You control the dial

Philips CT iDose^4 iterative reconstruction technique

PHILIPS

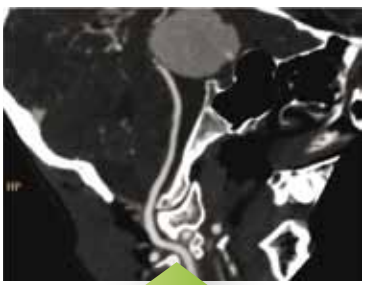
sense and simplicity

The results you want

Philips iDose[4] is an iterative reconstruction technique that gives you control of the dial so you can personalize image quality based on your patients' needs at low dose. When used in combination with the advanced technologies of the iCT, Ingenuity, and Brilliance CT scanner families, this provides a unique approach to managing important factors in patient care – low energy, low dose, and low injected contrast imaging.

Which setting do you need?

Increase resolution with low dose
120 kVp; 150 mAs
$CTDI_{vol}$ – 10.2 mGy
DLP – 187 mGy*cm
Effective dose – 0.6 mSv*



Significantly improve resolution
120 kVp; 100 mAs
$CTDI_{vol}$ – 6.5 mGy
DLP – 136 mGy*cm
Effective dose – 2 mSv*

Manage dose without sacrificing image quality
80 kVp; 10 mAs
$CTDI_{vol}$ (32cm) – 0.21 mGy
DLP – 2.9 mGy*cm
Effective dose – 0.16 mSv*

*AAPM technical report 96

at the speeds you need

If it's fast, it's Philips

A majority of reference protocols are reconstructed in under 60 seconds with iDose[4] iterative reconstruction technique.

119 cm reconstructed in 49.5 seconds

With iDose[4], reconstruction is achieved in seconds rather than minutes. This is due to the innovative RapidView IR reconstruction engine. Designed to support iDose[4], this proprietary technology allows for this iterative reconstruction technique to be used routinely in inpatient, outpatient, and emergency care settings. With the combination of iDose[4] and RapidView IR, the majority of all factory protocols are reconstructed in 60 seconds or less. The design seamlessly integrates into your CT department, and provides you the look and feel of conventional higher dose images without long processing times.

RapidView IR

Philips Proprietary, state-of-the-art parallel architecture

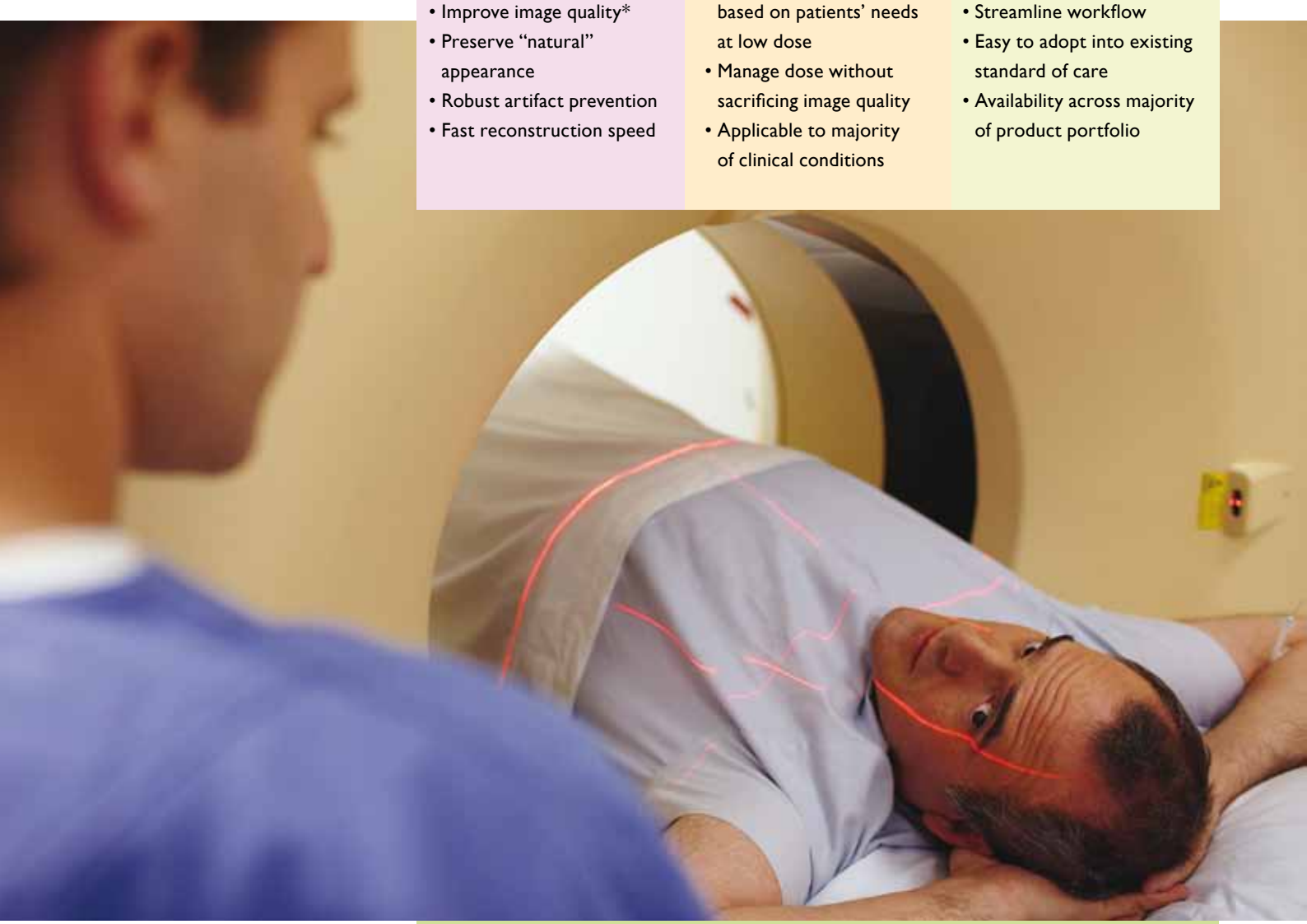
Philips high performance computational core is equivalent to the power of hundreds of computers.

