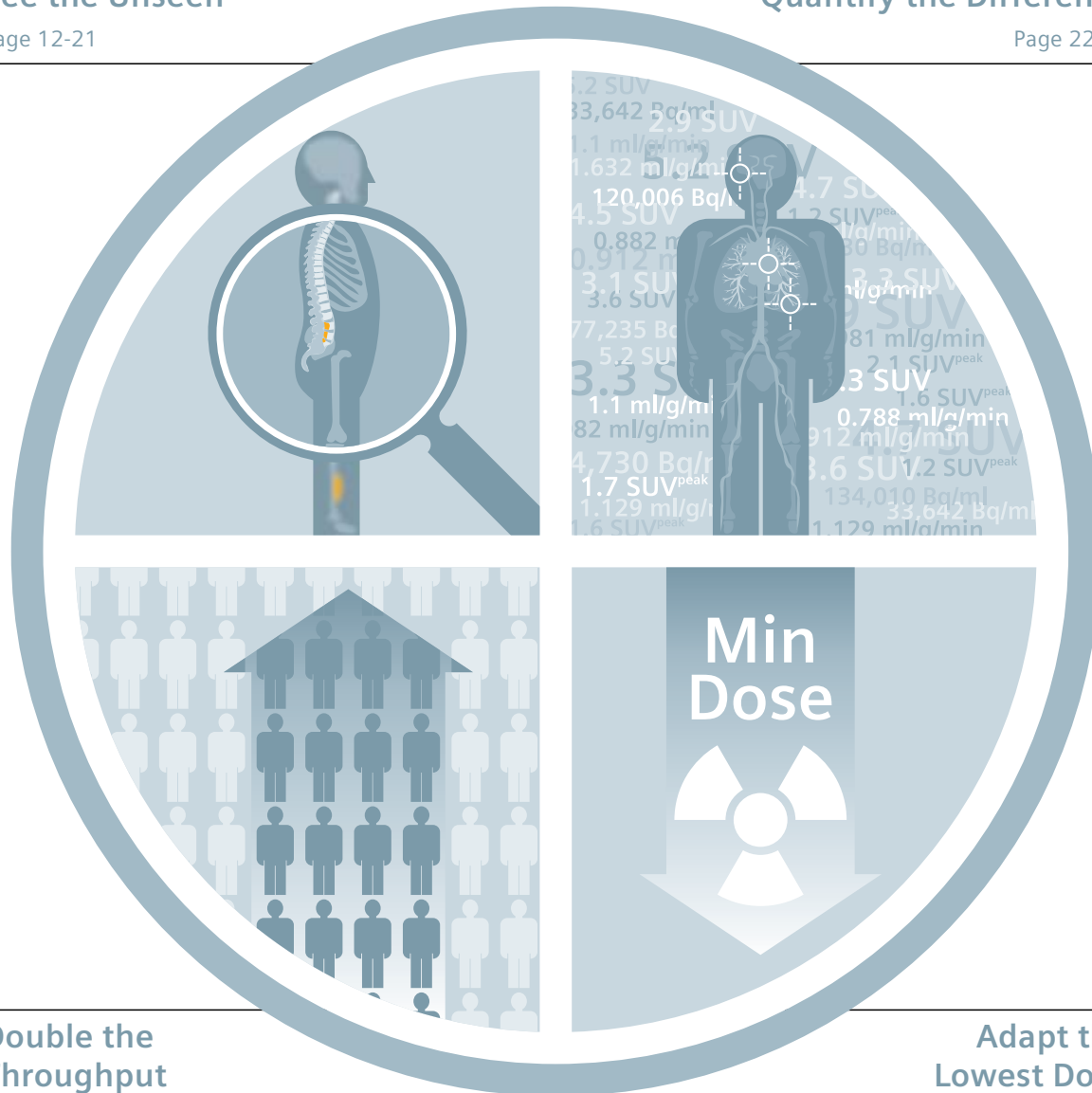
To address the additional needs of improving patient safety and increasing efficiency, Symbia Intevo was designed to offer innovative technologies that allow the administration of the lowest dose while still imaging patients faster than ever before.

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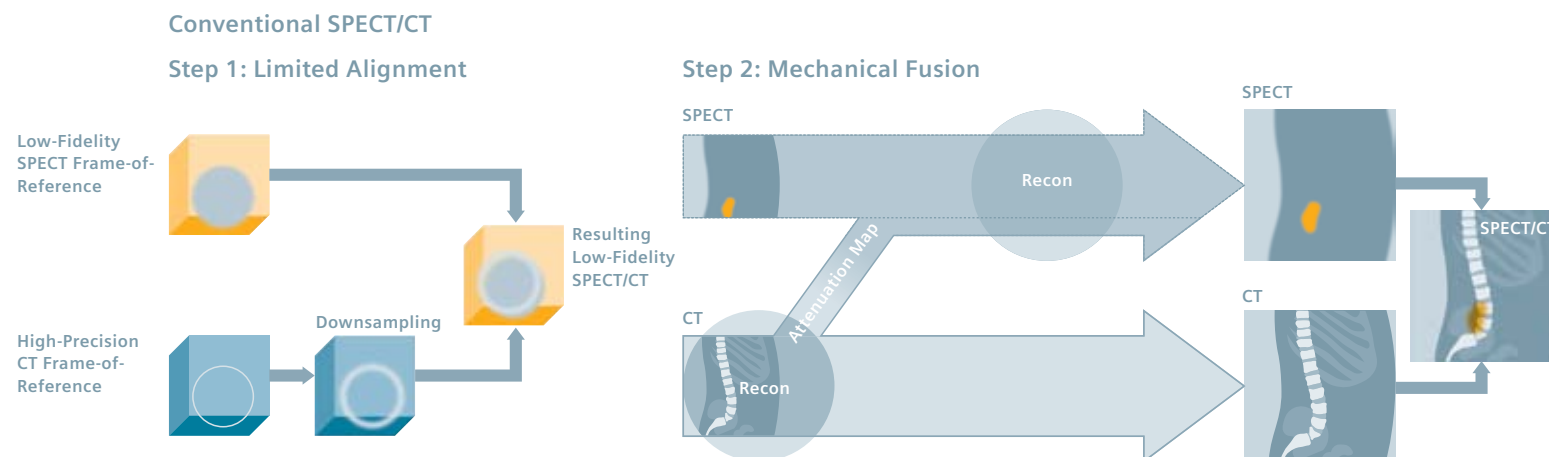
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With half the dose and double the speed, healthcare providers can potentially improve patient well-being, reduce costs and increase productivity. Symbia Intevo may give physicians the ability to make progress in diagnosing and treating the most challenging diseases, and to make more accurate treatment decisions. Challenging the limitations of conventional SPECT/CT systems, Symbia Intevo is the difference between seeing and knowing.



# Technology Behind xSPECT

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## xSPECT Integration

SPECT/CT has always been based on the principle of separately reconstructing images that are then mechanically fused. While this method enables basic anatomical localization of disease, the inherent misalignment of SPECT and CT prevents utilization of high-resolution CT properties during SPECT reconstruction. As a result, the physician's ability to characterize and follow disease is limited.

Unlike conventional SPECT/CT, xSPECT fully integrates SPECT and CT data during reconstruction. The foundation of data integration beyond mechanical fusion relies on the ability to precisely align SPECT and CT. xSPECT is the first-and-only modality designed to use the high-precision CT frame of reference as the basis for accurate alignment of SPECT and CT. The resulting complete integration could set the standard for image quality in anatomical detail and functional clarity. With xSPECT, physicians can potentially find the abnormality early and, more importantly, effectively characterize disease and monitor treatment response.

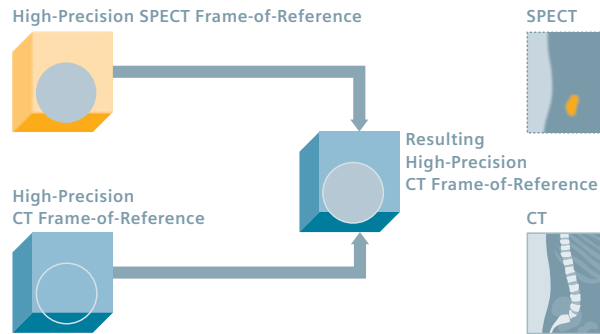
## xSPECT Frame of Reference

Precise data alignment is not possible with today's SPECT/CT as the low-fidelity SPECT is always used as the starting frame of reference, forcing the degradation of CT's fine spatial resolution.

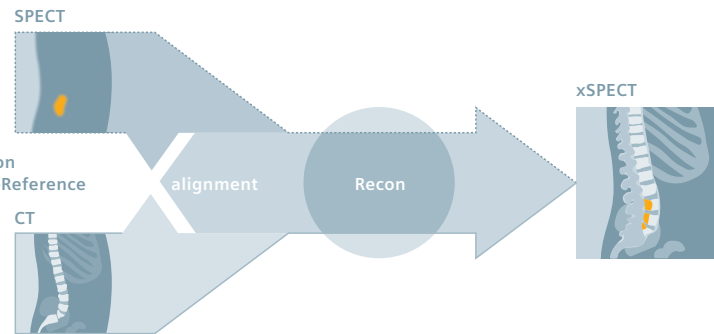
As the result of more than a decade of relentless engineering backed by the largest research and development budget in the industry, Siemens is the world's first molecular imaging company to overcome this challenge and to be able to align SPECT and CT at the high-resolution level of the xSPECT frame of reference—and power them with exclusive innovations in image acquisition and reconstruction.

