

Sistemas de reducción de dosis en CT para pediatría. Nuevos avances



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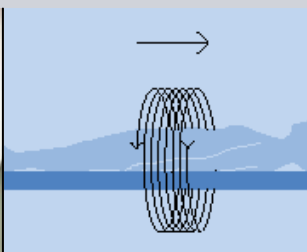
An Innovation Leader in Technical and Clinical Solutions

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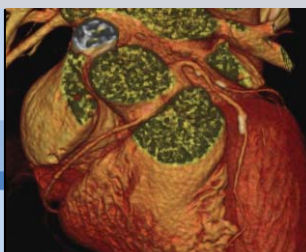
First CT from a
med. manufacturer
**To produce cross
sectional images**

1974



First spiral
CT scanner
**To leave the
axial world**

1987



First cardiac
CT scanner
**To explore the
heart**

1999



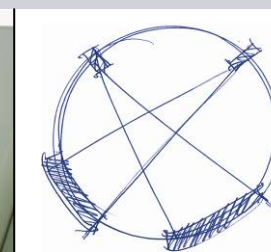
First 0 MHU x-ray
tube with TubeGuard (proactive
failure prediction) since 2008
**To scan without
compromise**

2003



First 64-slice
CT scanner
**To routinely scan
sub-mm resolution**

2003



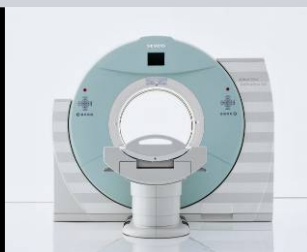
First Dual
Source CT
**To alleviate
compromise**

2005



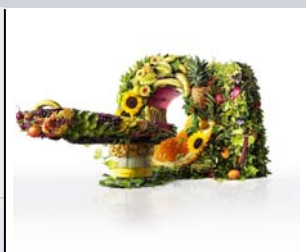
First routine Dual
Energy scan
**To change the
face of CT**

2006



First Adaptive
Scanner
**To adapt to any
clinical need**

2007



First Flash speed,
lowest dose CT
**To make CT
healthier**

2008



First multimodality
3D imaging network
**To make reading
fast & reproducible**

2009



First routine
Iterative Recon.
**To save up to
60% dose**

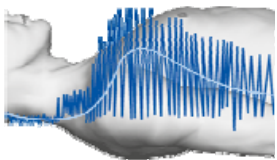
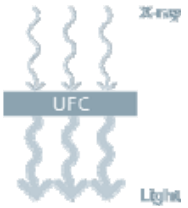
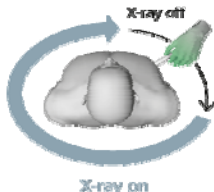
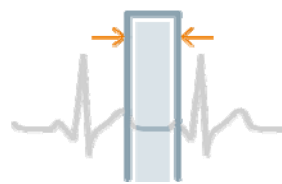
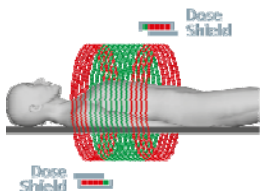
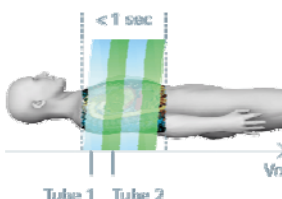
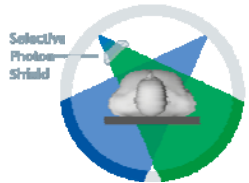
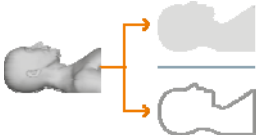
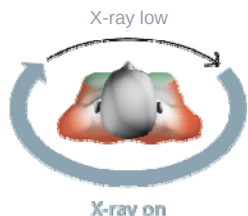
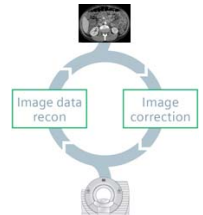
2009



