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[siemens.com/mct-flow](https://www.siemens.com/mct-flow)

Biograph mCT Flow

Moving the standard to personalized care.

Every patient is unique.
Every organ is different.
Every disease is specific. So
a one-size-fits-all exam protocol
is not ideal for achieving the
best imaging quality and can
negatively influence treatment
decisions. A tailored approach,
however, is more complex and
usually requires additional
time. With Biograph mCT Flow,¹
you can standardize imaging
protocols while ensuring
personalized scans, providing
a higher standard² of imaging
in a single, fast exam.

Better care starts at the molecular level

In today's healthcare environment, small details can lead to significant value — for patients, caregivers and enterprises. Our advances in molecular imaging help you reveal critical details that result in meaningful improvements for all.





Moving the standard to personalized care

Biograph mCT Flow with FlowMotion™ technology combines our standard-setting PET/CT with a unique system design that enables continuous motion of the patient table—allowing increased image quality, greater patient comfort, better performance and expanded versatility.²

SIEMENS

Set the standard in PET/CT

Our foundation of reliable, sustainable and proven technologies allows you to start from a position of clinical power using our entire family of Biograph™ scanners.



Leverage an open design

Streamline user experience and address a broader patient population with design purposefully built on our key technology.

Tailor each exam

Meet individual patient needs across your entire enterprise by personalizing scans based on anatomy, and ensure reproducibility by standardizing imaging protocols based on indication.

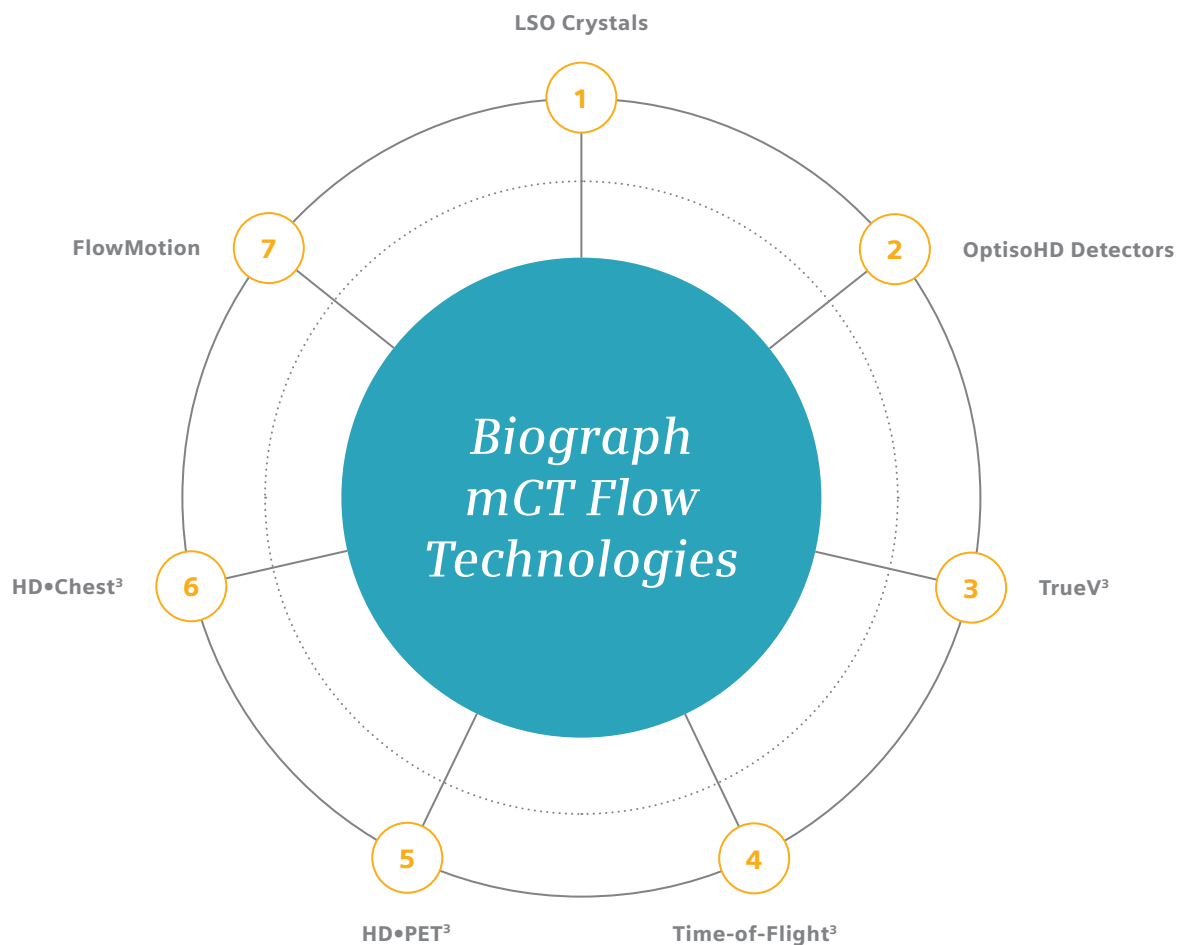


Move your business forward

Evolve your business with the changing healthcare market with our scalable PET/CT platform that opens doors to new opportunities and helps to maximize and protect your investment for the future.

Set the standard in PET/CT

The value of PET/CT is in the details—more precise information leads to greater potential for an earlier diagnosis and a more definitive treatment strategy, helping to improve patient outcomes. Our entire product portfolio is built on technology that all together adds up to more. Our wide range of features expand your clinical capabilities and deliver excellent lesion detectability, spatial resolution and quantification accuracy—letting you bring a higher standard of care to more patients.



1

LSO crystals

Address a broader range of indications

Everything starts with the smallest element—the crystals. We are the only company to grow and individually select LSO crystals in house. Compared to BGO crystals, ours scintillate faster and have a higher light output, enabling better image quality and Time-of-Flight.⁴ With LSO crystals you are able to use all available PET tracers for a broader range of indications.



80%

Market share of lutetium-based scanners in 2015⁴

2

OptisoHD detector

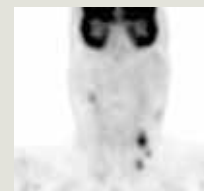
Visualize more lesions

After our crystals are grown and individually selected, they are arranged with no gaps between detector blocks to provide very high spatial resolution and lesion visualization. The smaller the crystal element, the more detailed the image. Biograph mCT Flow's patented OptisoHD detectors feature our unique LSO crystals cut into only four millimeter elements.

A smaller crystal size improves the visualization of small structures. In this head and neck cancer case, for example, **two additional small lesions** are identified.