## xSPECT

### Step 1: Accurate Alignment



### Step 2: Complete Integration



To help ensure precise and accurate image registration during acquisition, Symbia Intevo introduces new slim detectors that provide improved rotational uniformity. The new rear bed support prevents deflection and allows a 202 cm scan length—longer\* than any conventional SPECT/CT.

Moreover, Siemens diagnostic CT technology offers fine detector collimation and the smallest\* focal spot size in its class—6x0.5 mm and 16x0.6 mm—for visualizing the smallest diagnostic details.

Going beyond image acquisition, Siemens has also revolutionized data processing and reconstruction. Starting with a state-

of-the-art 64-bit computer architecture, Symbia Intevo comes fully equipped to process and handle high resolution clinical data without impeding workflow.

Regarding reconstruction, most conventional algorithms utilize generically estimated correction models that do not fully account for detector motions, gantry deflections, collimator hole size and shape, and distance from the patient to the detectors. Using generic estimates for these variables may result in artifacts and truncation that can negatively impact image quality. For example, gravitational deflections of the detector heads during gantry rotation can potentially degrade tomographic resolution.

To overcome these challenges and truly integrate SPECT and CT, through its ground breaking approach, Siemens has developed the most advanced reconstruction software available in nuclear medicine today.

The xSPECT reconstruction algorithm fully and precisely accounts for detector motion, deflections of the gantry, collimator hole size and shape, and distance from patient to the detectors. This advanced xSPECT reconstruction method is a proprietary implementation of a conjugate-gradient iterative reconstruction algorithm. Using a measured three-dimensional point response, this method provides accurate SPECT and CT image reconstruction.

\* Based on competitive literature available at time of publication. Data on file.



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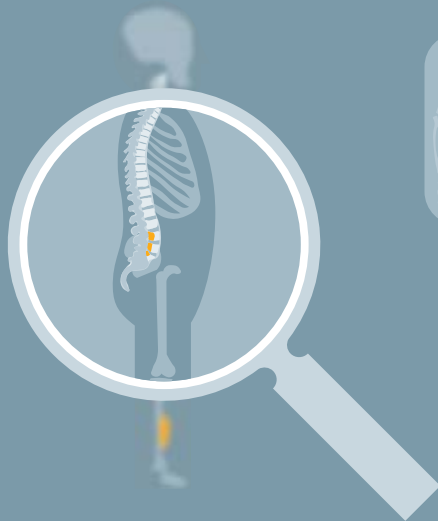
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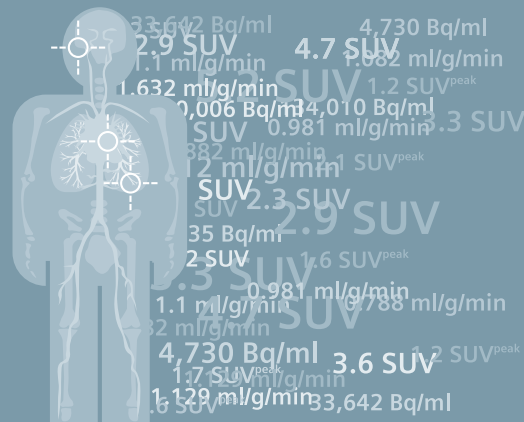
From the beginning, one of the most frequent customer demands has been to improve diagnostic decision making to enable greater confidence. At the same time, healthcare is facing the dual mandates to improve patient safety and increase productivity, while ensuring the highest quality and cost-efficient patient care. With a focus on fulfilling clinical, operational and financial needs, Siemens goal is to deliver innovations that consistently meet the following three criteria:

- Lead the way in technological and medical advancement
- Maximize operational efficiency
- Make state-of-the-art healthcare affordable



#### See the Unseen

Higher xSPECT image contrast and more precise lesion characterization provide physicians with additional support in distinguishing between degenerative disease and cancer. This facilitates clinical decision making and potentially minimizes the need for costly CT, MR or biopsy follow-ups.



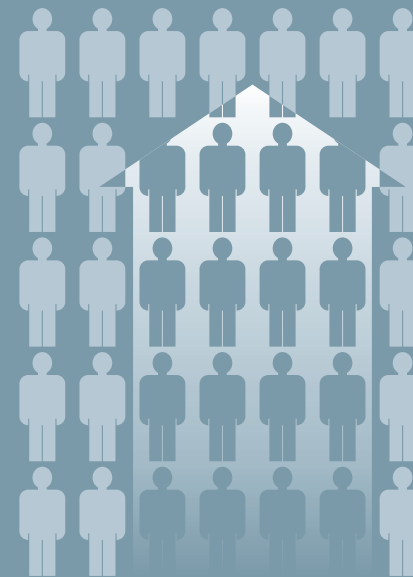
#### Quantify the Difference

Accurate and reproducible quantification may support physicians' ability to more confidently interpret clinical images, enabling early modification of patient treatment to reduce costs associated with ineffective cancer drugs for up to 75% of patients.<sup>1</sup>



#### Adapt the Lowest Dose

Automated dose modulation, flexible CT protocols and unique collimator design deliver up to 74%\* lower CT radiation and up to 26%\* reduction of injected dose to minimize long-term patient radiation risk. By offering the lowest\* patient radiation exposure, healthcare institutions can attract more patients and expand their referral base.



#### Double the Throughput

Increase productivity by improving acquisition time by up to 75% with IQ•SPECT to enhance patient comfort and help reduce motion artifacts, while also leveraging automation features to save on average one hour of staff time each day. Ultimately, this enables healthcare practitioners to double patient throughput.

<sup>1</sup> Brian B. Spear, Margo Heath-Chiozzi, Jeffrey Huff, "Clinical Trends in Molecular Medicine, Volume 7, Issue 5, 1 May 2001, Pages 201-204.

\* Competitive information is based on published literature at the time of printing. Data on file.

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Symbia Intevo enables higher image resolution and more precise lesion characterization than conventional SPECT/CT bone imaging.

# See the Unseen

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Every physician strives to make a confident diagnosis the first time. While today's SPECT/CT systems are effective at disease localization, the technology's limited image quality and context could restrict a physician's ability for disease characterization. Consequently, this conventional medicine may leave physicians with more questions than answers and the need for more correlative tests that mean more time, expense and patient anxiety.

With Symbia Intevo, the world's first xSPECT system, physicians now have access to more diagnostic information to aid them in differentiating cancer from other forms of disease. Now more than ever before, physicians are able to see the unseen.

## xSPECT Foundation

Siemens recognizes the basis of an excellent image is an accurate detection system built with optimized components. From its earliest days developing SPECT/CT technology, the company made image quality its highest priority, and this commitment still holds true today.

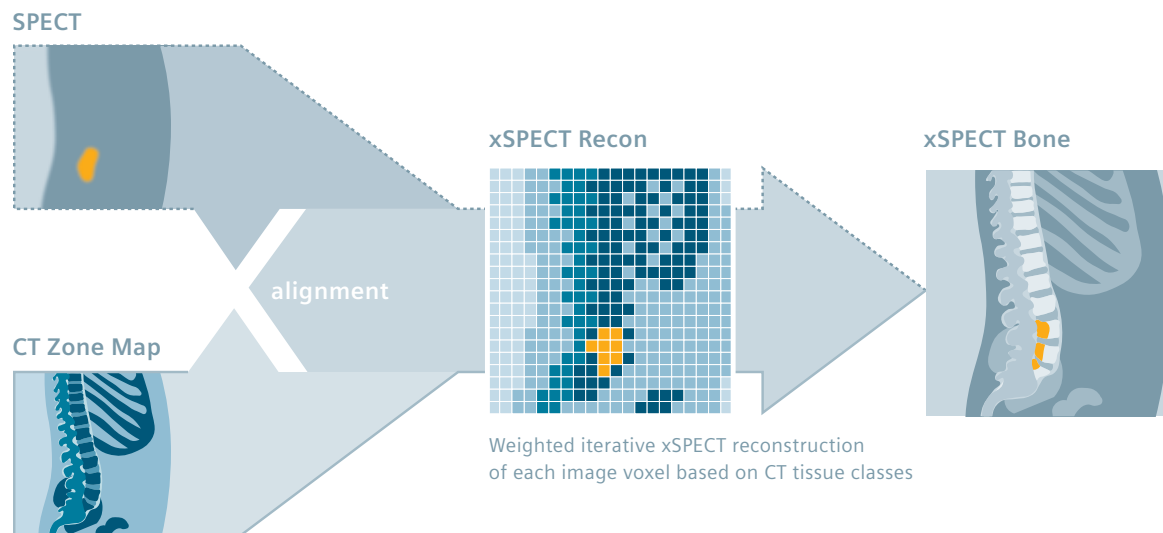
When SPECT/CT was introduced in the late 1990s it was heralded as the end of unclear medicine. Unfortunately, the resolution of SPECT has since remained virtually unchanged and the clinical use of SPECT/CT has continued to be limited. These shortcomings are a direct result of the inherent misalignment of SPECT and CT that degrades the high resolution CT and prevents the two modalities from being

integrated. The result is that conventional SPECT/CT systems are used for attenuation correction and anatomical localization only.