First affordable
performance CTs
**To make 16/64 CT
more affordable**

2010

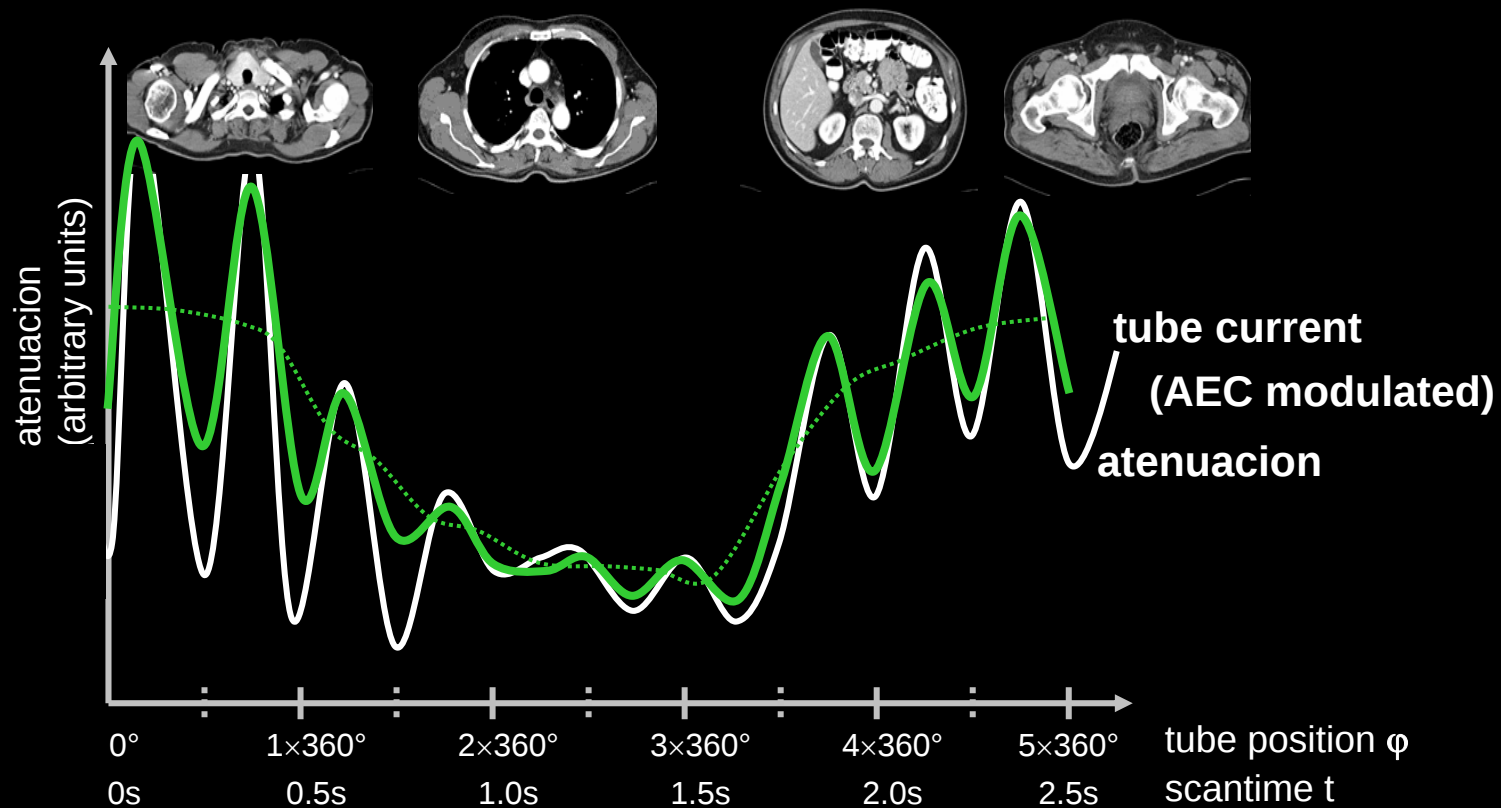
Lider en baja dosis

	CARE Dose 4D Up to 68%		UFC Up to 30%		Hand CARE Up to 70%
	Pediatric 80 kV Protocols Up to 50%		DSCT Up to 50%		Adaptive ECG-Pulsing /Sequence 2.5 mSv
	Adaptive Dose Shield Up to 25%		Flash Spiral <1 mSv		Selective Photon Shield No penalty
	4D Noise Reduction Up to 50%		X-CARE Up to 40%		IRIS Up to 60%