6.3 mm crystal element



4.0 mm crystal element

36% smaller

2x more crystal elements per scanner

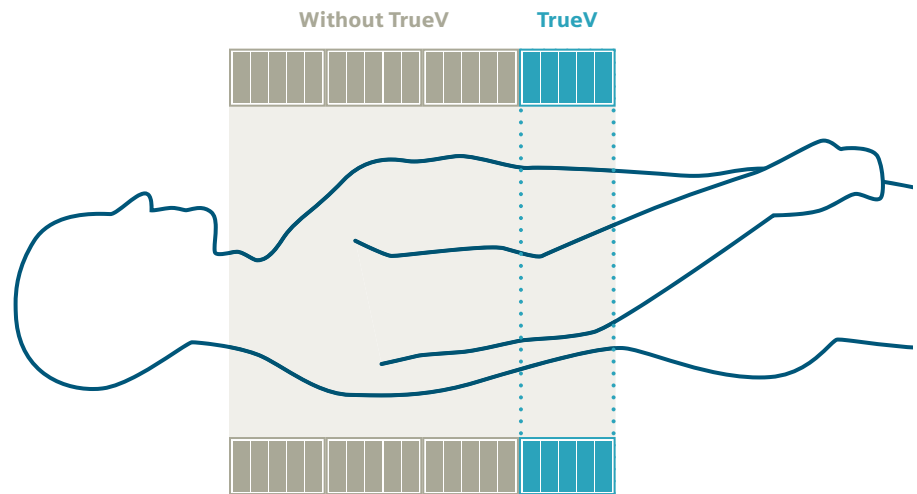
Data courtesy of University of Tennessee, Knoxville, Tennessee, USA.

3

TrueV³

Scan faster or offer a lower dose

Once the block detectors are assembled, they can be arranged in standard or extended configurations. Our extended configuration, TrueV, widens the axial FOV for an increased count rate. **33% more⁴** detector elements results in more than a **70% increase** in count rate performance,⁵ enabling either half the dose or two times the speed.

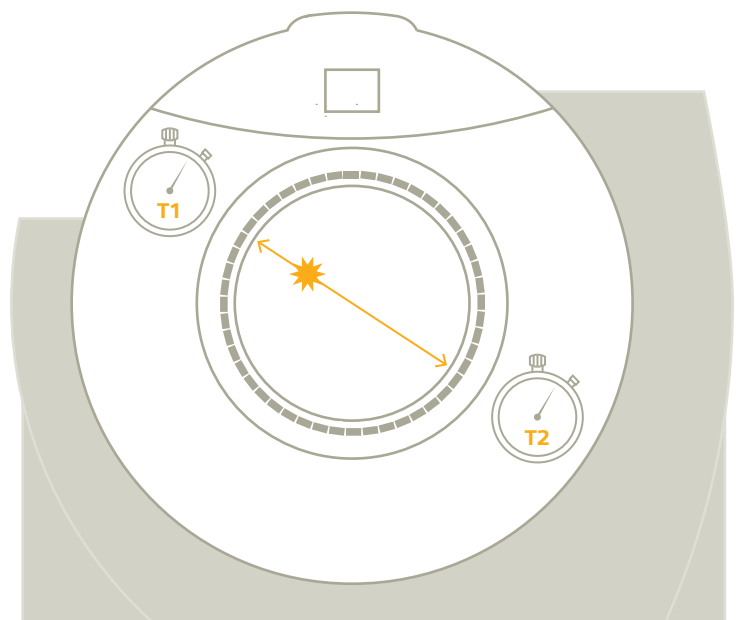


4

Time-of-Flight³

Generate increased image quality, lower dose or faster scans

LSO's short decay time enables you to measure the time difference between the detection of the two photons from the annihilation. That timing information, known as Time-of-Flight, can offer up to 200% improvement in signal-to-noise ratio, for even better image quality, lower dose or faster scan speed. It is quickly becoming an industry standard as 99% of all Biograph mCT Flow systems sold in 2016 included TOF.⁴



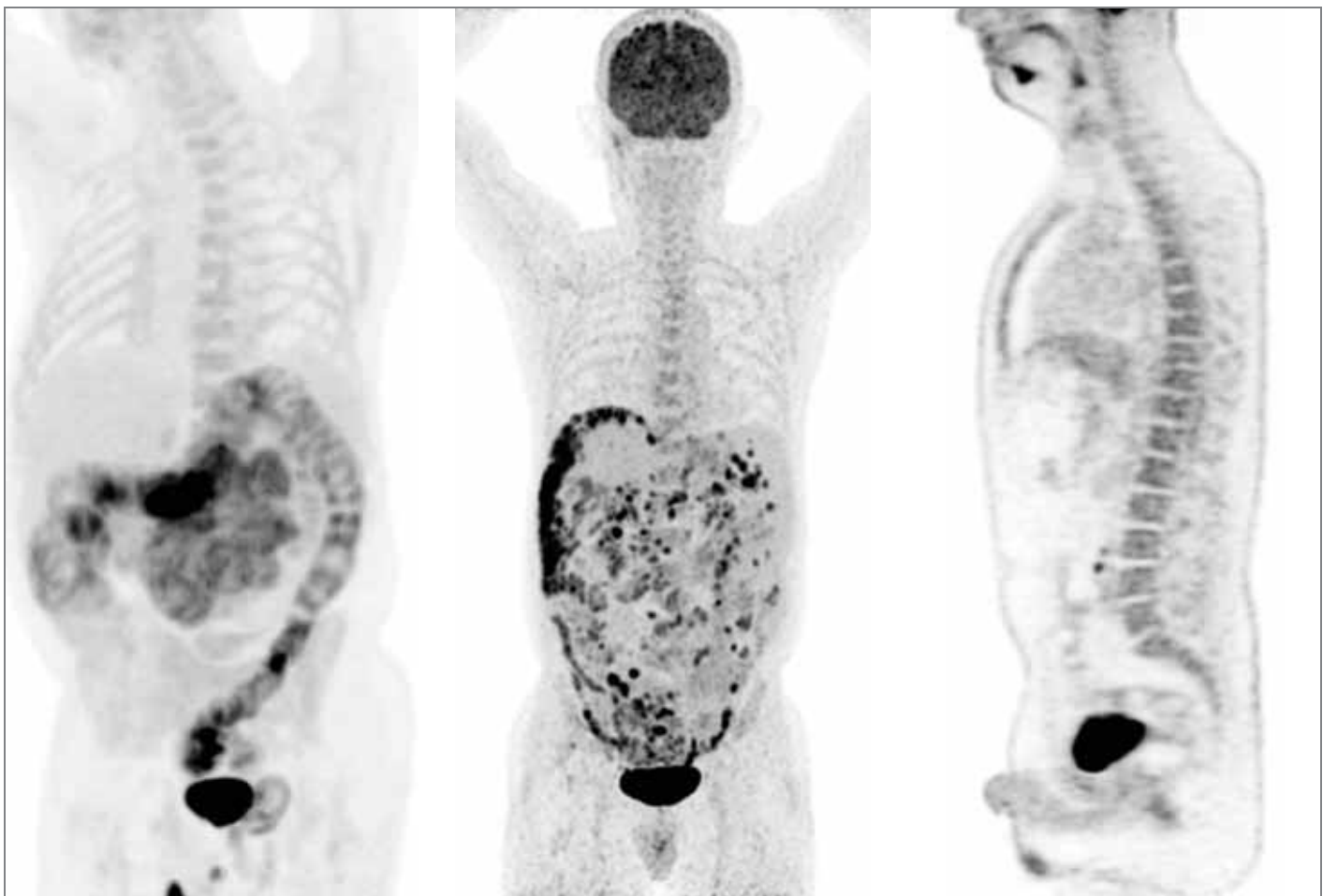
5

HD•PET³

Create visually sharper images⁶

The high-quality raw data provided by the combination of the high-resolution LSO detectors and Time-of-Flight is now reconstructed to generate the final images for interpretation. HD•PET incorporates measured point spread functions (PSF) into the iterative reconstruction algorithm. Through modeling of the PSF, HD•PET more precisely accounts for the positioning of the line of response (LOR), yielding visually sharper clinical images.