The iDose^4

Clinical integration and collaboration
- Improve image quality*
- Preserve "natural" appearance
- Robust artifact prevention
- Fast reconstruction speed

Patient focus
- Personalize image quality based on patients' needs at low dose
- Manage dose without sacrificing image quality
- Applicable to majority of clinical conditions

Improve economic value
- High throughput
- Streamline workflow
- Easy to adopt into existing standard of care
- Availability across majority of product portfolio



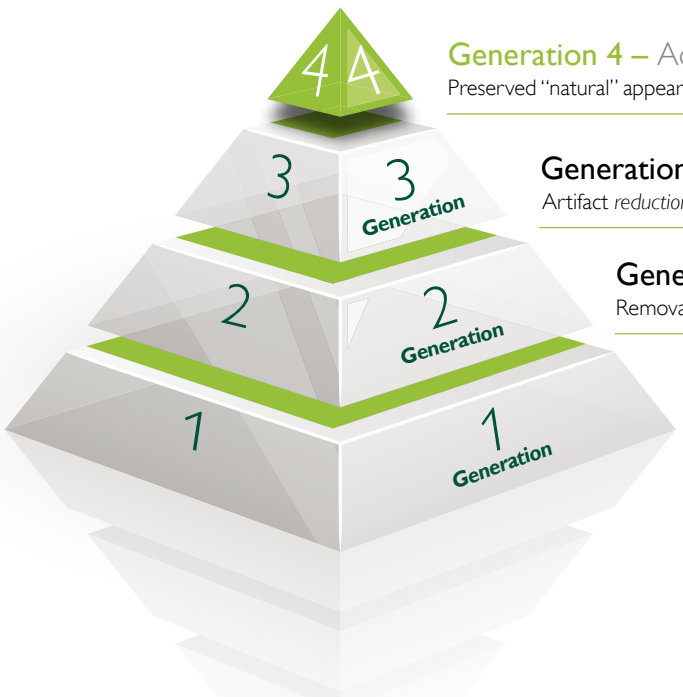
What is Imaging 2.0?

Web 2.0 described the evolution of the web from being data-driven to user-centric, redefining the way people connect, share, and use the Internet. Imaging 2.0 is doing the same, bringing a new world of possibilities for radiology. It is about integration and collaboration, and new levels of patient focus and care that can help clinicians achieve what was unimaginable just a few short years ago.

*Improved image quality as defined by improvements in spatial resolution and/or noise reduction as measured in phantom studies.

advantage

The evolution of reconstruction



Generation 4 – Advanced iterative reconstruction technique
Preserved "natural" appearance | Robust artifact *prevention* | Improved image quality*

Generation 3 – Basic iterative reconstruction technique
Artifact *reduction*

Generation 2 – Image based filtering/denoising
Removal of some image noise

Generation 1 – Standard reconstruction without iDose^4
Fast

Philips iDose^4 (4th-generation reconstruction) provides key clinical benefits**	
Improved image quality*	Up to 57% improvement in spatial resolution
Preserved natural image appearance	Less than 5% noise-power-spectrum shift
Robust artifact prevention	Low signal streak correction
Protocol integration	Axial, helical, ECG- and pulmonary-gated, dual-energy, and perfusion Standard, high, and ultrahigh resolution 512^2, 768^2, and 1024^2 image matrix sizes
Flexible	7 distinct, user-selectable levels that support image quality personalization based on your clinical needs
Fast	With RapidView IR, reconstruction is achieved in seconds rather than minutes. The majority of reference protocols are reconstructed in under 1 minute.

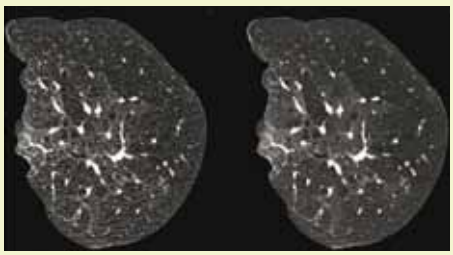
"I think that iDose^4 is going to be the future for everyone in the sense that I can honestly think of no reason why you would not use it in your practice if you have it available."

Barry D. Daly, MD
University of Maryland Medical Center, Baltimore, MD

* Improved image quality as defined by improvements in spatial resolution and/or noise reduction as measured in phantom studies.
** Results may vary based on scanner model.