Medidas de reducción de Dosis

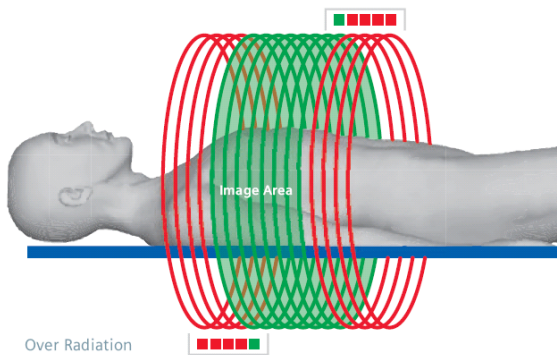
Modulación dinámica de Dosis: CARE Dose 4D

Gran variabilidad de atenuación entre distintos órganos y ángulos (AP / Lateral)

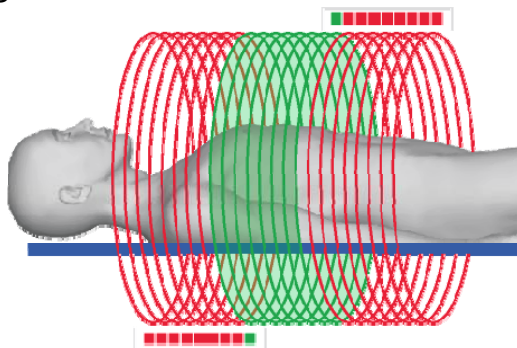


Eliminando la dosis innecesaria

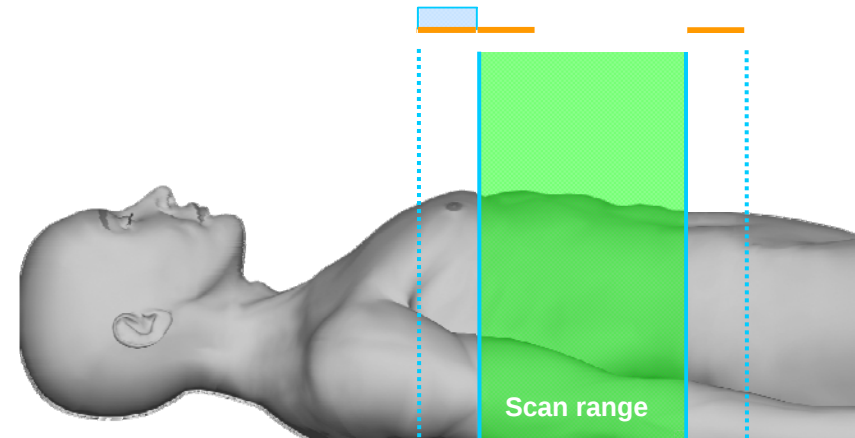
Dosis innecesaria en todos los CT's



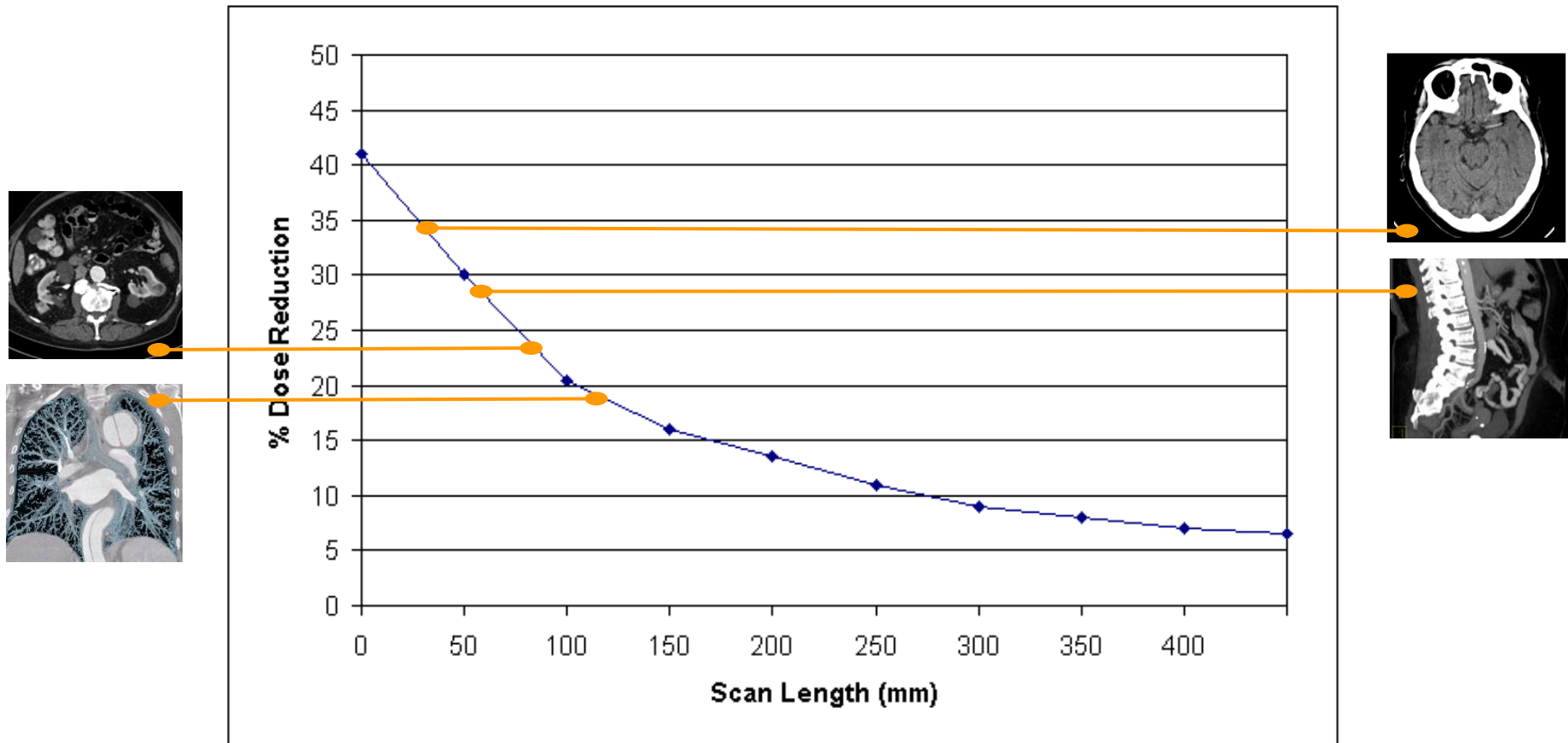
La dosis innecesaria aumentan con detectores mayores