Achieve excellent image quality with combined HD•PET and TOF



Sarcoma of the mesentery

Data courtesy of University of Tennessee, Knoxville, Tennessee, USA.

Peritoneal metastases

Data courtesy of Keio Gijyuku University Hospital, Tokyo, Japan.

Testicular carcinoma

Data courtesy of Spectrum Health, Grand Rapids, Michigan, USA.

6

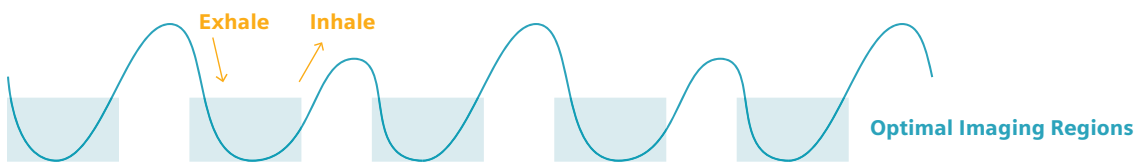
HD•Chest³

Achieve greater lesion detectability

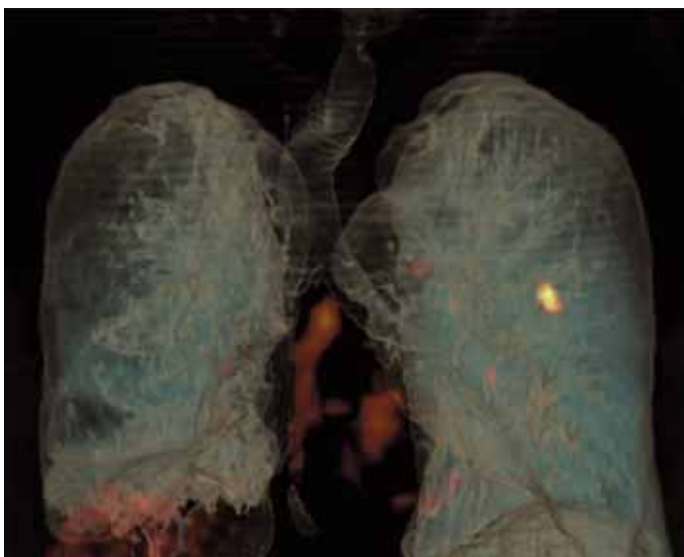
Regardless of how advanced a reconstruction method is, respiratory motion during imaging can displace organs and lesions by between five and 30 millimeters.⁷ HD•Chest is an automated solution that virtually eliminates motion from respiration. It automatically finds the region with the least movement and delivers high-definition motion-frozen images, so you can achieve greater lesion detectability.

14%

more lesions detected by HD•Chest than static acquisition (107 vs 94 lesions), studies show^{8,9}



HD•Chest captures the optimum area of the respiratory curve, eliminating blurring for an enhanced image.



Static

HD•Chest

Data courtesy of University of Tennessee, Knoxville, Tennessee, USA.

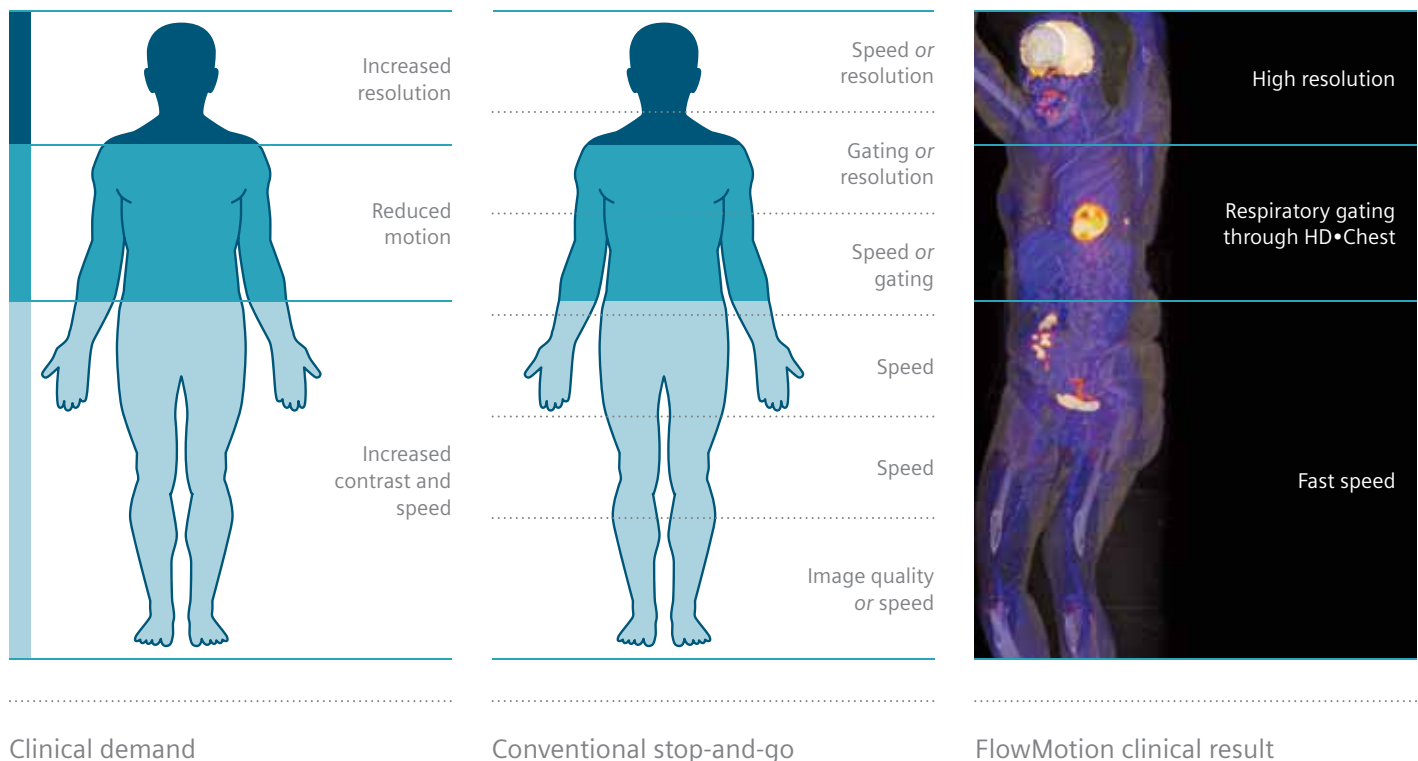
7

FlowMotion

Personalize patient care

As a complement to our key technologies, FlowMotion can help improve patient outcomes and optimize your workflow. Most conventional stop-and-go examinations are restricted by the inefficiencies of bed-based scanning, which limits the routine use of advanced imaging technologies. FlowMotion's continuous bed motion helps you standardize protocols while personalizing the scans in a single, fast exam. Ensure reproducibility from one exam to another, reduce CT dose, increase image quality and provide greater patient comfort. Simply load the standardized, indication-based protocol, personalize to patient anatomy and start the scan.

Personalized scans for increased image quality



Data courtesy of Kantonsspital Baselland, Liestal, Switzerland.