Now with xSPECT, the precise alignment of SPECT and CT, image contrast and small volume accuracy is improved to further assist physicians with confident decision making.

## xSPECT Integration

Every organ in the human body is unique, and some present additional challenges in obtaining the necessary information to support confident diagnoses. This is especially true for bone imaging, where conventional SPECT/CT image quality lacks the specificity required to distinguish between metastatic cancer



Creation of zone map with 5 tissue classes

and degenerative disease, which could prevent definitive diagnosis.

As a result, these limitations may require physicians to order additional tests, like MRI, which could delay treatment and increase cost. Alternatively, the patient may receive an incorrect cancer diagnosis that results in unnecessary treatment.

With xSPECT, Symbia Intevo is the first and only nuclear medicine system to potentially allow physicians to not only identify disease activity, but also better characterize it for more confident treatment decisions. xSPECT makes this possible through accurate alignment of SPECT and CT, facilitating the extraction and deep integration of medically relevant information from the CT into the xSPECT image.

### **xSPECT Bone**

The ability to extract and integrate medically relevant information is also the basis for differentiating between tissue boundaries in bone imaging, which may enable increased image resolution and anatomical clarity.

xSPECT Bone achieves this differentiation by first defining tissue classes based on attenuation coefficients at 140 keV—resulting in five tissue classes of air, adipose, soft tissue, soft bone and cortical bone, as well as a sixth class for metal. With these tissue classes identified, each image voxel is indexed in an  $\mu$ -map where it is then classified as one of the five tissue classes. The result is the creation and implementation of a patient-specific

linear zone map, which can improve image resolution.

For the first time, physicians can potentially detect and distinguish between cancerous lesions and degenerative disorders and may better visualize small or low-uptake lesions thanks to a level of clarity and image detail never before experienced in nuclear medicine.

With Symbia Intevo, now and more than ever before, physicians are able to see the unseen.

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## Easier Decision Making

xSPECT Bone enables higher image contrast and more precise lesion characterization to support physicians in distinguishing degenerative disease from cancer, facilitating easier physician decision making.

## Increased Reading Confidence

Symbia Intevo has the ability to increase physician's reading confidence by offering better visual localization of bone lesions compared to conventional technology.

## Reduced Interpretation Time

Single-step reading with integrated xSPECT Bone images may reduce time to read and report.

## Early Treatment Decisions

Finest image detail can potentially help initiate earlier treatment decisions and reduce length of stay.

## Expand Referral Base

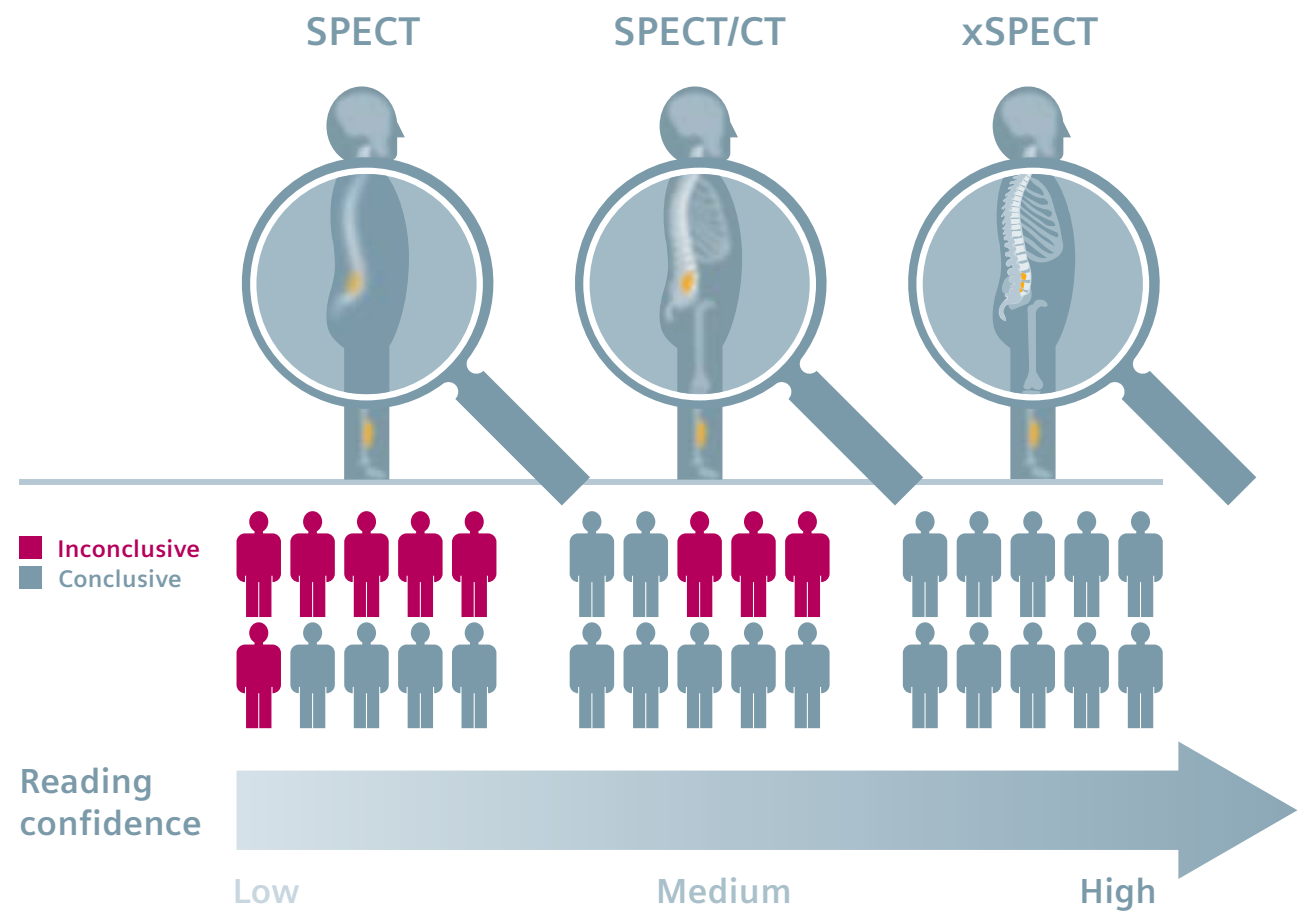
Higher diagnostic image quality may improve referring physician acceptance and increase patient volume.

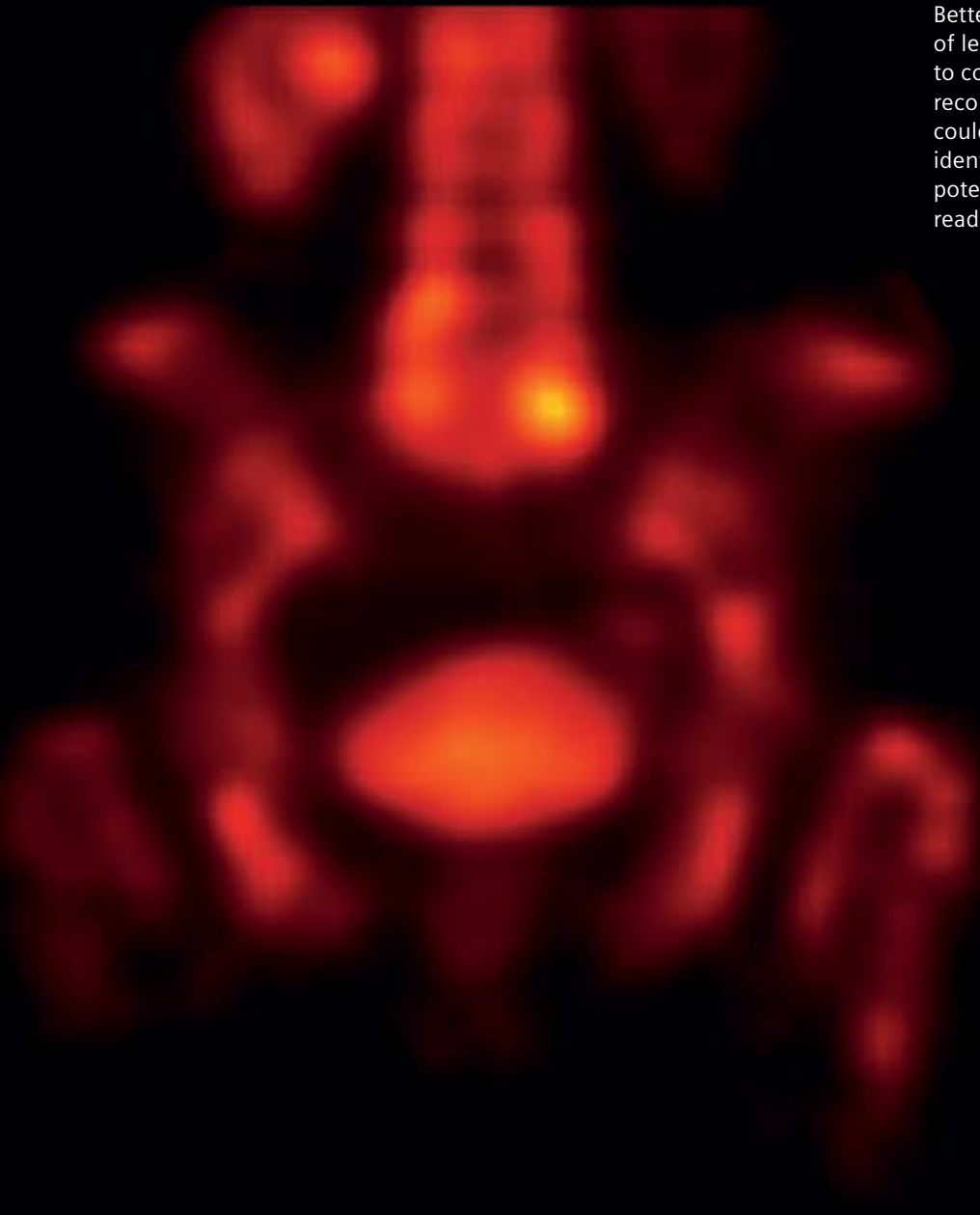
## Reduce Costly Follow-Ups

Clearer images potentially reduce the need for costly CT, MR or biopsy follow-ups.