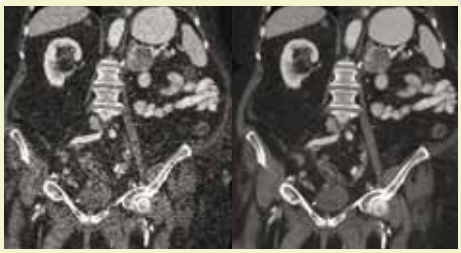
Scanner benefits

Pulmonary imaging with increased resolution



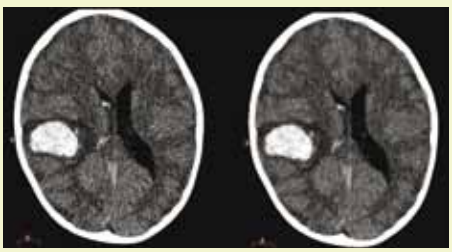
High resolution iDose^4: OFF | High resolution **iDose^4: Level 7**

Bariatric imaging with improved image quality*



iDose^4: OFF | **iDose^4: Level 3**

Neuro imaging with increased contrast-to-noise



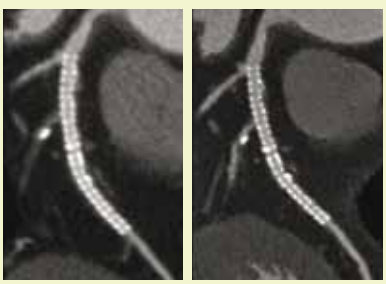
iDose^4: OFF | **iDose^4: Level 3**

Improve image quality* and preserve "natural" appearance

Orthopedic imaging with reduced artifacts from implants

iDose^4: OFF | O-MAR + iDose^4: OFF | O-MAR + **iDose^4: Level 7**

Coronary imaging with increased resolution



iDose^4: OFF | **iDose^4: Level 7**

*Improved image quality as defined by improvements in spatial resolution and/or noise reduction.

enabled by iDose^4

Manage dose without sacrificing image quality

Routine chest X-ray
0.06 mSv

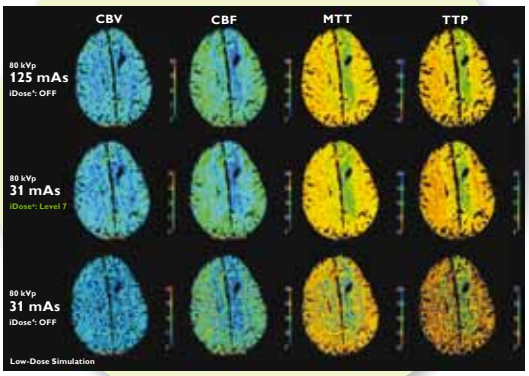
80 kVp, 10 mAs,
0.2 mGy, 0.08 mSv
iDose^4: OFF

80 kVp, 10 mAs,
0.2 mGy, 0.08 mSv
iDose^4: Level 3

Robust artifact prevention and noise reduction.

Fast and seamless integration.

Quantitative imaging at low-dose

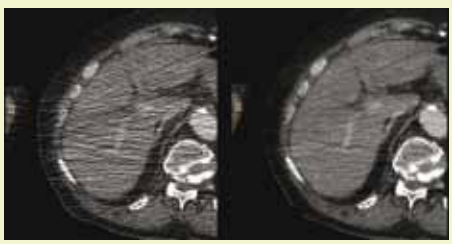


iDose^4: OFF

iDose^4: Level 7

iDose^4: OFF

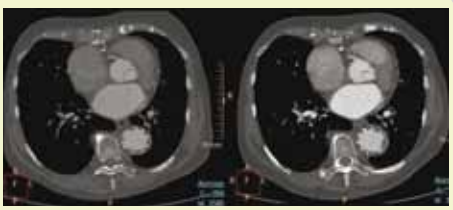
Trauma imaging with reduced artifacts



iDose^4: OFF

iDose^4: Level 4

Low energy imaging when combined with advanced scanner technologies



120 kVp, 100 mAs,
6.6 mGy, 9.6 mSv
Nov 2009
iDose^4: OFF

80 kVp, 130 mAs,
2.7 mGy, 2.8 mSv
April 2010
iDose^4: Level 4

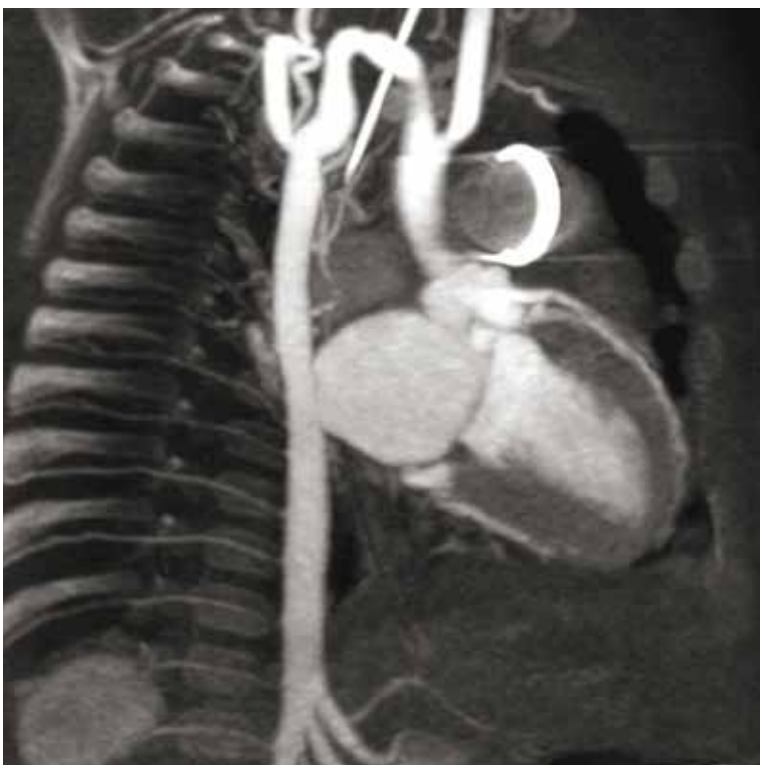
Manage dose without sacrificing image quality