Biograph mCT Flow provides key technologies to work with when encountering complex patient situations, it enables personalized scans and a more comfortable patient user experience for a standard of imaging.²

puts our
work. Even
challenging
enables
and provides
patient and
higher

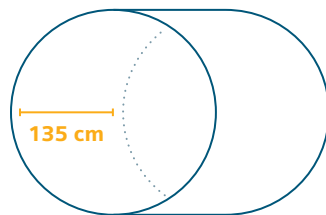
Leverage an open design

The changing healthcare landscape calls for state-of-the-art medical systems—ones that can accommodate a broader patient population, offer expansion into new service lines like radiation therapy, minimize rescans due to patient motion, reduce patient discomfort and deliver a streamlined user experience to give staff more time to spend with each patient.

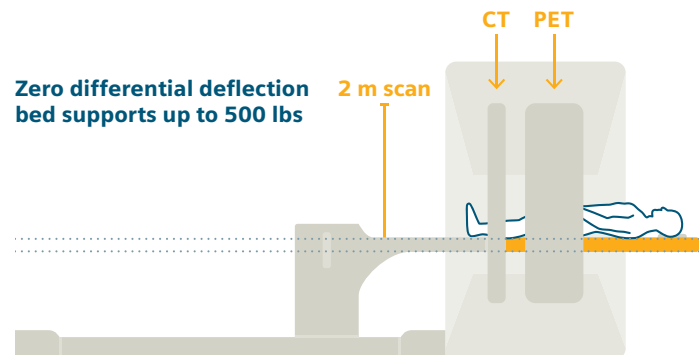
Biograph mCT Flow's design addresses these needs today for success into the future. A large 78 cm bore, short 135 cm tunnel and 227 kg (500 lb) table capacity support the examination of a heavier patient population, allow for easier patient positioning, offer space for additional therapy accessories and help increase patient comfort.



Large bore



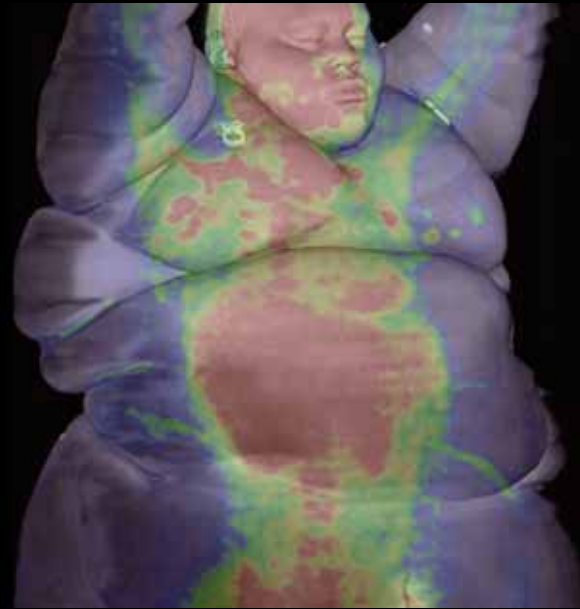
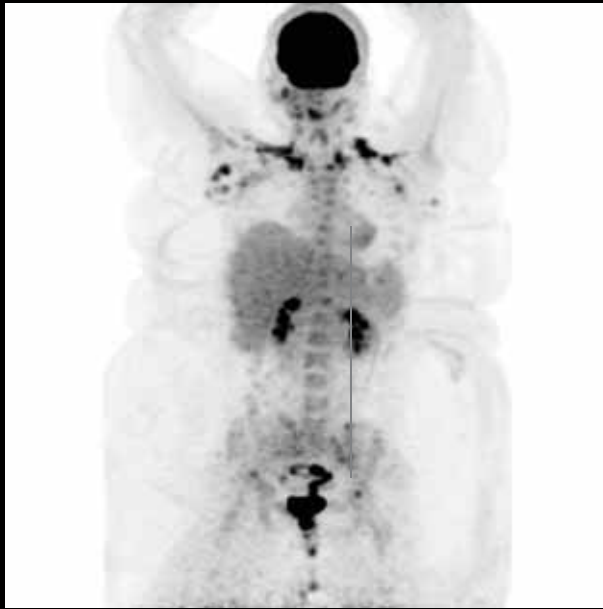
Short tunnel



Unique bed design

BARIATRIC IMAGING

**Biograph mCT Flow's
78 cm bore can deliver
high-quality PET/CT
images for large patients.**



*Data courtesy of Ohio State University, Columbus, Ohio, USA.
Parameters: Weight: 217 kg (478 lbs); height: 155 cm (5'1"); BMI: 90.3; dose: 15.6 mCi.*

Maximize your patient base

Conventional technology sometimes fails to accommodate for a diverse patient demographic, especially now that over one-third of U.S. adults are obese. Biograph mCT Flow is engineered for clinical flexibility, promoting a larger referral base and the growth of your business.



WORLD HEALTH ORGANIZATION OBESITY STATS¹⁰

USA	35.0%	New Zealand	30.6%
United Arab Emirates	34.5%	Canada	30.1%
Bahrain	34.1%	Australia	29.9%
Saudi Arabia	33.7%		

An optimal experience for patients and technologists

For patients, the large bore and short tunnel help reduce discomfort. The system's water cooling component, which eliminates the need for noisy fans and overly cold air conditioning, creates a calmer environment. And the continuous bed motion conveys a sense of progress, making patient movement less likely. For technologists, physiological devices in the bed reduce clutter and well-located controls make patient positioning easy.

1st

and only PET/CT to combine a large 78 cm bore with continuous motion¹

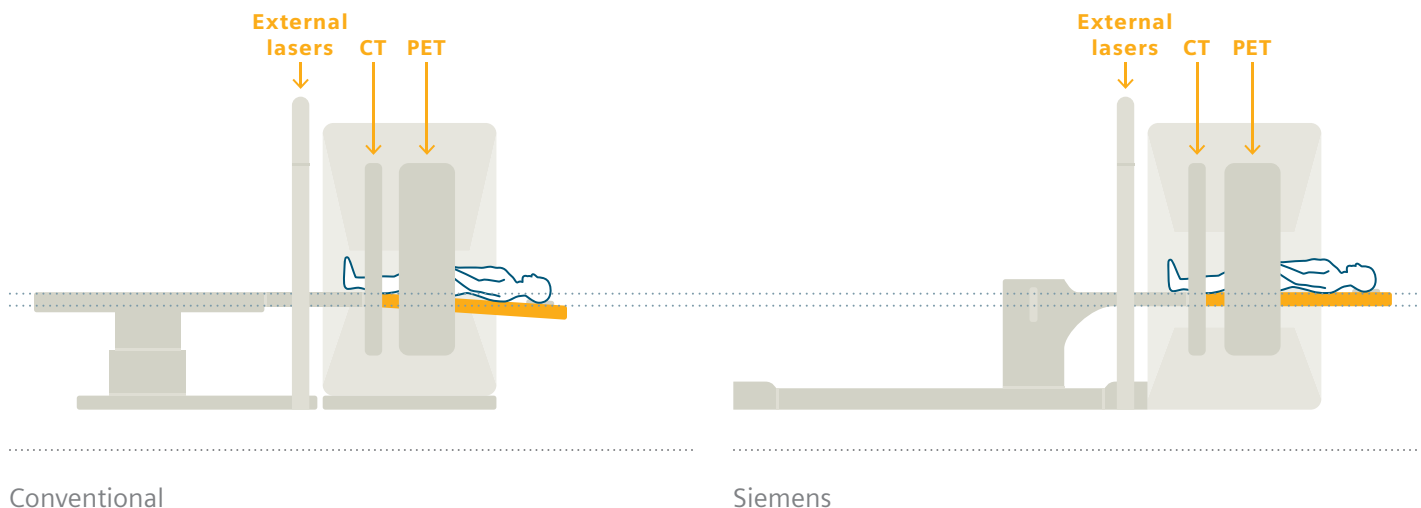
“The scans are so comfortable that some patients fall asleep during acquisitions. Those who do, tend to sleep through the entire examination.”⁹