Eliminación de la sobre-irradiación con el colimador adaptativo



Validación de la Eficacia del Colimador adaptativo (ej. pediatría)



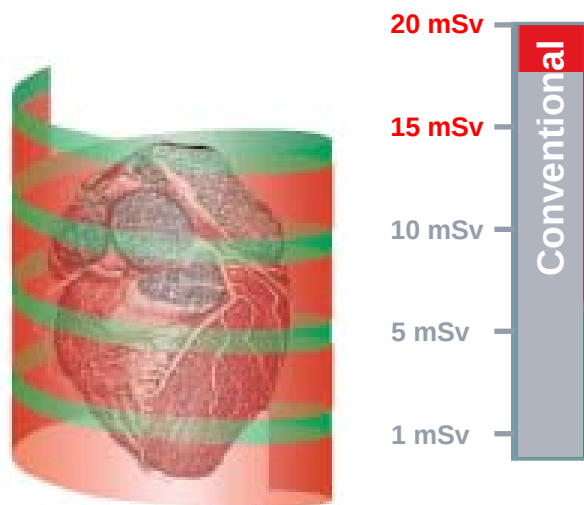
These results are made available by Mayo Foundation for Medical Education and Research under a comprehensive research agreement.
Actual Study "Dose Reduction in Spiral CT Using Dynamically Adjustable Z-axis Beam Collimation". RSNA 2008 - ID: 6012801