Low dose acquisitions are often associated with streak artifacts. Basic iterative reconstruction techniques may provide some incremental benefit in reducing these artifacts; however, iDose^4 – an advanced iterative reconstruction technique – prevents these artifacts and improves image quality** in this Step & Shoot Cardiac scan.

Scan parameters

- 100 kVp
- 17 mAs
- Coverage – 18.7 cm
- iDose^4 – Level 4
- $CTDI_{vol}$ – 0.8 mGy
- DLP – 15.7 mGy*cm
- Effective dose – 0.2 mSv*
- Reconstruction time – 32 s (415 images)
- Scanner – iCT

Pediatric patients undergoing frequent follow-up imaging benefit from low-energy, low-dose and high image quality. This high-heart-rate, sub-mSv follow-up study was performed on a non-sedated patient using the iCT with iDose^4, resulting in low signal streak correction and high image quality.



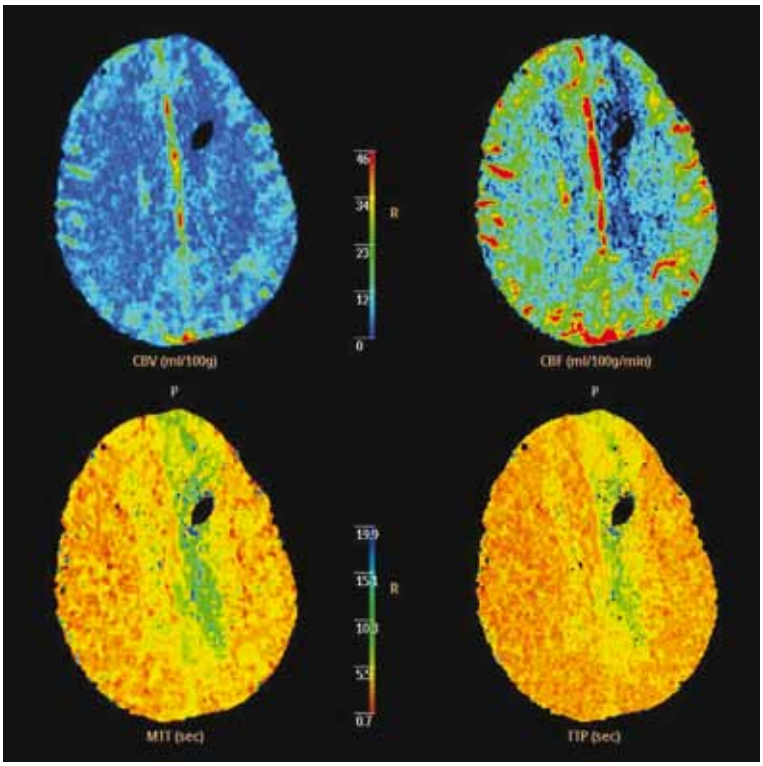
Scan parameters

- 80 kVp
- 100 mAs
- Coverage – 10.3 cm
- Heart rate – 143 bpm
- Scan time – 6.6 s
- iDose^4 – Level 3
- $CTDI_{vol}$ – 2.2 mGy
- DLP – 22.6 mGy*cm
- Reconstruction time – 12 s
- Scanner – iCT

*AAPM technical report 96
**Improved image quality as defined by improvements in spatial resolution and/or noise reduction.