ALBAN BAILLIEZ, MD



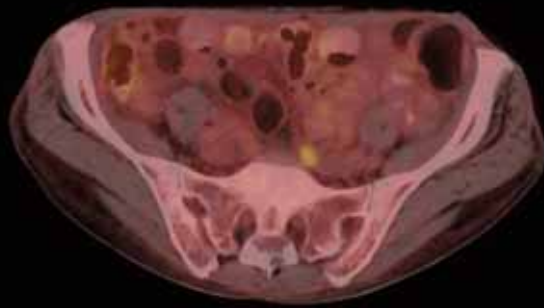
Fine-tune your radiation therapy planning

To provide effective treatments, imaging for radiation therapy planning is often complicated and demands great care in replicating treatment positions. Biograph mCT Flow's zero-differential-deflection, patient bed provides accurate registration between the external lasers and the CT and PET fields of view, for precise treatment delivery while the large bore lets you fit a variety of radiation accessories.

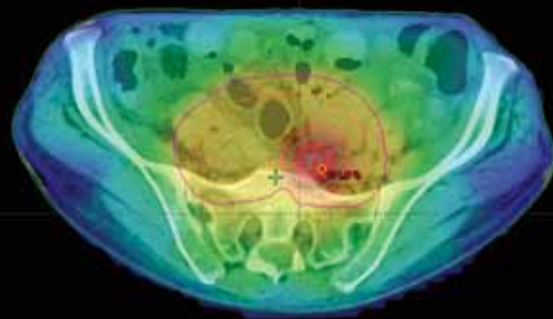


RADIATION THERAPY PLANNING

Delineation of delivery target volume for rectal cancer treatment plan with iliac lymph node metastases



PET/CT



Radiation therapy plan

Data courtesy of Keio Gijyuku University Hospital, Tokyo, Japan.

5x

The proportion of radiation treatment plans using PET images has increased by five times since 2006.¹²



Tailor each exam

To achieve an optimal outcome, you need more than just a high-quality image. With Biograph mCT Flow you can combine standardized protocols and personalized scans all in one exam with excellent performance.

Increase reproducibility and image quality, improve lesion detectability, reduce unnecessary exposure to radiation, provide greater patient comfort and decrease examination time—all in a single, fast exam.

Advanced standardization for consistent image quality and reproducibility

FlowMotion lets you develop and save protocols based on clinical indication so that they're easily incorporated into the clinical routine for your patients—helping to reduce the variability of image quality from different users and enabling reliable visualization of disease from one exam to another.

“FlowMotion allows us to visualize the tiniest lesions in head and neck cancer patients.”

KOJI MURAKAMI, MD, PHD



550,000

Annual incidence of head and neck cancers worldwide¹³

300,000

Deaths per year caused by head and neck cancer¹³

Personalized scans for more precise lesion detectability

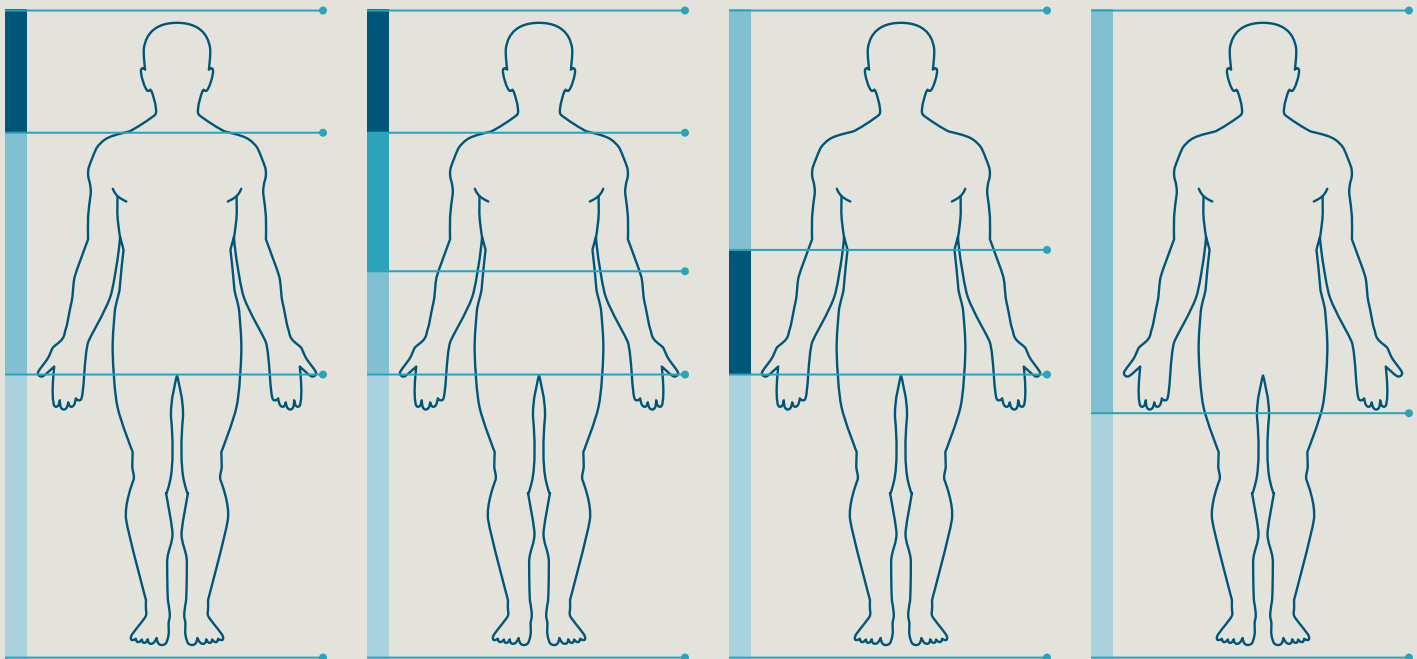
With up to four distinct scan zones, FlowMotion allows precise examination planning. For example, imaging of head and neck lesions requires very high resolution, whereas imaging of lung or liver lesions is subject to motion from breathing, which can reduce detectability. Because FlowMotion lets you integrate motion management with respiratory gating, you can improve your small-lesion detectability even in areas affected by motion, potentially changing patient staging.

Since the four FlowMotion scan zones can be adjusted to the anatomy and indication of each patient, the PET/CT examination can be individually tailored, providing higher image quality in one single, fast exam.