SOMATOM Definition Flash

Pitch 3,4

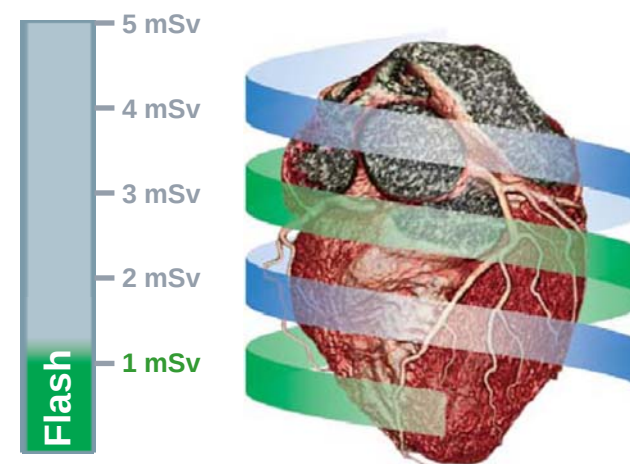
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Angio CT Convencional



- 135-175 ms resolución temporal
- 5-10 s tiempo de escan
- **dosis de 8-40 mSv ***

Espiral Flash Cardio



- 75 ms resolución temporal
- 250 ms tiempo de escan (1/4 de latido)
- **Dosis baja a < 1 mSv**

* Source: Reference dose based on the industry independent multicenter, multivendor "PROTECTION 1" study.

SOMATOM Definition Flash

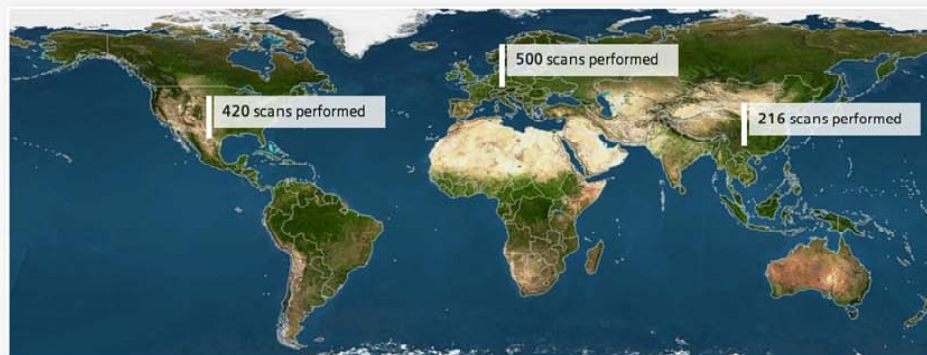
Contador de baja dosis en directo

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SIEMENS

Worldwide Dose Savings
LIVE Statistics

Next update scheduled in: 18 minutes



* compared to the mean average of 12 mSv of the PROTECTION I study.

Status Monitor

Reading logfiles...done!

Adding new Flash CT logs to statistics...

...Serial No.=73-XXX / Location=Austria
...Serial No.=73-XXX / Location=Canada
...Serial No.=73-XXX / Location=Republic Korea
...Serial No.=73-XXX / Location=Hong Kong
...Serial No.=73-XXX / Location=Malaysia
...done!

Updating statistics...done!



0.87 mSv

Flash Dose @ 100kV

1.41 mSv @ 120kV

www.siemens.com/low-dose

SOMATOM Definition Flash

Flash thorax pediatric scan in 0.37 s

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Scan Time: 0.37 s
No breath hold
No sedation