Quantitative imaging below background radiation dose

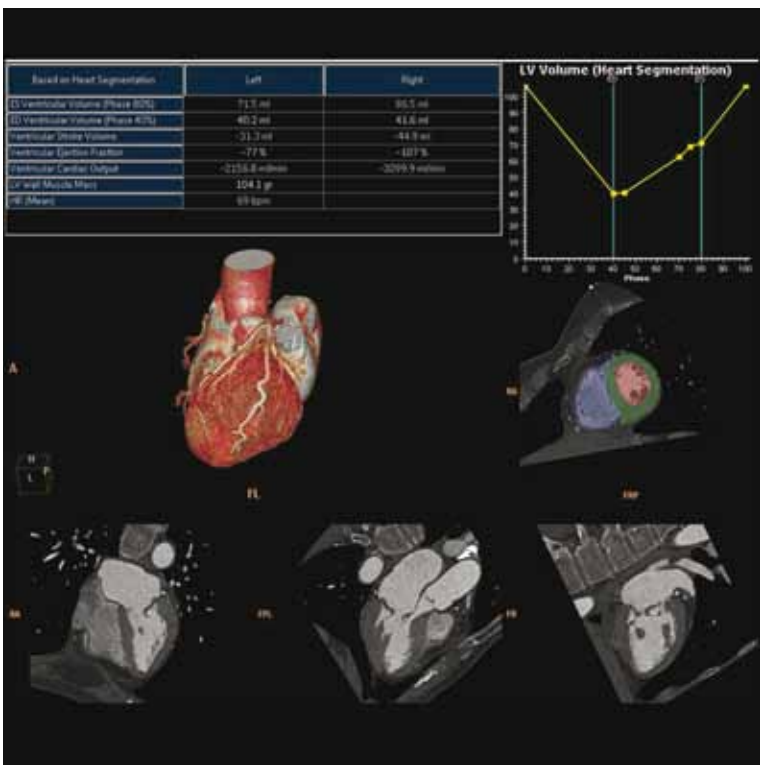
Perfusion scans may result in relatively high patient dose due to repeated scanning of the same structure over time. In this case, low-dose scanner technologies combined with iDose^4 helped manage dose without sacrificing image quality.



Scan parameters

- 80 kVp
- 31 mAs**
- Coverage – 8 cm
- iDose^4 – Level 7
- $CTDI_{vol}$ – 1.2 mGy x 40
- DLP – 9.6 mGy*cm x 40
- Effective dose – 0.8 mSv*
- Scanner – iCT

The primary rationale to move from retrospective to prospective ECG-gated cardiac CTA acquisitions was to enable low-dose acquisitions at the expense of losing functional information. Low-energy scanner technologies combined with iDose^4 resulted in full cardiac assessment at dose levels equivalent to background radiation without sacrificing image quality.



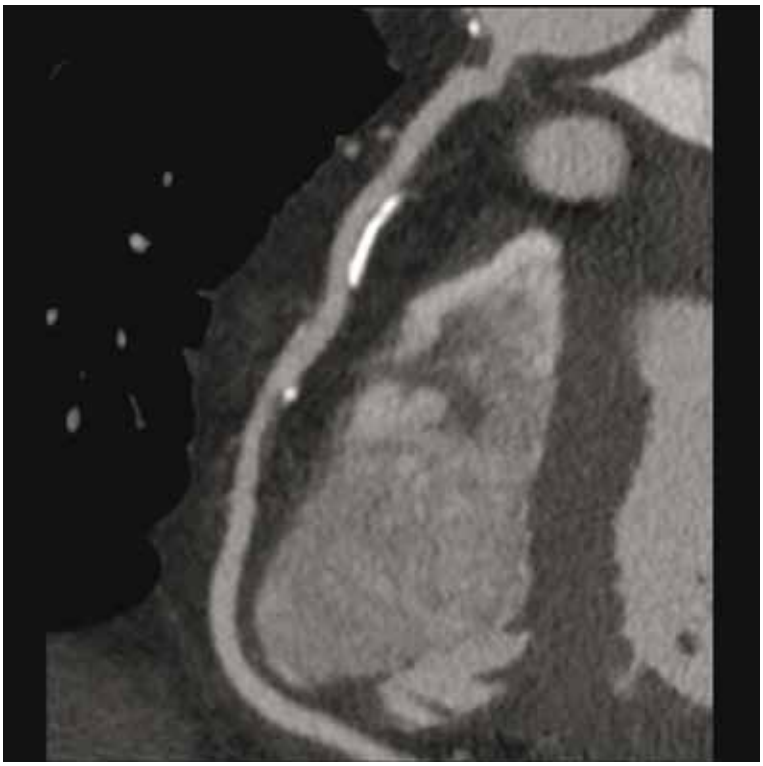
Scan parameters

- 100 kVp
- 273 mAs
- Coverage – 16.5 cm
- Scan time – 6.3 s
- Resolution – 12.3 lp/cm
- iDose^4 – Level 4
- $CTDI_{vol}$ – 10.5 mGy
- DLP – 223.2 mGy*cm
- Effective dose – 3.1 mSv*
- Reconstruction time – 91 s (1,155 images)
- Scanner – iCT