## Access to Research Grants

The enhanced clinical opportunities provided by xSPECT may unlock new medical applications and advance future areas of research.





Better visual localization of lesions as compared to conventional iterative reconstruction methods could aid in the identification of defects, potentially increasing reading confidence.

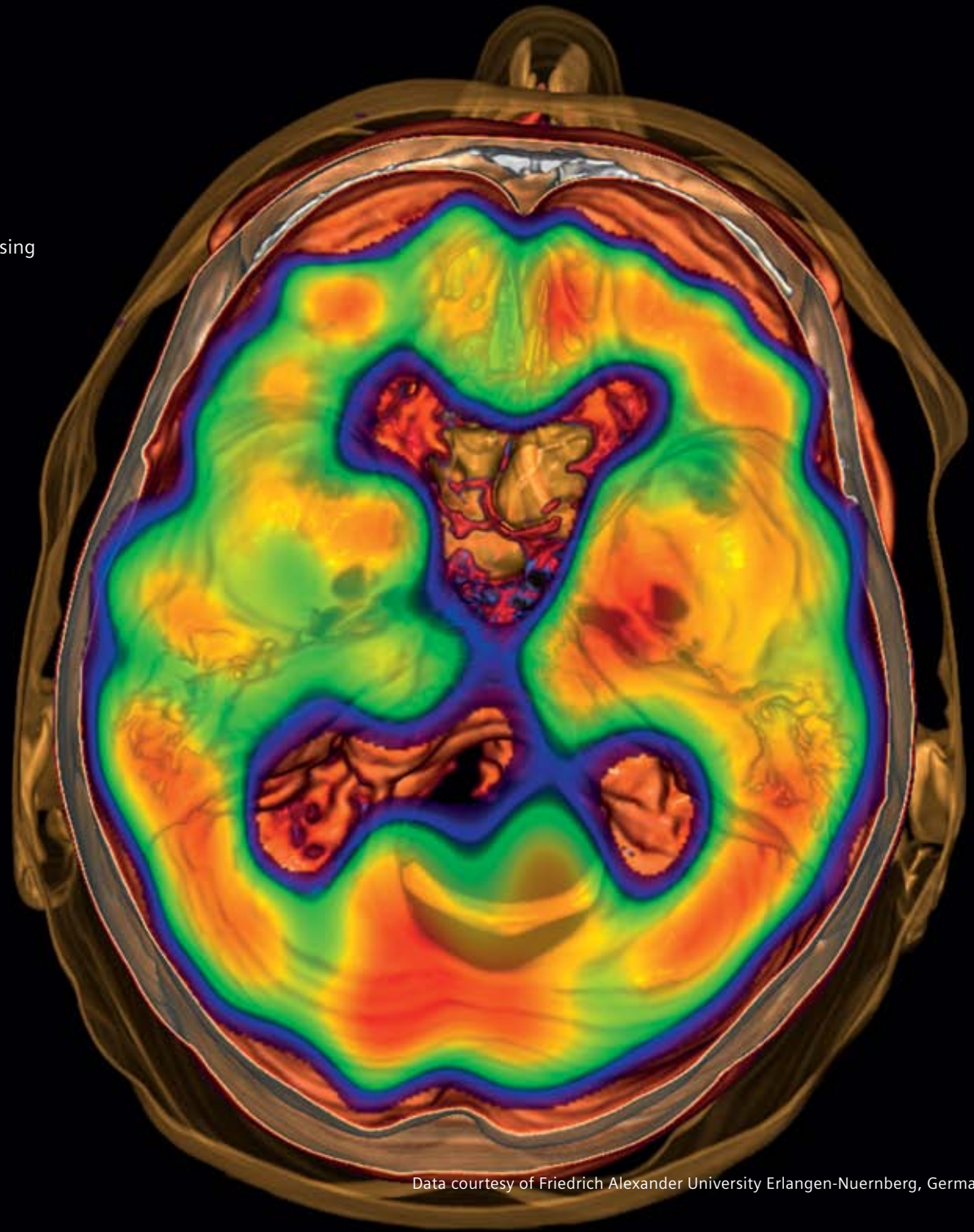




With Symbia Intevo, physicians are now able to have more diagnostic information to aid them in differentiating cancer from other forms of disease.



Symbia Intevo may give physicians the ability to make progress in diagnosing and treating the most challenging diseases.



Data courtesy of Friedrich Alexander University Erlangen-Nuernberg, Germany

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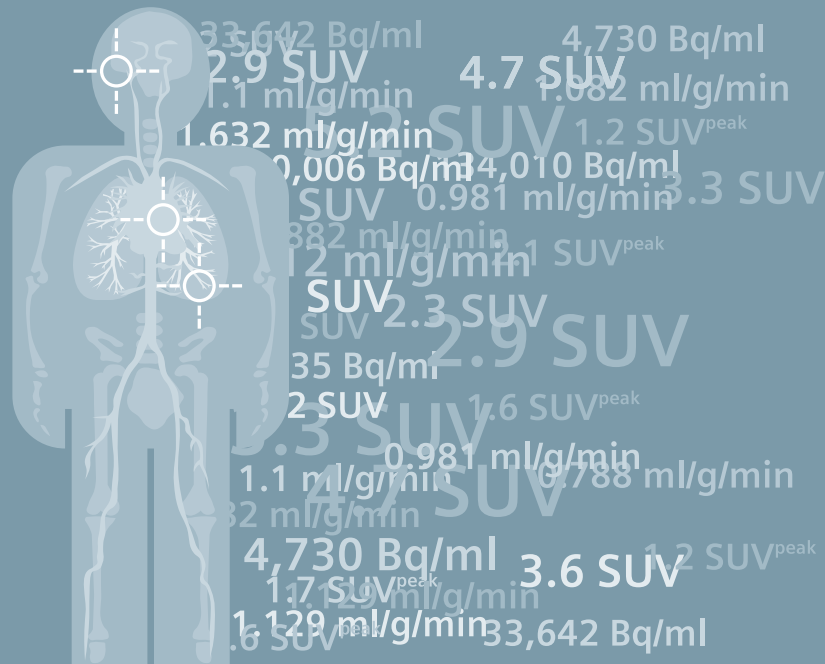
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When a physician is able to make a confident diagnosis, decisions regarding a patient's course of treatment become clearer. Until now, the inability to follow and monitor therapy response has remained a significant obstacle with SPECT/CT. Inherent limitations in conventional technology have prevented SPECT/CT from producing quantitative measurements, the cornerstone of early and accurate evaluation of treatment response.

Symbia Intevo is the first system of its kind to allow easy, accurate and reproducible quantification, making treatment follow-up possible. Siemens' quantitative breakthrough is built on the absolute integration of SPECT and CT made possible by the accurate and precise alignment of xSPECT.

## Quantitative Breakthrough

Measuring a disease's response to therapy can aid physicians in determining treatment effectiveness earlier and allow them to adapt care as needed, thus helping to minimize unnecessary and costly treatments.

In cases where chemotherapy is part of a patient's cancer treatment, the ability to quantify early tumor response is crucial. In addition to the prohibitive cost of multiple treatments, patients can only receive a certain number of rounds before the cancer-fighting therapy does more harm than good.

With current SPECT/CT technology, accurate and routine use of quantifiable information is not possible as the inherent misalignment of SPECT and CT during reconstruction prevents the extraction and integration of critical CT information into the SPECT image data—a necessary component to making SPECT images quantitative.

## xSPECT Quant

Now with the accurate alignment that only xSPECT can provide, Symbia Intevo with xSPECT Quant integrates SPECT count rate for  $^{99m}\text{Tc}$  studies with CT volume and tissue density information to create a quantitative xSPECT image.



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## Early Treatment Modification

Quantitative accuracy may enable early modification of patient treatment to reduce side effects from ineffective therapies.

## More Confident Interpretation

Quantification may support physicians with more confident clinical interpretation<sup>1</sup> (e.g., liver imaging).

## Automated Quantification

Fully automated quantitative reconstruction saves time compared to inefficient manual processes.

## One-click Analysis

One-click quantitative analysis software eliminates up to 22 time consuming steps<sup>2</sup> typically performed for conventional SPECT.