40%

of lung lesions may go undetected without respiratory gating.¹⁴

Standardization of disease-specific protocols



Head & neck:
High resolution in the head and neck region

Lung & liver:
Respiratory gating for thorax and/or abdomen

Colorectal & prostate:
High resolution in the lower abdomen and pelvis

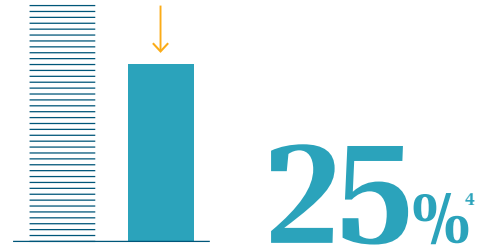
Lymphoma & melanoma:
Fast speed in the legs

■ High resolution
 ■ Respiratory gating
 ■ Normal speed
 ■ Fast speed

A better way to see more patients

Exams can be tailored for more people in a shorter amount of time with standardized, disease-specific protocols. Biograph mCT Flow allows you to integrate respiratory gating and high resolution in a single scan so you can perform more scans in less time.

REDUCE SCAN TIME UP TO

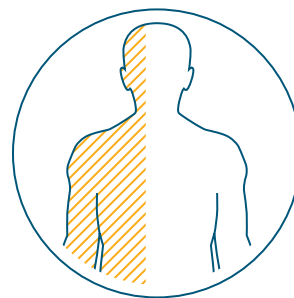


A story of enhanced performance^{9,15}

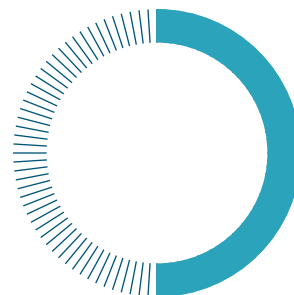
Following the upgrade from Biograph mCT to Biograph mCT Flow with FlowMotion, the University of Tennessee experienced an increase in patient volume, improved throughput and a larger referral base.

“For the first time we can do dedicated lung PET on patients at the same time as doing the whole body.”

YONG C. BRADLEY, MD



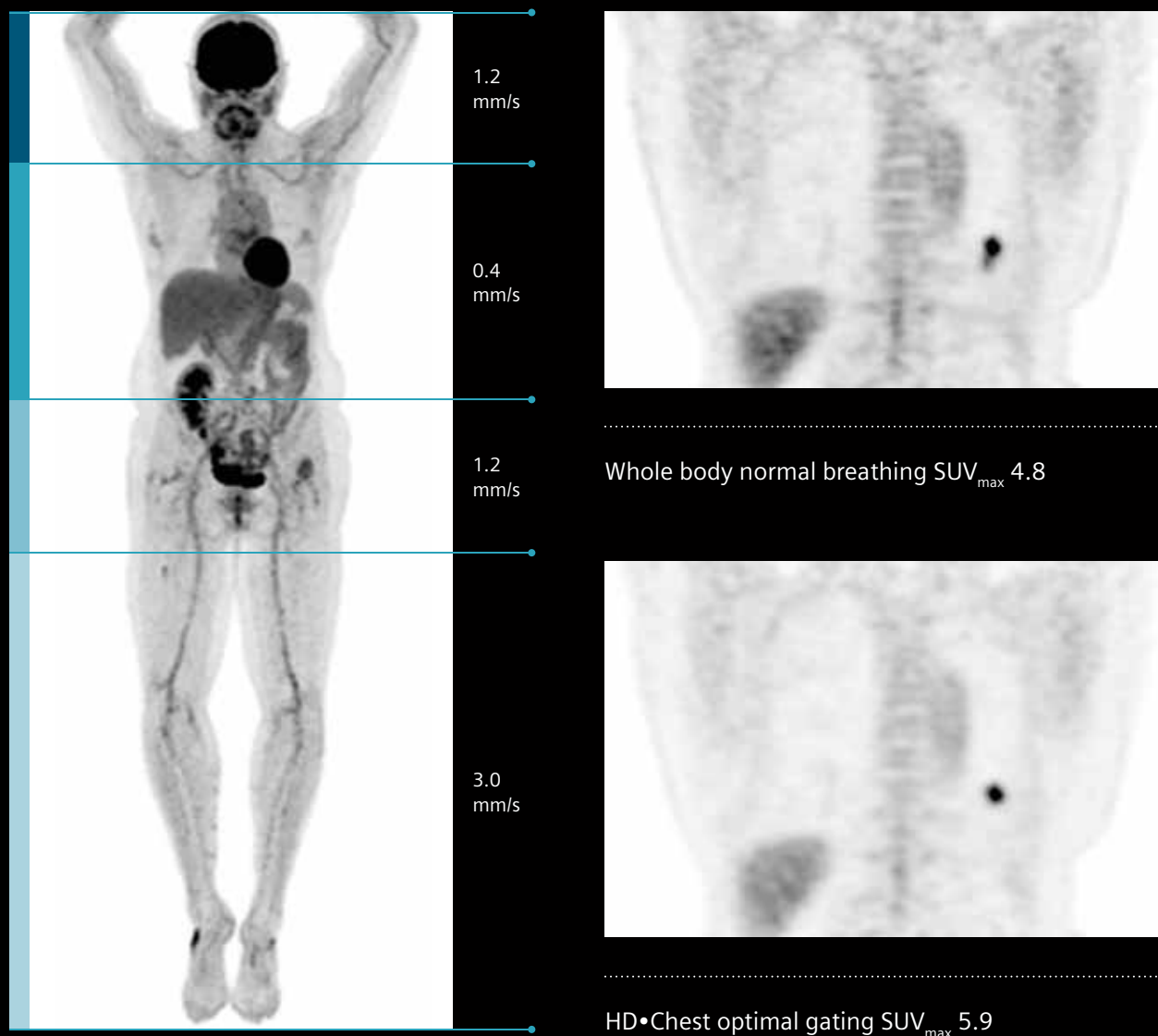
44%
more patients scanned



50%
increase in scheduling

LUNG CANCER

Examine more patients faster, while offering high resolution and integrating gating in a single, fast exam—according to an individual's anatomy.



Data courtesy of Kantonsspital Baselland, Liestal, Switzerland.

■ High resolution ■ Respiratory gating ■ Normal speed ■ Fast speed

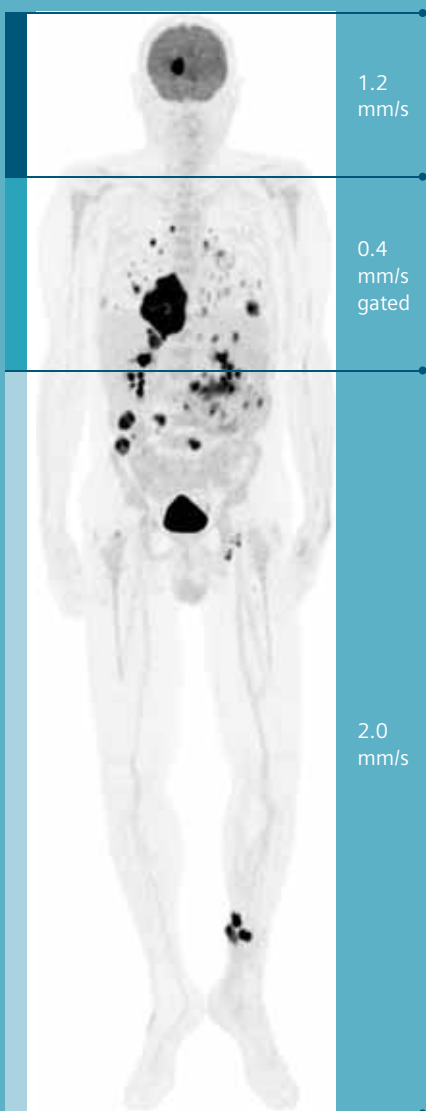
CLINICAL PROTOCOLS

Gain a highly personalized view into every patient’s unique disease state with FlowMotion.