*AAPM technical report 96
**Simulated from 125 mAs acquisition

Improve resolution of cardiac imaging

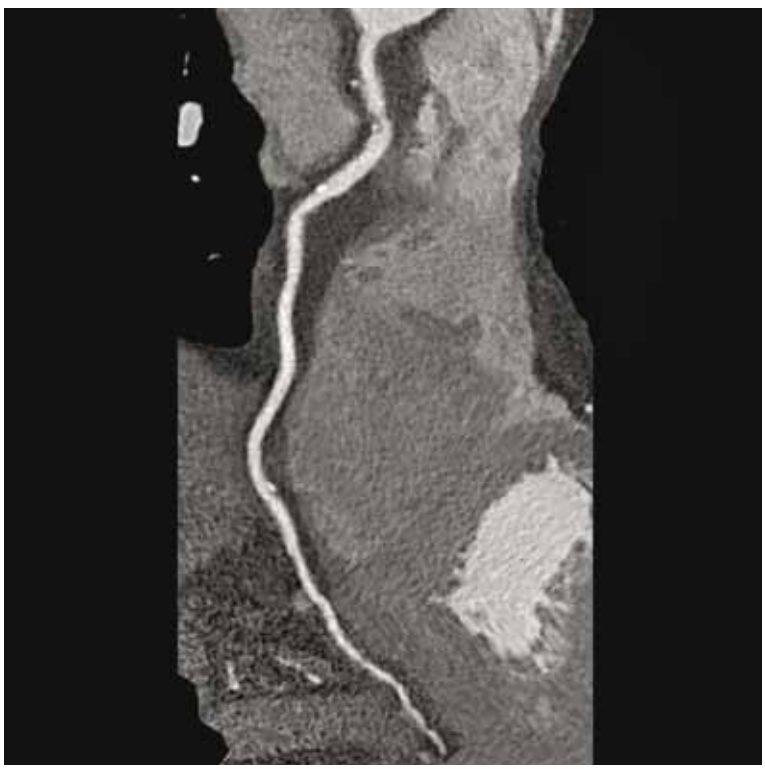
Limited resolution on cardiac CTA acquisitions can hinder visualization of the coronary lumen in the presence of heavy calcified plaque or coronary stents. This can be particularly challenging when balancing the low-dose needs of the patient. iDose^4 significantly improves spatial resolution at low dose.



Scan parameters

- 80 kVp
- 195 mAs
- Coverage – 13.5 cm
- Scan time – 4.5 s
- iDose^4 – Level 4
- $CTDI_{vol}$ – 4.2 mGy
- DLP – 56.7 mGy*cm
- Effective dose – 0.8 mSv*
- Scanner – iCT

Leveraging the low-dose capabilities of Step & Shoot Cardiac with the high-resolution capabilities of iDose^4, the study provides improved visualization.



Scan parameters

- 120 kVp
- 200 mAs
- Coverage – 12.5 cm
- Scan time – 7.9 s
- Heart rate – 51 bpm
- iDose^4 – Level 6
- $CTDI_{vol}$ – 16.8 mGy
- DLP – 210.0 mGy*cm
- Effective dose – 2.9 mSv*
- Scanner – Ingenuity CT

*AAPM technical report 96

Improve resolution and artifact prevention in orthopedic imaging

CT imaging of patients with orthopedic implants often results in loss of anatomical information due to a combination of artifacts. O-MAR reduces artifacts caused by large orthopedic implants and iDose^4 improves image quality.

Scan parameters

- 140 kVp
- 145 mAs/slice
- Coverage – 25.6 cm
- O-MAR – on
- iDose^4 – Level 4
- Scanner – Brilliance 64

The noise-resolution correlation on standard reconstruction techniques previously required trade-offs between dose and resolution. Breaking this connection, iDose^4 provides high-resolution with low-noise in this low-dose study.

Scan parameters

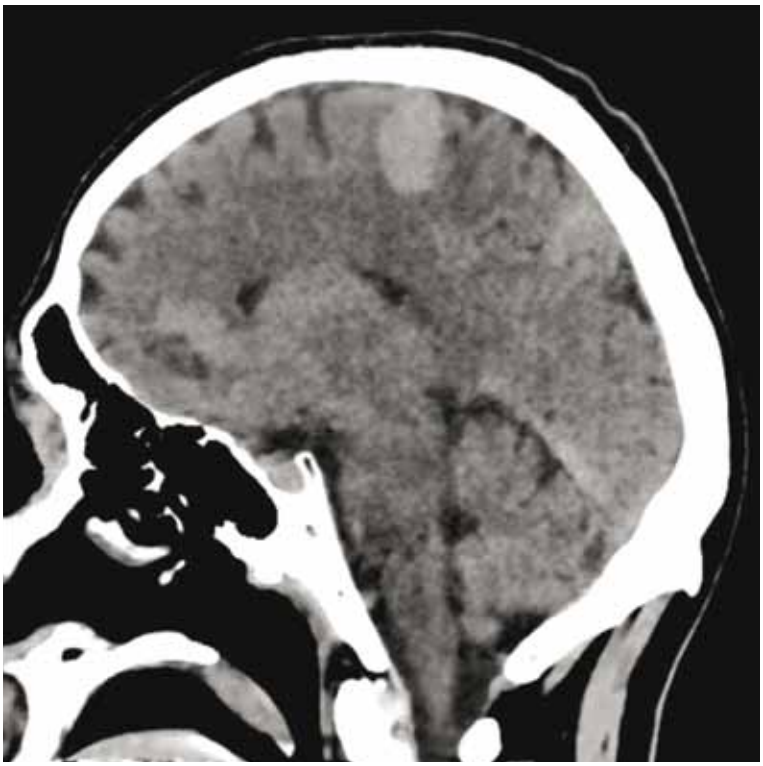
- 120 kVp
- 100 mAs
- Coverage – 15.3 cm
- Focal spot resolution – high
- Image matrix – 768 x 768
- iDose^4 – Level 3
- $CTDI_{vol}$ – 6.5 mGy
- DLP – 136 mGy*cm
- Effective dose – 2 mSv*
- Scanner – Ingenuity CT