## Expand Clinical Applications

With xSPECT quantification institutions can potentially expand applications, improve referring physician satisfaction and increase reimbursement.

## Reduce Ineffective Treatment Costs

By quantifying small differences, Symbia Intevo can enable early modification of patient treatment to reduce costs associated with ineffective cancer drugs for up to 75% of patients.<sup>3</sup>

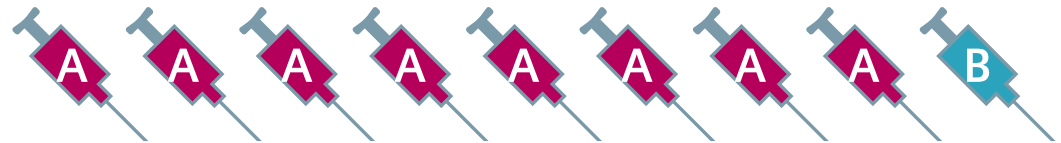
<sup>1</sup> Garin et al, "Dosimetry Based on 99mTc-Macroaggregated Albumin SPECT/CT Accurately Predicts Tumor Response and Survival in Hepatocellular Carcinoma Patients Treated with 90Y-Loaded Glass Microspheres: Preliminary Results", J Nucl Med 2012; 53:255–263

<sup>2</sup> As compared to Mediso Post-Processing quantification steps. Data on file based on the time of publication.

<sup>3</sup> Brian B. Spear, Margo Heath-Chiozzi, Jeffrey Huff, "Clinical Trends in Molecular Medicine, Volume 7, Issue 5, 1 May 2001, Pages 201-204.

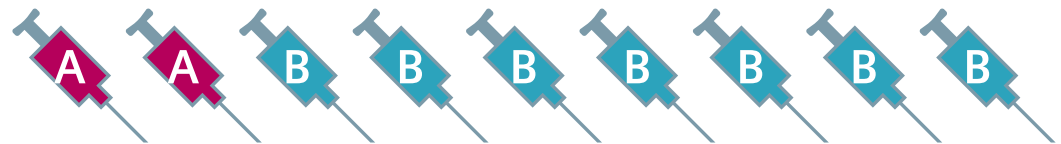
## Earlier monitoring increases chance for therapy adjustment

Anatomical visualization



Visual treatment monitoring alone could result in a late adjustment of ineffective chemotherapy

Accurate and reproducible SUV



Quantitative treatment monitoring could result in early adjustment of ineffective chemotherapy

Possible therapy cycles



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Achieving the highest technical performance is important only when it meets the needs of both patients and users. In diagnostic imaging, patient safety translates primarily to dose reduction.

Mandates to improve patient safety and lower radiation exposure are some of the most controversial topics in medical imaging today, subjecting patients to a high level of uncertainty and increasing the pressure for medical professionals to justify imaging procedures.

## Low Dose CARE

Principles like As Low as Reasonably Achievable (ALARA) guide the reduction of all radiation exposure to the lowest possible level.

With CARE (Combined Applications to Reduce Exposure), Siemens has been highly successful at integrating many innovations into its systems that significantly reduce radiation dose compared to conventional SPECT/CT systems.

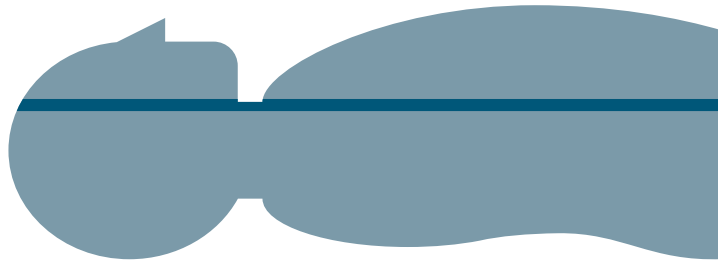
## CARE Dose4D

It stands to reason that because every patient is unique in terms of size, weight and physical configuration that each should receive an individually determined dose. Unfortunately, many conventional SPECT/CT

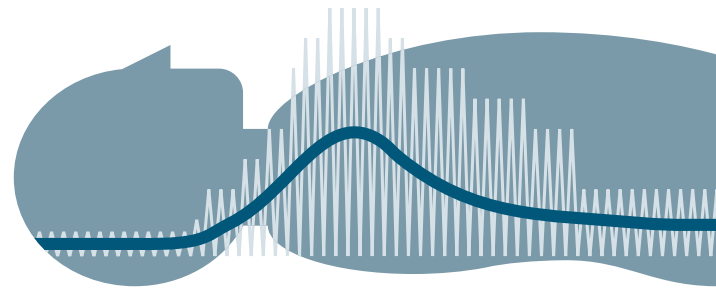
systems lack the ability to fully adjust CT parameters and prevent dosage from being adjusted on a patient-by-patient basis. And even if conventional 3D modulation is available, the dose is calculated using only the patient topogram and is not adjusted in real-time as the scan takes place, potentially exposing patients to higher doses than needed.

Siemens CARE Dose4D™ automatically adapts radiation dose to the size and shape of the patient, achieving optimal tube current modulation in two ways. First, tube current is varied on the basis of a topogram that compares the actual patient to a “standard-sized” patient. As might be expected, tube current is increased for larger patients and reduced for smaller ones. Differences in attenuation in distinct body regions are taken into account.

## Conventional



## CARE Dose4D



For example, in an adult patient, 140 mAs might be needed in the shoulder region, whereas 55 mAs would be sufficient in the thorax, 110 mAs in the abdomen and 130 mAs in the pelvis.

In addition, real-time angular dose modulation measures the actual attenuation in the patient during the scan and adjusts tube current accordingly—not only for different body regions, but also for different angles during rotation.

With CARE Dose4D, every patient receives a dose tailored to their body, reducing radiation exposure by up to 68%.\*

### Flexible kV

In addition to CARE Dose4D, Symbia Intevo features the unique ability to also adjust the

X-ray tube voltage (kV) for an even greater level of dose reduction.

While conventional SPECT/CT systems limit users to a tube voltage of 120 kV, Symbia Intevo enables users to select between 80, 110 and 130 kV. This becomes especially important for cardiac attenuation correction where the ability to lower the tube voltage to 80 kV, and when combined with CARE Dose4D, enables the dose to be up to 74% lower than if the study had been performed with a conventional fixed 120 kV.

### Ultra Fast Ceramic Detectors

Due to their luminous efficiency and optimized wavelength, Symbia Intevo's Ultra Fast Ceramic CT detectors allow for the applied X-ray dose to be optionally evaluated according to the patient's anatomy for an exposure reduction of up to 30%.\*

### CT Iterative Reconstruction

Dose reduction with CT has been limited by the filtered back projection reconstruction algorithm currently in use. When using this conventional reconstruction of acquired raw data into image data, a trade-off between spatial resolution and image noise has to be considered.

With Symbia using the proposed Siemens Iterative Reconstruction in Image Space (IRIS),\*\* raw data reconstruction is intended to be applied only once. During this initial raw data reconstruction, a so-called and newly developed master image is generated that contains the full amount of raw data information, but at the expense of significant image noise. During the following iterative corrections, the image noise is removed without degrading image sharpness.

\* Based on competitive literature available at time of publication. Data on file.

\*\* IRIS is under development and is not yet commercially available. Due to regulatory reasons its future availability cannot be guaranteed.

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## **Reduce Radiation Risk**

By offering automated dose modulation, flexible CT protocols and unique collimator design, Symbia Intevo enables up to 74%\* lower CT radiation and up to 26%\* reduction in injected dose to minimize long-term patient radiation risk.

## **Reduced Setup Time**

CARE Dose4D automatically modulates dose on-the-fly, eliminating the need for manual dose adjustments.

## **Readily Available Dose Documentation**

Integrated dose reports and dose alerts enable easier and more efficient documentation of patient radiation exposure.

## **Increase Referral Base**

By offering the lowest\* patient radiation exposure, institutions will attract more patients and expand their referral base.

