



**How can we achieve  
excellent outcomes at the  
lowest possible dose?**

Combined Applications to Reduce Exposure (CARE) help to reduce radiation dose with excellent diagnostic and interventional outcomes. Life is precious. Take CARE.

Answers for life.

**SIEMENS**



# Life is precious. Take CARE.

Protecting patients and staff from unnecessary radiation is our concern. That's why, as an innovation leader in dose reduction, Siemens has always been committed to the ALARA principle (As Low as Reasonably Achievable). Built on this principle, Siemens has long applied a comprehensive approach to all areas of diagnostic and interventional imaging: CARE - Combined Applications to Reduce Exposure.

The Siemens CARE standard combines a variety of advanced technologies and applications, including one of the most extensive 2D and 3D imaging portfolios in the industry. Our equipment and soft-

ware are uniquely designed to optimize outcomes for diagnosis and intervention while reducing radiation exposure for patients and physicians. Furthermore, Siemens training helps to educate on the most efficient use of our dose reduction technologies.

The philosophy driving Siemens CARE applications and technologies can be summed up simply: they are designed to help you deliver better care.

**Better care for your patients.**  
**Better care for your staff.**  
**Better care for your business.**

# CARE for patients

## Impact of low-dose imaging on patient care

Imaging is integral to caring for patients as it provides a less invasive and more accurate method of diagnosis, and helps measure the efficacy of treatment. Reducing radiation exposure for patients today means reducing the risk of acute and potential long-term damage. Siemens has a long, successful history of delivering maximum image quality with minimum dose using imaging features that are unique in the industry. By offering state-of-the-art imaging based on the Siemens CARE standard, you may ease patients' concerns about exposing themselves to too much radiation.

- Lower radiation dose helps reduce the potential risk of long-term damage.
- Dose reduction is particularly important when diagnosing or treating children, women of child-bearing age, and patients who may need to receive multiple examinations.
- Innovative imaging technology enables fast scans so you can quickly examine your most challenging patients without having to repeat the scan.



Siemens' innovations in dose reduction lets you diagnose and treat patients using a fraction of earlier radiation doses. For example, by combining scans with the revolutionary Siemens SOMATOM® Definition Flash and the latest iterative reconstruction technology, you can obtain comprehensive cardiac data within 0.5 mSv, which is less than a quarter of the average natural radiation absorbed by people every year.

Courtesy of Dr. med. Jörg Hausleiter, German Heart Center, Munich, Germany.



CAREGuard provides an effective skin dose control in the interventional suite. With CAREGuard, which is available with all Artis zee angiography systems, three threshold values (low, medium and high) for accumulated skin dose can be defined. If the accumulated skin dose exceeds a defined threshold, an audible warning is given, a skin dose indicator on the live display flashes, and a warning popup is displayed on the touchscreen of the system's tableside control. This makes it easier to monitor the patient's dose during an interventional procedure.



#### **CARE kV**

CARE kV suggests the optimal kV settings for a CT scan and works hand in hand with CARE Dose4D, our well-established automated real-time exposure control solution, which can save up to 60% and especially benefit the youngest patients.

#### **SAFIRE\***

SAFIRE is the first raw-data-based iterative reconstruction. It allows up to 60% dose reduction or delivers superior image quality. Furthermore, SAFIRE provides an improved workflow with variable settings.

#### **IQ•SPECT™**

With IQ•SPECT, you can get more information from the heart in 5 minutes than you would get with a conventional SPECT in 20 minutes. IQ•SPECT performs scans with half the dose and in half the time resulting in superb patient comfort.

#### **Low-dose syngo DynaCT®**

During complex interventional cases 3D imaging provides valuable additional information. With Low-dose syngo DynaCT this information can be acquired at, e.g. only 0.3 mSv\*\* during neuro imaging.

#### **CAREposition**

CAREposition provides with every Artis zee system radiation-free patient positioning and allows the table to be panned or the C-arm to be moved without fluoroscopy.