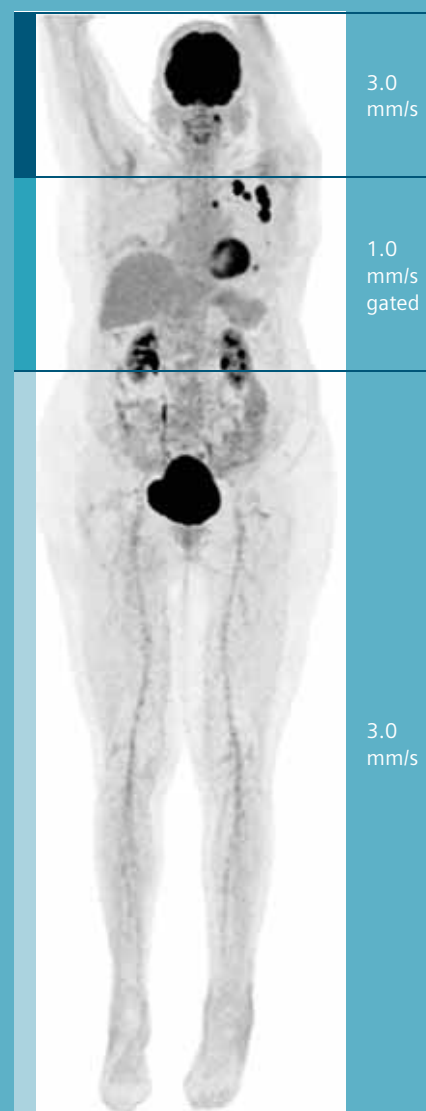
Metastatic breast carcinoma

Data courtesy of Kantonsspital Baselland, Liestal, Switzerland.



Melanoma

Data courtesy of University of Tennessee, Knoxville, Tennessee, USA.



Lung cancer

Data courtesy of Kantonsspital Baselland, Liestal, Switzerland.

High resolution
 Respiratory gating
 Normal speed
 Fast speed



Bone metastasis

Data courtesy of Erlanger Medical Center, Chattanooga, Tennessee, USA.



Morbus Hodgkin

Data courtesy of Kantonsspital Baselland, Liestal, Switzerland.



Lymphoma

Data courtesy of University Hospital of Geneva, Geneva, Switzerland.

Move your business forward

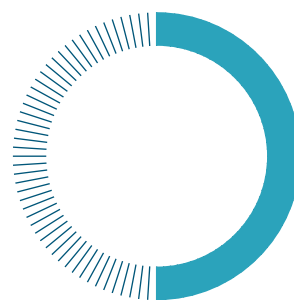
The changing healthcare market has introduced increasing cost pressures, reimbursement cuts and the need to attract more referring physicians and patients. Biograph mCT Flow is configured to address challenging patient situations, giving you the opportunity to maximize your return on investment. A remarkably scalable PET/CT platform, it's designed to evolve with your business, helping you to attract referrals now and well into the future.

Do more in radiology with true dual-use

Biograph mCT Flow is engineered as a true dual-modality scanner, which integrates the best performance of both PET and CT into a single compact system. Available in CT configurations of up to 128 acquired slices per rotation, it provides all the functionalities of high-end standalone CT, including intervention so that it can potentially generate revenue by performing dedicated CT scans. Requiring just one room and one team, it saves you space, time and cost.

50%

of Biograph mCT users perform standalone CT examinations in addition to PET/CT scans.¹⁶

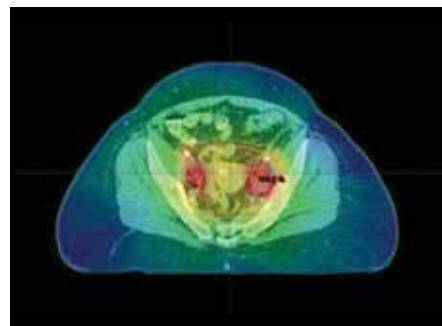


Highly tailored radiotherapy planning

PET/CT usage in radiation therapy planning is gaining momentum—particularly as modern radiotherapy and radiosurgery treatments deliver higher doses to more targeted areas. Biograph RT Pro edition is designed to take full advantage of the premium PET and CT technologies of the Biograph mCT family of large bore scanners, giving you an accurate image for planning personalized treatment strategies with confidence.

87%

of radiation therapy sites incorporate PET into their radiation therapy planning protocols.¹²



Data courtesy of Keio Gijyuku University Hospital, Tokyo, Japan.

Excellent pediatric care

Pediatric oncology patients must often endure multiple examinations that include radiation exposure. Because they're still growing, such exposure is a major concern. To minimize it—and attract a greater pediatric population—you can harness Biograph mCT Flow's 70 kV protocols, Adaptive Dose Shield for dose minimization and FlowMotion for customized scan ranges.

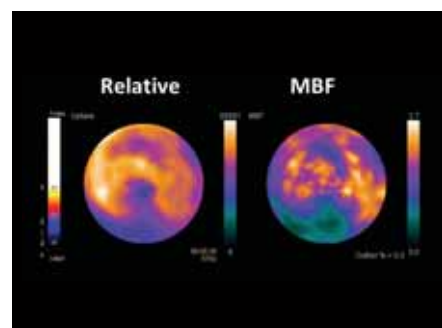


Enhanced accuracy in cardiology

Due to the short half life of isotopes used in cardiac imaging, a high injected dose is typically used and demands a higher count rate camera. Slow detectors, such as BGO, can't handle such high count rates and provide less accurate results. With Biograph mCT Flow, you can achieve precise quantitative values by performing PET-based perfusion or myocardial blood flow examinations.

91%

increase in cardiac PET imaging scans in the U.S. from 2011 to 2015¹⁷

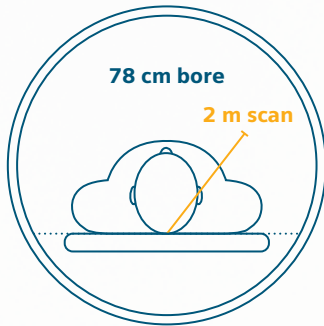


Data courtesy of University of Michigan, Ann Arbor, Michigan, USA.

Uniquely suited to your needs

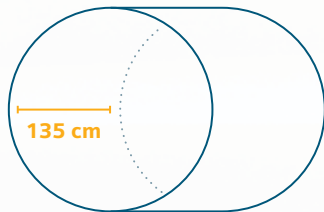
LARGE BORE

A large 78 cm bore and a table capacity of 227 kg (500 lb) support the study of a larger patient population.



SHORT TUNNEL

135 cm tunnel improves patient comfort and allows more room for patient positioning.



EXCLUSIVE BED DESIGN

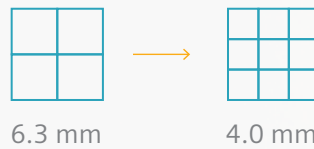
Zero differential deflection between PET and CT for accurate attenuation correction, and TG-66 compliant for radiation therapy.

BED-INTEGRATED PHYSIOLOGICAL INPUTS

Integrated physiological inputs and IV support provide a clutter-free work environment.

4 MM LSO CRYSTALS

Better image quality and greater NEMA spatial resolution than BGO crystals.