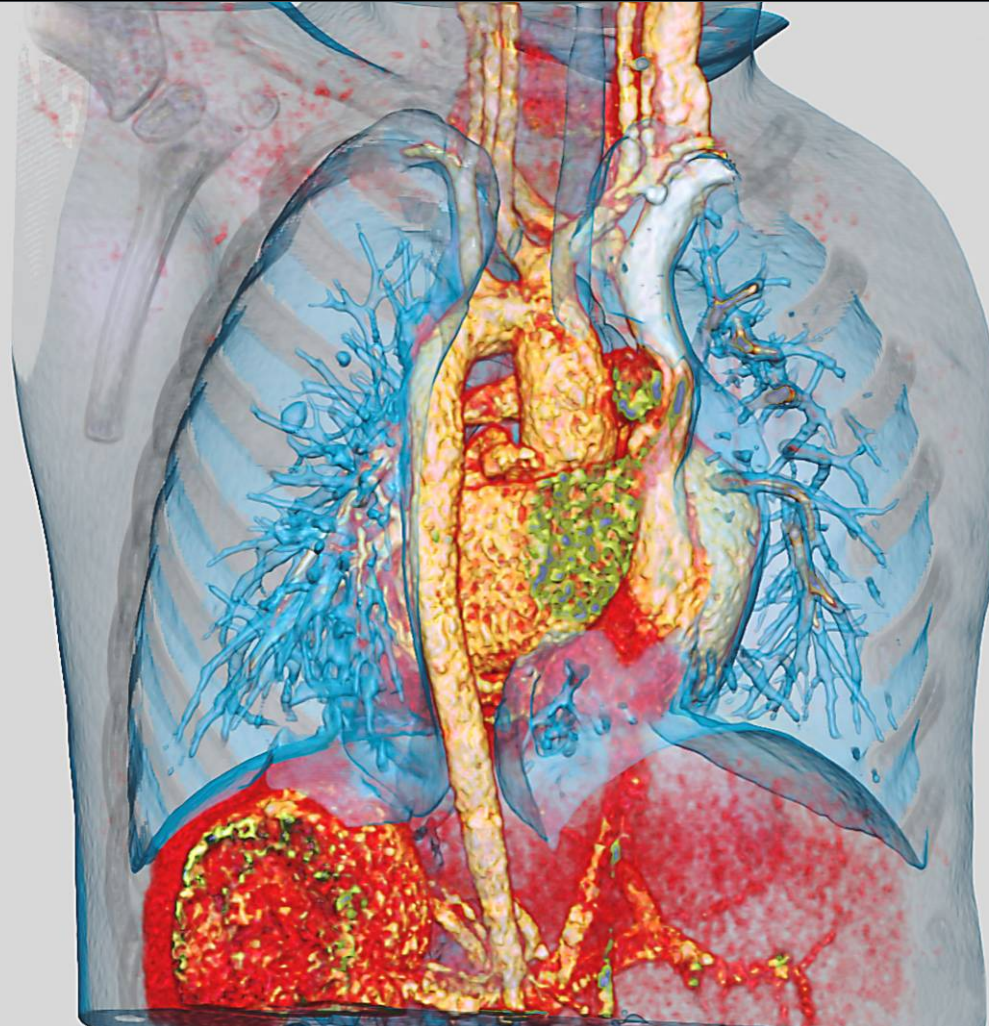
Courtesy of Friedrich-Alexander University Erlangen-Nuremberg
– IMP / Erlangen, Germany

SOMATOM Definition Flash: 0.33 mm spatial resolution, 0.37 seconds for 146 mm, 0.28 second rotation, 100 kV, 70 mAs / rotation