\*The information about this product is being provided for planning purposes. The product is pending 510(k) review, and is not yet commercially available in the U.S.  
\*\*Based on the Alderson phantom according to ICRP 60 and 103

### HandCARE®

HandCARE reduces the radiologist's radiation exposure in CT-guided interventions by switching off the radiation in segments where the physician's hand might be in the field of measurement.

### HD•PET Technologies

HD•PET and ultraHD•PET technologies deliver razor sharp, distortion-free PET image quality that enable greater diagnostic confidence. Together with our unique TrueV technology, scans can be completed with half the dose and double the speed, minimizing your staffs' exposure while at the same time providing quicker and more efficient scans.

### CAREvision

CAREvision provides with every Artis zee system variable fluoroscopy pulse rates that can be adapted according to the clinical need from 30 pulses per second (p/s) in various steps, down to 0.5 p/s saving radiation dose for staff and the patient. When reducing the pulse rates from 30 p/s to 7.5 p/s a dose saving of up to 75% is possible.



# CARE for clinical staff

## Addressing annual dose level issues for technologists and physicians

Siemens CARE is designed to help your team get the most information possible from patient images, while reducing exposure from high X-ray and radiopharmaceutical radiation. Siemens constantly measures and reports the doses used with our systems so you can increase employee awareness and enhance their well-being in the workplace. At the same time, the improved, clear images provided with Siemens CARE features give your clinicians the state-of-the-art tools they need to help them quickly and accurately assess and treat patients. With Siemens CARE, dose reduction and excellent image quality are part of the same package.

- Imaging systems which offer reduced radiation help limit technologists' and physicians' exposure to dose.
- Monthly dose usage reports raise awareness and enhance employees' well-being in the workplace.
- High-quality images obtained with less radiation dose help enable clinical staff to accurately treat and diagnose patients while limiting their daily dose exposure.



In order to further reduce radiation to the operator and patient in the interventional suite, it is possible to generate a special low-dose acquisition program. This new low-dose acquisition protocol achieves excellent image quality (see image above) at the lowest possible dose values, allowing savings of up to 67% compared to a standard protocol.

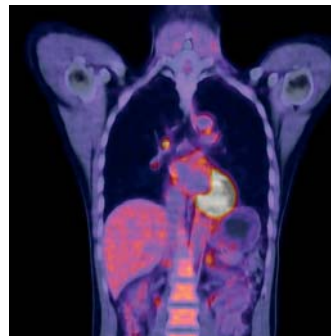


With the Biograph® mCT, scans can be completed with half the dose, lowering exposure to the staff by 50% each day. Both dose reduction and monthly reporting of dose usage help prevent employees from exceeding their dose limits and having to miss work.

# CARE for business

## Draw patients and professionals to your facility

With Siemens CARE, you can advise patients that their procedures will be done using the lowest possible dose, giving your facility a competitive advantage. An increasingly competitive healthcare market requires productivity improvements. Siemens CARE innovations also speed examinations, increasing throughput and system utilization while improving patient comfort. Additionally, the ability to provide enhanced care will also attract top medical professionals to your workplace.

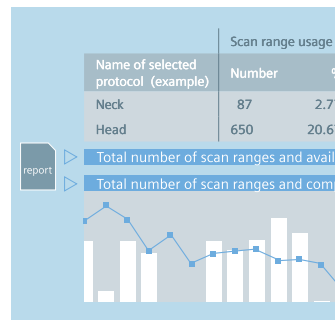


Typical PET dosages fall in the range of 10-20 mCi, depending on the patient's weight. In this case, the FDG tracer is injected with an activity of 6 mCi. This corresponds to an effective dosage of about 4.2 mSv.