TrueV³

TrueV increases the axial field of view to enable two times faster scans or half the injected dose without compromising image quality.

TIME-OF-FLIGHT³

Up to 200% improvement in signal-to-noise ratio for better image quality, lower dose or faster scan speed.

TIME-OF-FLIGHT + HD•PET + TRUEV³

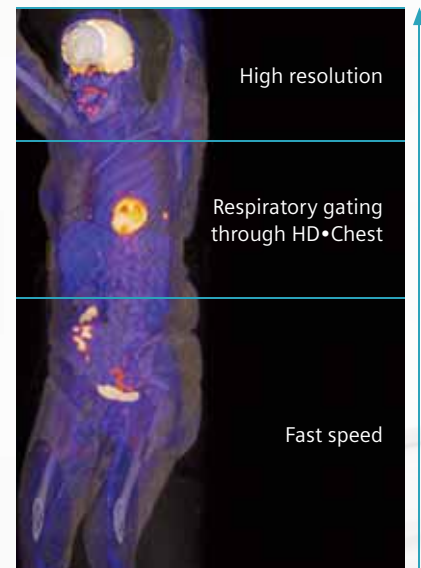
A combination of technologies that offers the potential for five-minute and five mCi PET scans.

HD•CHEST³

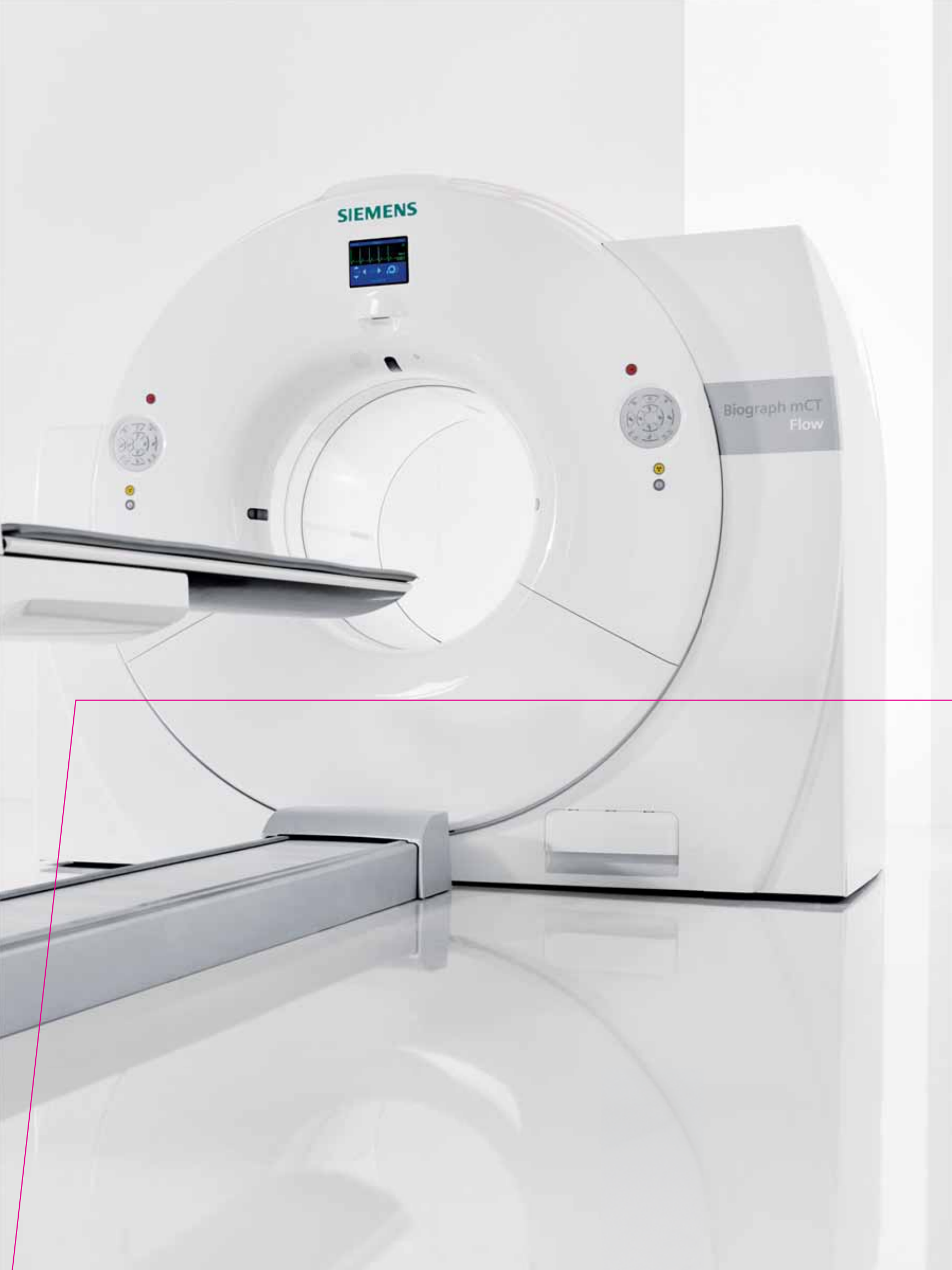
Advanced motion management helps improve delineation and quantification of small lesions.

FLOWMOTION TECHNOLOGY

Continuous bed motion enables standardized protocols and personalized scans, helping to improve reproducibility, lesion detectability, reduce dose and enhance patient satisfaction in a single, fast exam.



Data courtesy of Kantonsspital Baselland, Liestal, Switzerland.



SIEMENS



Biograph mCT
Flow

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Disclaimers

¹ Biograph mCT Flow is not commercially available in all countries. Due to regulatory reasons, its future availability cannot be guaranteed. Please contact your local Siemens organization for further details.

² Compared to systems without FlowMotion technology.

³ Optional.

⁴ All claims based on internal measurements at time of publication. Data on file.

⁵ Compared to the standard configuration. Data on file.

⁶ Conventionally reconstructed images compared to images reconstructed with HD•PET.

⁷ Grills, Inga S et al. *Potential for reduced toxicity and dose escalation in the treatment of inoperable non-small-cell lung cancer: A comparison of intensity-modulated radiation therapy (IMRT), 3D conformal radiation, and elective nodal irradiation*. International Journal of Radiation Oncology, Biology, Physics, Volume 57, Issue 3, 875-890.

⁸ Van Der Gucht, A. et al. *Impact of a new respiratory amplitude-based gating technique in evaluation of upper abdominal PET lesions*. Eur J Radiol (2013).

⁹ The statements by Siemens' 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 (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

¹⁰ World Health Organization data accessed November 2016: http://apps.who.int/gho/athena/data/GHO/NCD_BMI_30A,NCD_

¹¹ Based on competitive literature available at time of publication. Data on file.

¹² IMV 2014 Radiation Therapy Market Summary Report.

¹³ Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. *Global cancer statistics*. CA Cancer J Clin 2011; 61(2):69-90.

¹⁴ Garcia Vicente AM, et al. *¹⁸F-FDG PET-CT respiratory gating in characterization of pulmonary lesions: approximation towards clinical indications*. Ann Nucl Med. 2010 April 24 (3) 207-14.

¹⁵ Data courtesy of University of Tennessee, Knoxville, Tennessee, USA.

¹⁶ Average patients per month. SRS of randomly selected 30 Biograph mCT.

¹⁷ IMV 2015 PET Imaging Market Summary Report.

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