*AAPM technical report 96

Improve resolution in oncology imaging

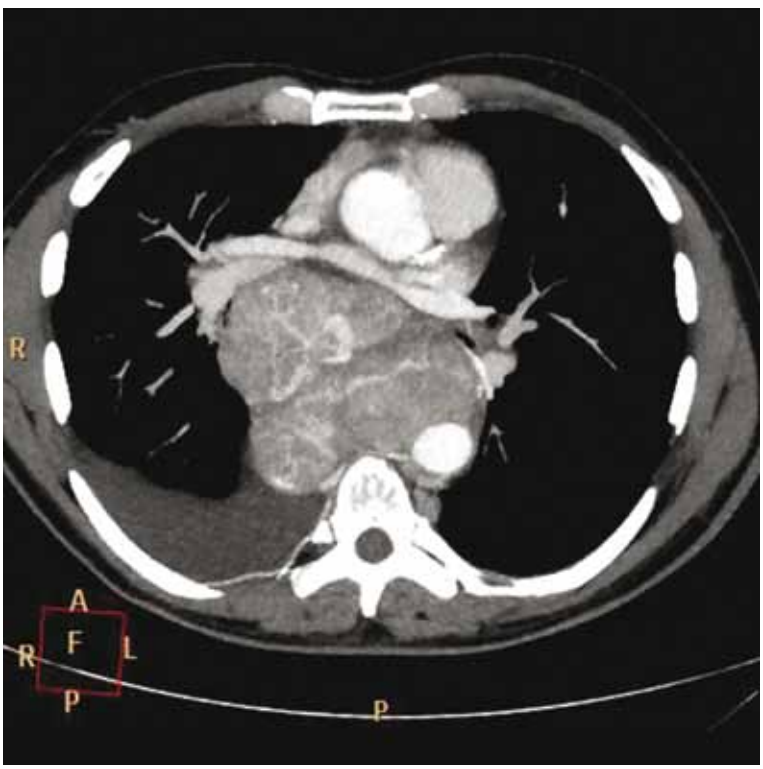
In radiation oncology, clinical needs are particularly focused towards accurate treatment planning, which ties into the need to have increased image quality. The increased contrast-to-noise in this study helps improve visualization.

Scan parameters
- 120 kVp
- 500 mAs
- Coverage – 24 cm
- iDose^4 – Level 1
- Scanner – Brilliance CT Big Bore



In oncology patients, improved image quality plays an important part in accurate treatment planning. The image quality benefits of iDose^4 extend across a majority of the CT product portfolio, to include the Brilliance CT 16-slice.

Scan parameters
- 120 kVp
- 200 mAs/slice
- Coverage – 34.2 cm
- iDose^4 – Level 4
- Scanner – Brilliance 16



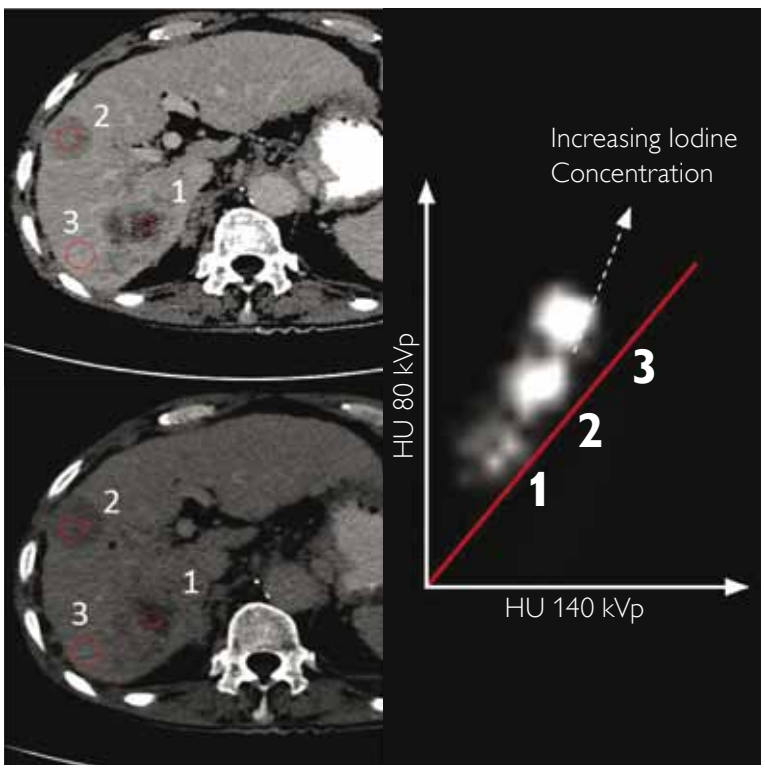
Improve image quality in noisy acquisitions

Bariatric imaging is prone to increased image noise and artifacts (streaks and bias). Standard reconstruction and basic iterative reconstruction techniques are particularly limited in addressing artifacts. iDose^4 advanced iterative reconstruction technique helps reduce noise and prevent artifacts.

Scan parameters

- 120 kVp
- 190 mAs
- Coverage – 56.5 cm
- Scan time – 6.3 s
- iDose^4 – Level 7
- Scanner – iCT

Quantitative analysis of iodine enhancement was performed on the dual-energy data in delayed phase images relative to liver parenchyma. One lesion demonstrated washout in the delayed enhancement phase, subsequent to early enhancement in the arterial phase. The other lesion demonstrated central hypoenhancement in the delayed phase and other phases. The use of the iDose^4 iterative reconstruction technique reduced image noise and allowed greater detail to be seen in the quantitative analysis.