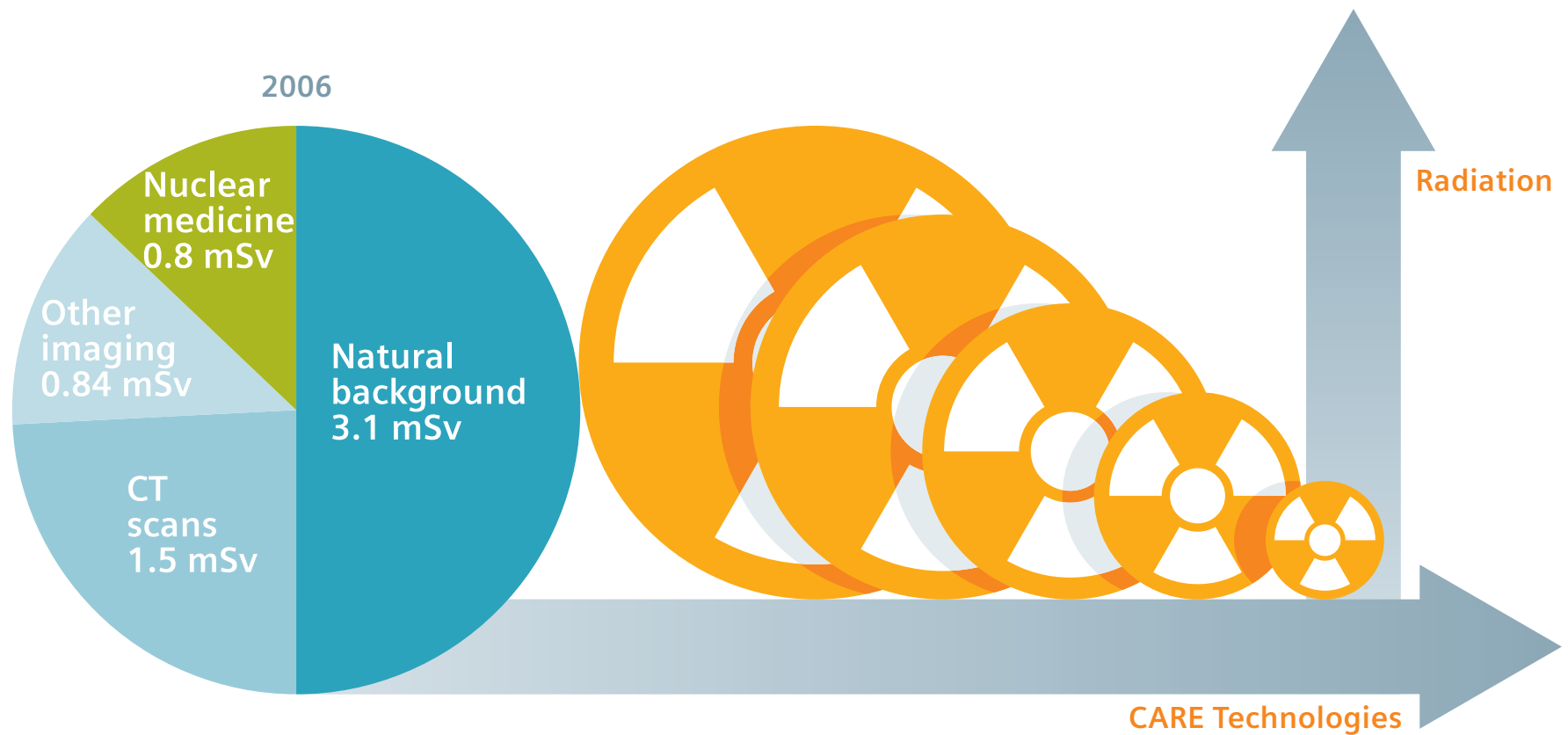
## **Up to 26% Reduction in Radioisotope Cost**

With unique AUTOFORM collimator technology, Symbia Intevo allows for up to 26% lower dose\* saving radioisotope costs.

## **Lower Lifecycle Cost**

By adapting the lowest dose, Symbia Intevo uses less CT tube voltage and current potentially extending tube life.

## CARE Technologies Support Dose Reduction



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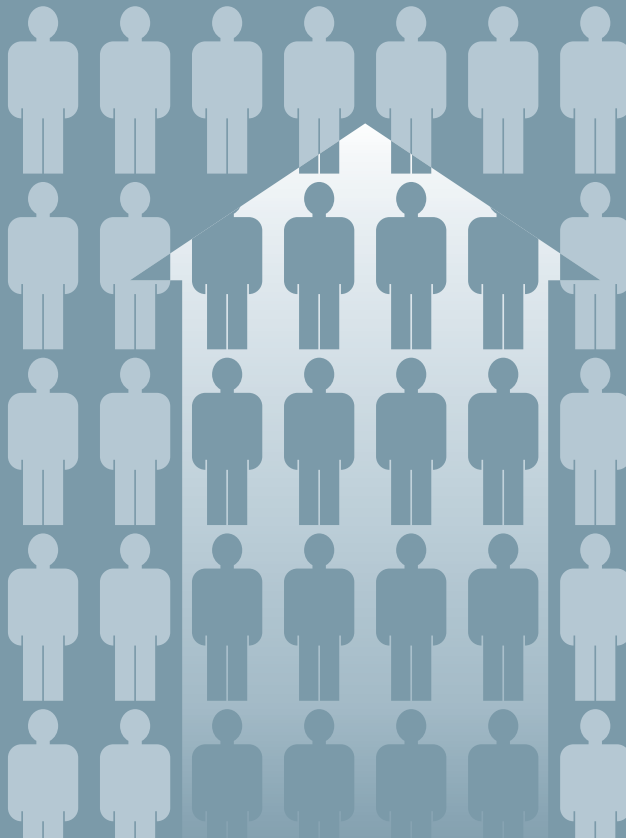
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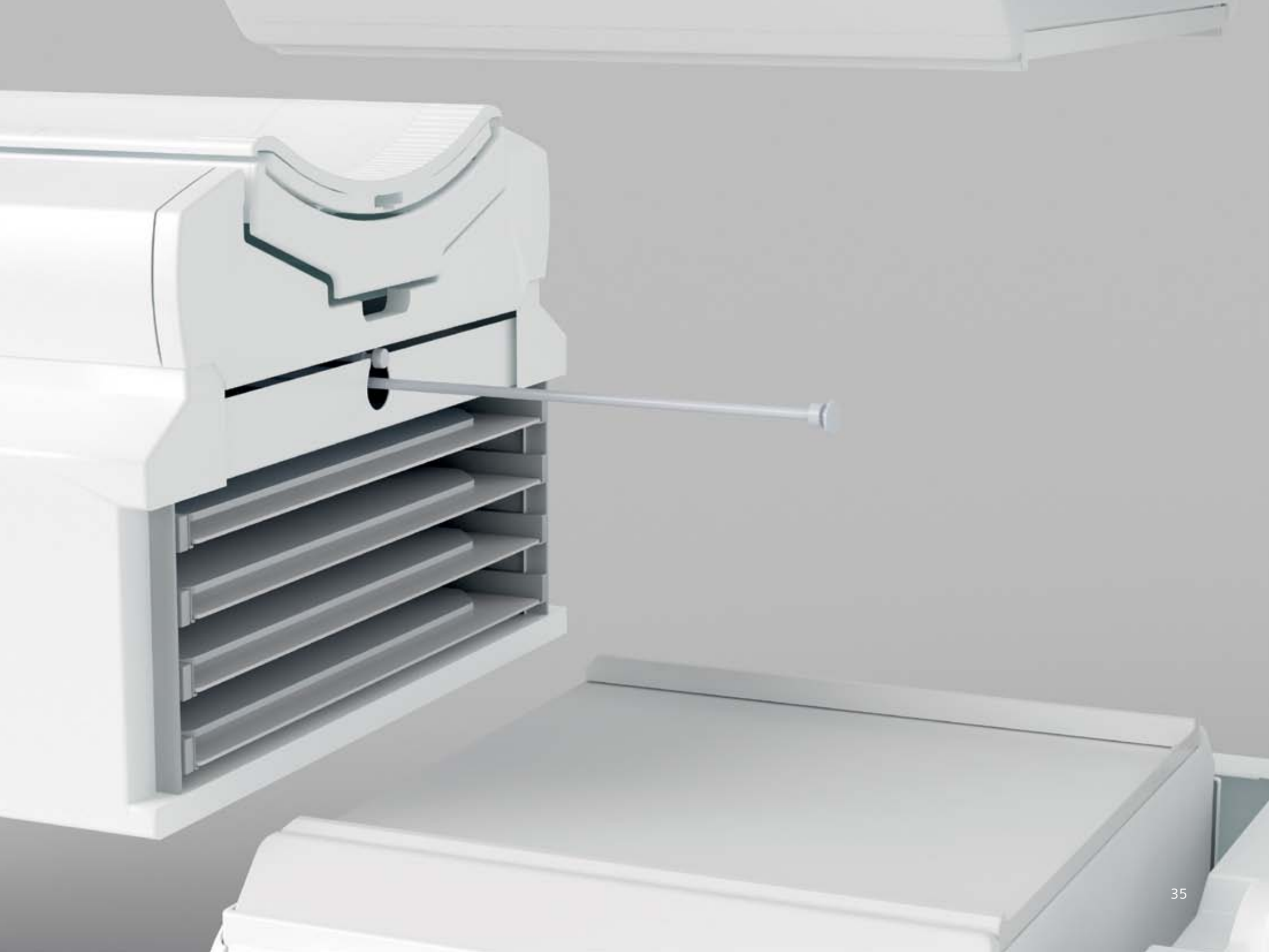
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Time affects all aspects of daily imaging from patient comfort to staff productivity. With increasing patient demand and decreasing reimbursement levels, efficiency and productivity are essential. Routine manual tasks take away time and resources that could be better used in patient preparation, scanning and processing.

Understanding the need for higher workflow efficiency, Siemens has introduced several unique and proprietary solutions that optimize operational efficiency, increase utilization and enable the potential to double patient throughput.

## Automatic Quality Control

All SPECT/CT systems require regular quality control (QC) tests to validate calibration of the detectors and other components. For conventional scanners, quality control is performed manually and typically requires 20 minutes to an hour for daily QC and about six hours for monthly QC. Because the tests require preparation and handling of open radioactive sources, the process must be rotated amongst the staff to avoid overexposure. Dose spillage adds further risk to the process.