SOMATOM Definition Flash

Aortic transposition

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0.25 mSv

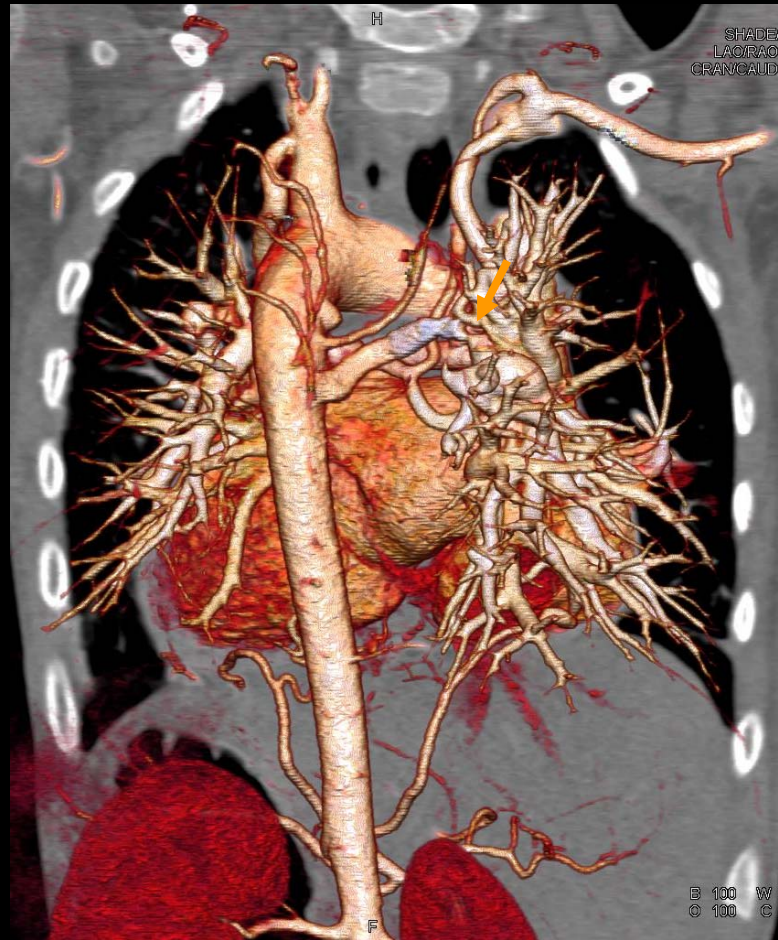
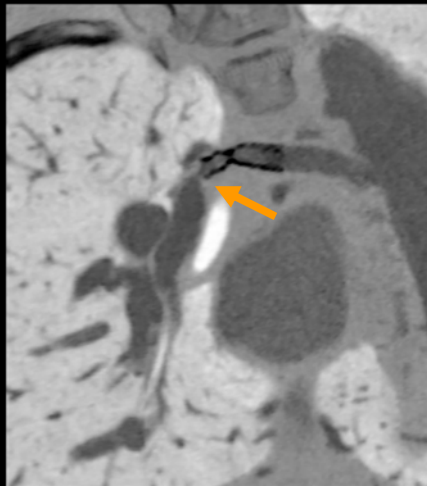
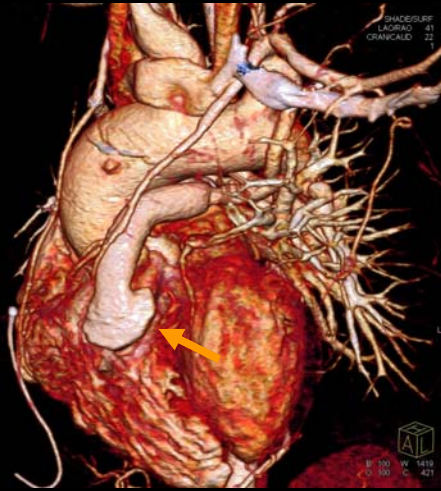
Courtesy of Hôpital de Jolimont/ La Louvière, Belgium

SOMATOM Definition Flash: 0.33 mm spatial resolution, 0.28 second rotation, 80 kV, 42 eff. mAs

Split-second thorax

Pediatric imaging without sedation

SIEMENS



SOMATOM Definition Flash

Flash speed.
Lowest dose.

Collimation: 128 x 0.6 mm
Spatial resolution: 0.33 mm
Scan time: 0.52 s
Scan length: 211 mm
Rotation time: 0.28 s
80 kV, 104 effective mAs

1.65 mSv

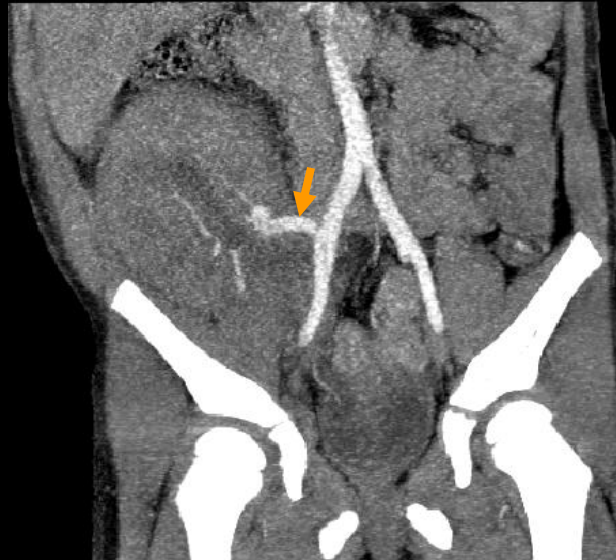
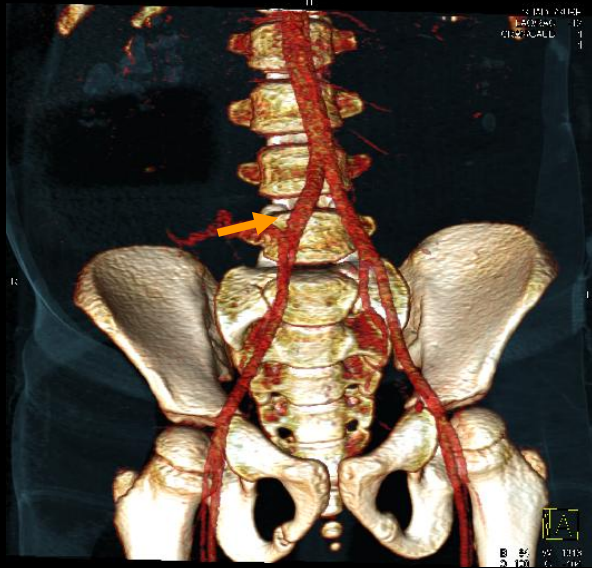
Sin sedación
Sin Apnea