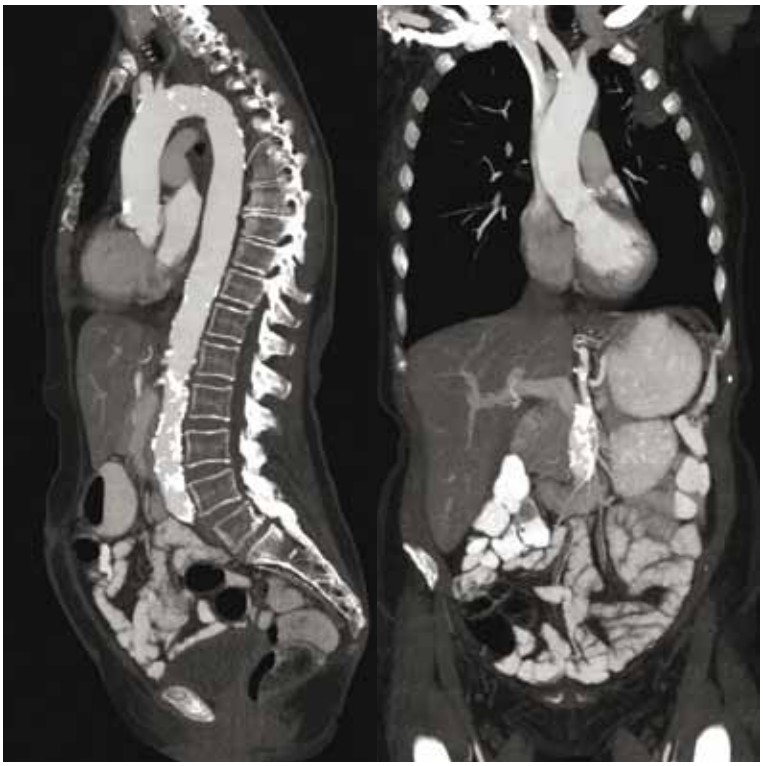
Scan parameters

- 80/140 kVp
- 460/90 mAs
- Collimation – 64 x 0.625 mm
- iDose^4 – Level 4
- DLP – 75.2 mGy*cm
- $CTDI_{vol}$ – 9.4 x2 mGy
- Effective dose – 1.1 mSv*
- Scanner - iCT

*AAPM technical report 96

The results you want, at the speeds you need

Low-energy imaging allows for increased iodinated contrast resolution at low dose; however, low-energy techniques often result in increased artifacts in larger patients. Ingenuity CT with iDose^4 provides robust artifact prevention in low-energy acquisitions, even in large patients.



Scan parameters

- 80 kVp
- 135 mAs avg.
- Coverage – 59.5 cm
- Scan time – 10.3 s
- iDose^4 – Level 6
- $CTDI_{vol}$ – 2.6 mGy
- DLP – 169.5 mGy*cm
- Effective dose – 2.5 mSv*
- Reconstruction time – 148 s (1,181 images)
- Scanner – Ingenuity CT

Emergency and trauma imaging are highly demanding in terms of artifacts that may impact image quality and time to diagnosis. iDose^4 reduces artifacts in images. This can be helpful in imaging patients who cannot lift their arms due to positioning requirements, weakness, or injury.

Scan parameters

- 120 kVp
- 39 mAs
- Coverage – 157.7 cm
- Scan time – 50.4 s
- Focal spot resolution – high
- iDose^4 – Level 5
- $CTDI_{vol}$ – 2.6 mGy
- DLP – 428 mGy*cm
- Effective dose – 6.4 mSv*
- Scanner – Ingenuity CT

*AAPM technical report 96

On the SmartPath with you

We understand how critical it is to elevate quality and efficiency in your daily work routine. And Philips SmartPath is your way to obtain access to the latest innovations throughout the cycle of your ownership.

We are committed to bringing the benefits of iterative reconstruction technique to all. This is why we designed an iDose[4] upgrade to put you at the forefront of clinical innovations and workflow efficiencies, and expand the clinical capabilities of your current system.

iDose[4] is available across the iCT, Ingenuity, and Brilliance CT families

iCT TVI • iCT • iCT SP

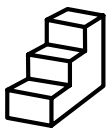
Ingenuity CT • Ingenuity Core[128] • Ingenuity Core

Brilliance CT 64-channel with Essence technology • Brilliance CT 64-channel
Brilliance CT 40-channel* • Brilliance CT Big Bore*
Brilliance CT 16-slice*† • Brilliance CT 10-slice* • Brilliance CT 6-slice*†

Philips SmartPath provides you easy access to solutions and innovations for the full life of your computed tomography system, so you can boost your clinical and operational potential and achieve your organizational goals.

Optimize

Optimize your system's performance both now and in the future with regular and ongoing updates, including functionality improvements and remote technical support.



Enhance

Enhance your equipment with regular technology upgrades, and take advantage of the newest features and capabilities.

Transform

Transform your investment at the end of your system's life by transitioning seamlessly to a next-generation solution or refurbished option.

* May require prerequisite upgrade for iDose[4] eligibility. Air-cooled scanners only. Please contact your local Philips representative for availability and prerequisite requirements.
† 8 MHU X-ray tube configuration prerequisite.

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