With Siemens Automatic Quality Control (AQC), the process is performed automatically overnight, with a report provided for the technologist to review the next morning. This has the potential to save up to one hour each day and ensures the

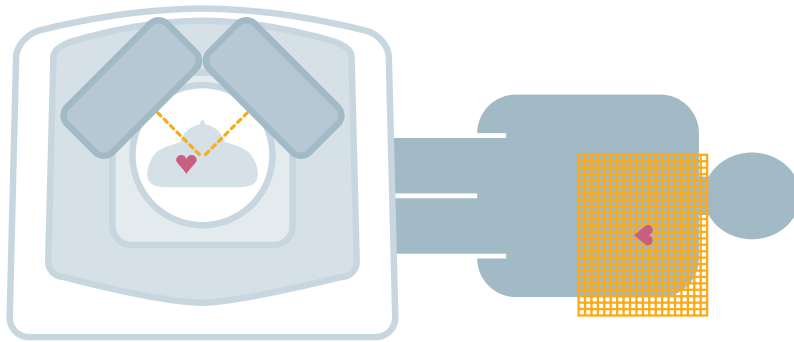
camera is always ready to scan patients. Additionally, Siemens AQC facilitates performance trending, reduces the risk of open-source spillage and potentially minimizes staff radiation exposure.

## Automatic Collimator Changer

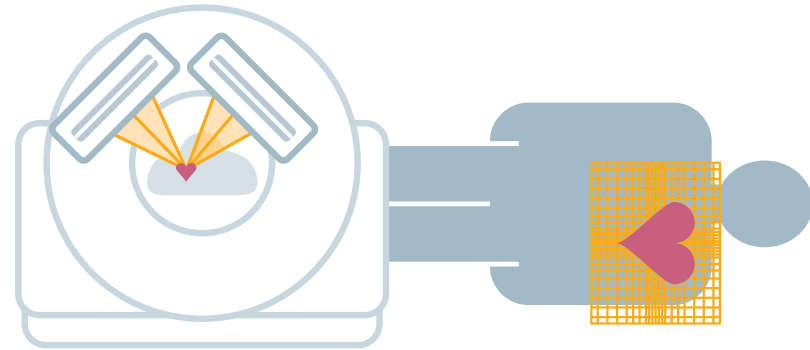
With conventional SPECT/CT systems, collimators must be exchanged manually. This is not only time consuming, but increases the risk of technologist injury or equipment damage.

Siemens Automatic Collimator Changer (ACC) automatically exchanges the collimators with a simple click so technologists can gain approximately five minutes per exchange to perform other tasks.

### Conventional Isocentric Acquisition



### IQ•SPECT Cardio-Centric Acquisition



#### Autocontour

With conventional scanners the technologist manually positions the detector heads as close as possible to the patient without risking contact. If the detector heads are not close enough, image resolution is lost. Siemens Autocontour automatically follows the patient's body using infrared sensors to reduce detector-to-patient distance for optimal SPECT resolution.

#### AUTOFORM Collimators

Conventional collimators have uneven septa wall thickness, which decreases sensitivity and can require longer scan times. Siemens AUTOFORM collimators use a proprietary design that provides uniform septa wall thickness that allows up to a 26% increase\* in sensitivity resulting in faster scan times.

#### IQ•SPECT Ultra-Fast Cardiac

Routine cardiac studies can take up to 20 minutes to perform, limiting the number of patient scans that can be performed. Additionally, longer acquisition times further increase the potential for patient movement, which can lower image quality.

In an attempt to lower acquisition time, conventional SPECT/CT systems use SPECT 3D iterative reconstruction to lower scan time, but in doing so sacrifice image quality. Alternative technologies such as dedicated cardiac systems exist but they require separate rooms, staffing and operating costs that make them less economically viable.

Symbia with IQ•SPECT is the only general-purpose system that enables 4-minute, ultra-fast cardiac imaging without sacrificing image quality.

IQ•SPECT's unique **SMARTZOOM** collimators magnify the heart to improve sensitivity four times to enable ultra-fast imaging without a loss in counts. A cardio-centric orbit powered by Symbia's advanced detector robotics ensures the heart is always in the detector's focus during acquisition. Finally, a proprietary implementation of a conjugate-gradient iterative reconstruction algorithm is used to accurately reflect the measured geometry of the 48,000 **SMARTZOOM** collimator holes and the cardio-centric orbit of the detectors ensuring an accurate image reconstruction.

\* Based on competitive literature available at time of publication. Data on file.

# Your Return on Innovation

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## **Reduce Motion Artifacts**

Symbia Intevo's unique cardiac imaging solution, IQ•SPECT, improves acquisition time by up to 75% for enhanced patient comfort and fewer motion artifacts.

## **Improve Diagnostic Confidence**

The unique automated quality control feature provides consistent image quality, supporting higher diagnostic confidence.

## **Save One Hour Daily**

Symbia Intevo offers a series of automation features such as AQC and ACC that can save on average one hour of staff time each day.

## **Reduce Patient Waiting List**

With unique collimator designs, institutions now have the potential to reduce their patient waiting list with up to 75% more cardiac counts and 26%\* more bone counts.

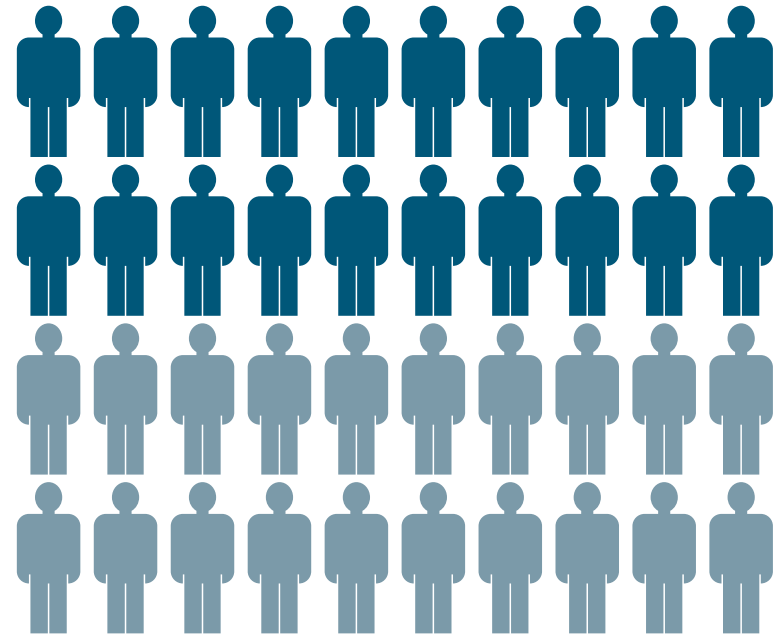
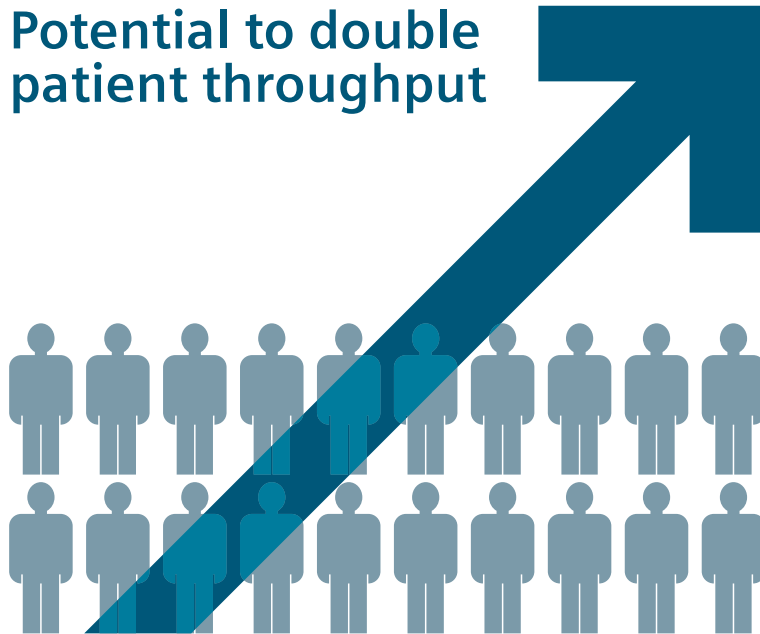
## **Expand Referral Base**

Symbia Intevo's faster imaging solutions improve patient comfort and satisfaction, potentially expanding the institution's referral base.

## **Double the Throughput**

By combining all of Symbia Intevo's unique productivity features, institutions can save up to 50% more time and have the potential to double patient throughput.

Potential to double  
patient throughput



Up to **50%** Time Savings



A woman with dark hair and bangs, wearing blue medical scrubs, is smiling and looking through a circular opening in a white wall. Her right hand is resting on the inner edge of the opening. The background is a plain, light-colored wall.