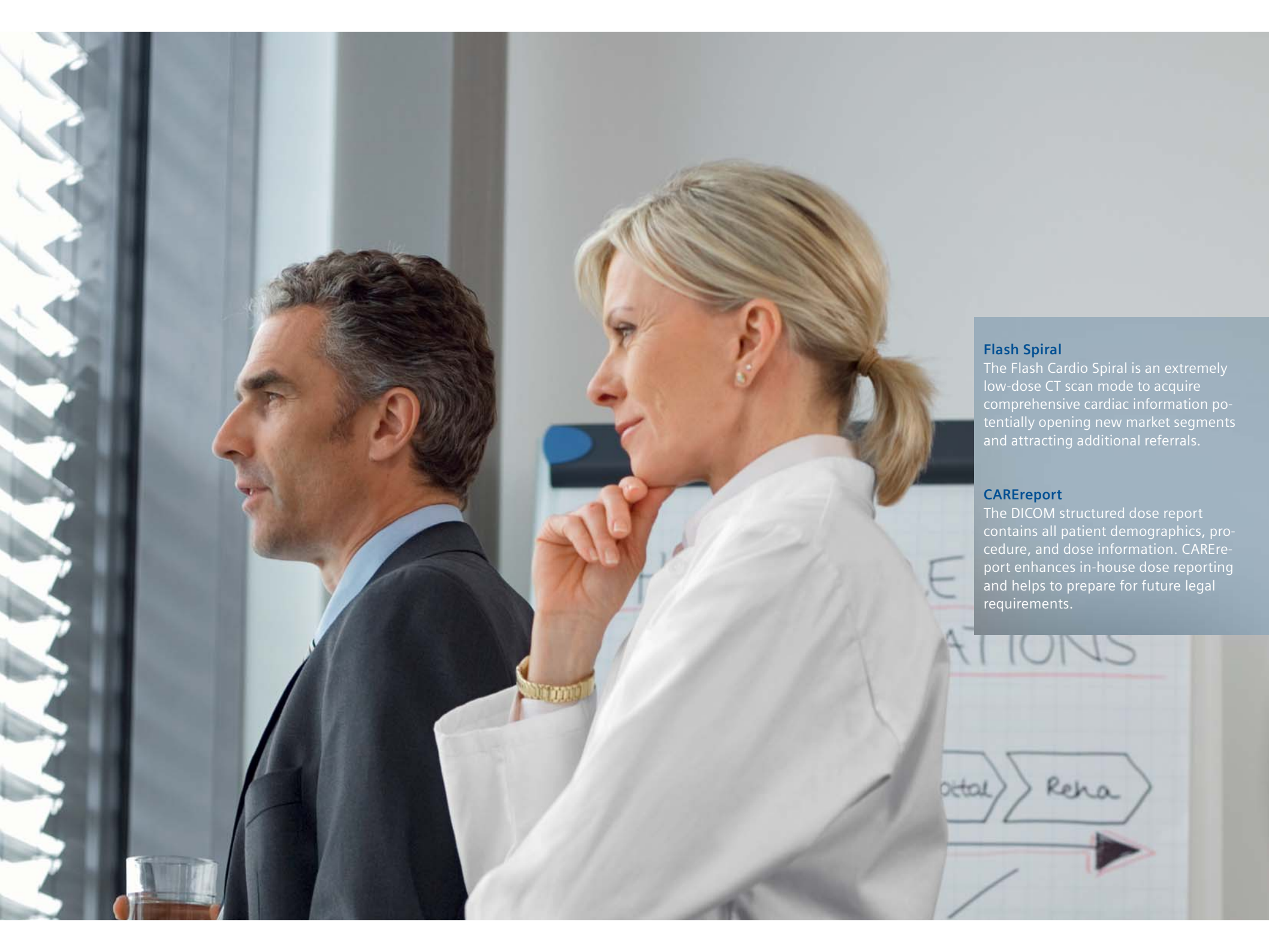
Biograph® mCT  
6 mCi <sup>18</sup>F-FDG injection  
5 minute total scan time  
Hilar node is visualized

Data Courtesy:  
National University Hospital Singapore

- Patients are more likely to choose health-care facilities that offer the latest in dose reduction technologies.
- Top medical professionals are drawn to clinical environments that provide state-of-the-art imaging tools while emphasizing staff and patient care.
- Siemens CARE goes beyond dose reduction to include the latest imaging technologies and reporting tools.
- With Siemens CARE, your business can leverage limited resources more efficiently and increase throughput.