Symbia Intevo

# Symbia.net

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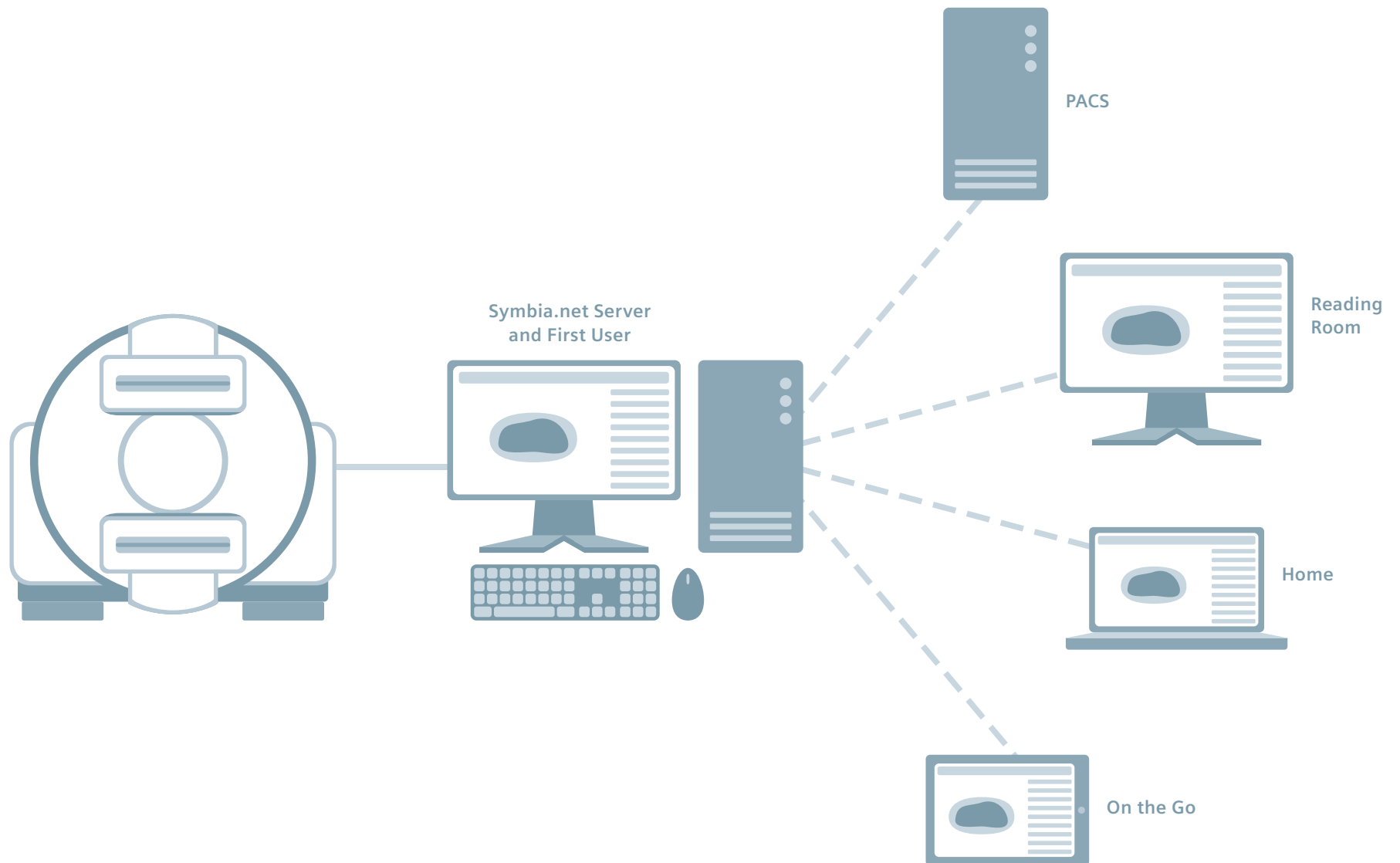
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Symbia.net is an economical client-server solution for anywhere,\* anytime processing and reading of molecular imaging studies—from basic nuclear medicine to quantitative measurements. Symbia.net is the platform that offers maximum flexibility and investment protection.

Symbia.net can be configured as a standalone workplace for one user or as a client-server with multiple concurrent users.

Symbia.net provides anywhere access from any compatible Mac or PC. With the Symbia.net app users can further leverage their investment to access all of their tools, applications and clinical cases from the iPad.\*\*

This enables users to more easily discuss images and cases with patients, present results in tumor board meetings and gather second opinions, even from the most remote places.



# Customer Care

## Service and Features Built Around You

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### Flexible Scalability and Upgradability

Symbia Intevo offers a scalable and flexible range of xSPECT, and CT features, giving customers confidence that they will have access to options that enable business growth as their needs change. All advanced xSPECT and CT features can be configured at system purchase or are available as an in-field upgrade. These flexible upgrade opportunities provide the best-possible investment protection to keep the system clinically relevant for years to come.

### MI University 360

Explore the world of MI University 360 and be surrounded with all of the resources needed to grow a business. MI University 360 is a single online source for valuable and practical molecular imaging information, offering an expansive library of

molecular imaging references and tools that span oncology, neurology, cardiology and radiation treatment planning.

Visit [www.siemens.com/miu360](http://www.siemens.com/miu360) to access MI University 360 for case studies, lectures, insights into new technologies, ideas for increasing molecular imaging utilization and improving productivity, methods and materials for marketing molecular imaging practices, continuing education, papers and publications, and ongoing service and support offerings.

### Siemens Guardian Program

Symbia Intevo offers the dependability of Siemens Guardian Program™. Based on real-time data, Siemens Guardian Program provides security online through constant system monitoring. By pro-actively observing your system, deviations are

detected before major problems occur. In the event your system malfunctions, a predefined high speed escalation process is activated, quickly guiding you through the first critical phase to the point where your system returns online again.

Our SRS Event Monitoring prerequisite responds quickly and appropriately. Event Monitoring software installed on Siemens systems, monitors all your system's parameters. If a default value is exceeded or falls short, the system automatically sends a status message to our UPTIME Service Center.

With SRS Preventive Event Monitoring, certified support engineers, guaranteed onsite response and minimum repair time, Siemens Guardian Program will minimize the downtime of your system and optimize your workflow.



### **Information and Communication**

Siemens offers easily accessible information portals, monthly newsletters and a customer magazine *Imaging Life*.

### **Dedicated to Your Success**

Stay one step ahead and take full advantage of your Symbia Intevo with the Siemens Customer Care program. As a worldwide innovation leader in medical imaging, Siemens has applied this extensive experience to its molecular imaging solutions. Customers benefit from Symbia Intevo capabilities and the innovative, flexible and comprehensive solutions that allow physicians to focus on delivering high quality patient care. The program helps maximize return on innovation throughout the entire life cycle of the system.



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# Technical Data\*

	Feature	Symbia Intevo 2-, 6- and 16-Slice
See the Unseen	Reconstruction frame-of-reference (FoR)	CT FoR
	SPECT reconstruction matrix size	256x256, 128x128, 64x64
	Advanced reconstruction	xSPECT iterative or Flash3D iterative
	Zone Map (tissue classification)	Yes, xSPECT Bone
	Detectors rotational accuracy	0.1°
	Detector caudal tilt	Yes, +16°/-16°
	CT focal spot size	Symbia Intevo 2: 0.8x0.7 mm/8° Symbia Intevo 6: 0.8x0.5 mm/7° and 0.8x0.7 mm/7° Symbia Intevo 16: 0.8x0.5 mm/7° and 0.8x0.7 mm/7° (smallest in the industry)
	Table flex	No, rear bed support prevents flex
	Reconstruction workstation	64-bit architecture
	CT continuous scan length	Symbia Intevo 2: 166 cm, Symbia Intevo 6: 168 cm, Symbia Intevo 16: 186 cm
	Gantry deflection matrix	Yes, 3D fully adaptive gantry deflection
	Extended field-of-view (eFOV)	70 cm eFOV
	Point-spread function (PSF)	Yes, 3D measured PSF
Quantify the Difference	Automated quantification	Yes, xSPECT Quant
	Quantitative volumetric analysis	Yes, in units of Bq/ml or SUV or HU units or counts-per-voxel
	Quantitative uncertainty %	<=10%**
	Reproducible quantification	Yes, with a unique monthly quantitative calibration
	Quantitative calibration source	Yes, NIST precision <sup>57</sup> Co source (unique to Siemens)
Adapt the Lowest Dose	CT dose modulation	Yes, 4D and fully automatic
	Flexible CT voltage settings	Yes, 80 kV, 110 kV, 130 kV
	CTDI Dose Values – Abdomen AC	1.20 mGy @130 kV
	CTDI Dose Values – Cardiac AC	1.56 mGy @130 kV or 1.00 mGy @110 kV or 0.4 @80 kV
	CTDI Dose Values – Parathyroid AC	1.80 mGy @130 kV
	LEHR collimator sensitivity @10 cm	202 cpm/μCi (best NEMA sensitivity)*
	SMARTZOOM collimator sensitivity @28 cm (recommended)	810 cpm/μCi (unique to Siemens)***
Double the Throughput	Average Autocontour distance	1.1 cm (0.45 in)
	Quality control	Yes, fully automated with 2 shielded sources embedded in the patient bed
	Unique cardiac collimator	Yes, SMARTZOOM with 810 cpm/min***
	Collimator exchange	Fully automatic with integrated set of collimators

\* Based on competitive literature available at time of publication. Data on file.

\*\* Accuracy data validated using phantom studies for objects larger than 3 times system resolution.

\*\*\* Values measured in accordance with NEMA Standards Publication NU-1 2007 using 3/8" crystal.

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