With regards to Computed Tomography, dose reports are generated by the Siemens service organization and made available through the LifeNet UPTIME Services Portal. This is Siemens' secure web portal providing customers the information needed to manage the productivity of their Siemens diagnostic equipment. In the dose report, customers obtain an overview of all selected protocols, indicating if any specific values have been exceeded, and that a significant radiation dose has been administered.



#### **Flash Spiral**

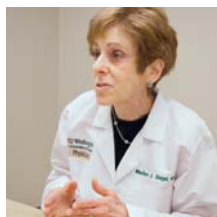
The Flash Cardio Spiral is an extremely low-dose CT scan mode to acquire comprehensive cardiac information potentially opening new market segments and attracting additional referrals.

#### **CAREreport**

The DICOM structured dose report contains all patient demographics, procedure, and dose information. CAREreport enhances in-house dose reporting and helps to prepare for future legal requirements.

# Siemens CARE

Setting a standard for excellent diagnostic and interventional outcomes



“It is essential to employ a CT scanner that can not only offer some dose reduction, but can also provide one of the fastest scan speeds, while maintaining optimal imaging performance”

*Marilyn J. Siegel*  
Professor of Radiology and Pediatrics  
Division of Diagnostic Radiology  
St. Louis Children's Hospital  
St. Louis, MO, USA



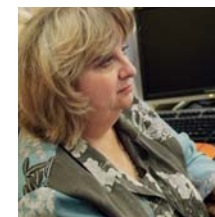
“Siemens dose reduction technology helps us deliver improved patient care. By doing what is right for the patient, we have gained an edge over our competition by attracting dose-conscious patients.”

*Robert Day*  
Chief Technology Officer  
Zwanger-Pesiri Radiology  
Lindenhurst, NY, USA



“Imaging the entire urinary tract with one single exposure with excellent image resolution has been ideally implemented in the interventional urology workstation. ”

*Michael Straub, MD,*  
Managing Senior Physician,  
University Hospital Rechts der Isar,  
Munich, Germany



“Siemens technologies ... allow us to provide a single diagnostic CT scan at the time of our hybrid nuclear medicine studies for our pediatric patients. This means that they can be exposed less; they can have one visit to the hospital when they need both tests together, and it certainly helps improve our throughput.”

*Dr. Helen Nadel*  
B.C. Children's Hospital  
Vancouver, Canada



“We have on the SPECT side also seen the introduction of these iterative reconstruction algorithms that allow to reduce radiation dose by half.”

*Dr. Torsten Kuwert  
Universitätsklinikum Erlangen  
Erlangen, Germany*



“We have shown quantitatively that with time of flight you can halve the injected dose to the patient. So a 10 mCi without time of flight gives the same signal to noise as a 5 mCi with time of flight.”

*Dr. David Townsend  
Singapore Bioimaging Consortium  
Singapore*



“With CAREreport I have for the first time all dose information for each series summarized. This allows me to further optimize my working method.”

*Dr. Eberhard Kuon  
Interventional Cardiologist  
Fränkische Schweiz Hospital  
Ebermannstadt, Germany*



“Due to its reduced dose our Artis zee system allows us to do pediatric procedures that we would never have attempted before”

*Dr. Kevin Baskin  
Pediatric Interventional Radiologist  
Children’s Hospital of Pittsburgh  
Pittsburgh, PA, USA*

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens sales organization worldwide. Availability and packaging may vary by country and is subject to change with-out prior notice. Some of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens reserves the right to modify the design, packaging, specifications and options described herein without prior notice. Please contact your local Siemens sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

#### **Global Siemens Headquarters**

Siemens AG  
Wittelsbacherplatz 2  
80333 Muenchen  
Germany

#### **Global Siemens Healthcare Headquarters**

Siemens AG Healthcare Sector  
Henkestrasse 127  
91052 Erlangen  
Germany  
Telephone: +49 9131 84-0  
[www.siemens.com/healthcare](http://www.siemens.com/healthcare)

[www.siemens.com/low-dose](http://www.siemens.com/low-dose)