Courtesy of Sakakibara Heart Institute / Tokyo, Japan

Flash Spiral Body

Only 1.17 mSv to exclude renal stenosis in transplanted kidneys

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SOMATOM Definition Flash

Flash speed.
Lowest dose.

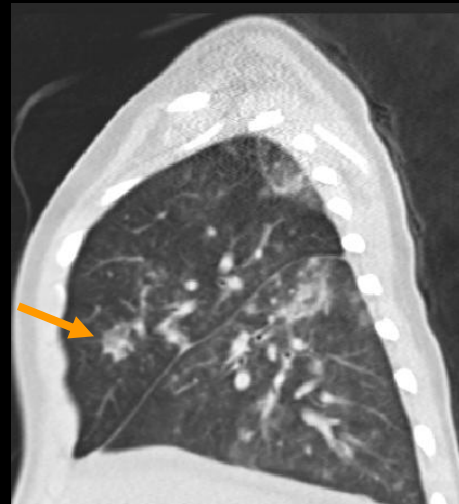
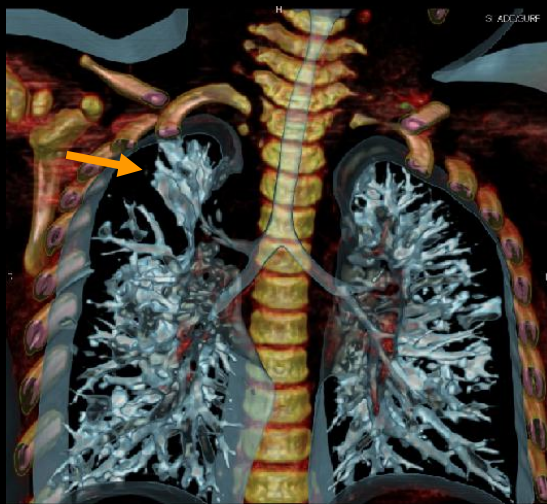
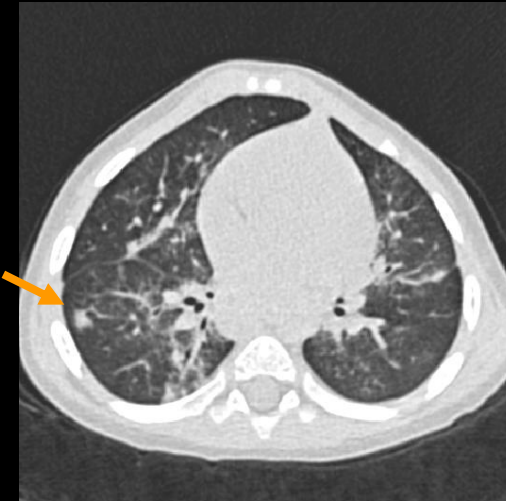
Collimation: 128 x 0.6 mm
Spatial resolution: 0.33 mm
Scan time: 0.5 s
Scan length: 204 mm
Rotation time: 0.28 s
80 kV, 102 effective mAs

1.17 mSv

Split-second thorax

Only 0.37 s to unveil cystic fibrosis in pediatric patient

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SOMATOM Definition Flash

Flash speed.
Lowest dose.

Collimation: 128 x 0.6 mm
Spatial resolution: 0.33 mm
Scan time: 0.37 s
Scan length: 146 mm
Rotation time: 0.28 s
100 kV, 70 effective mAs

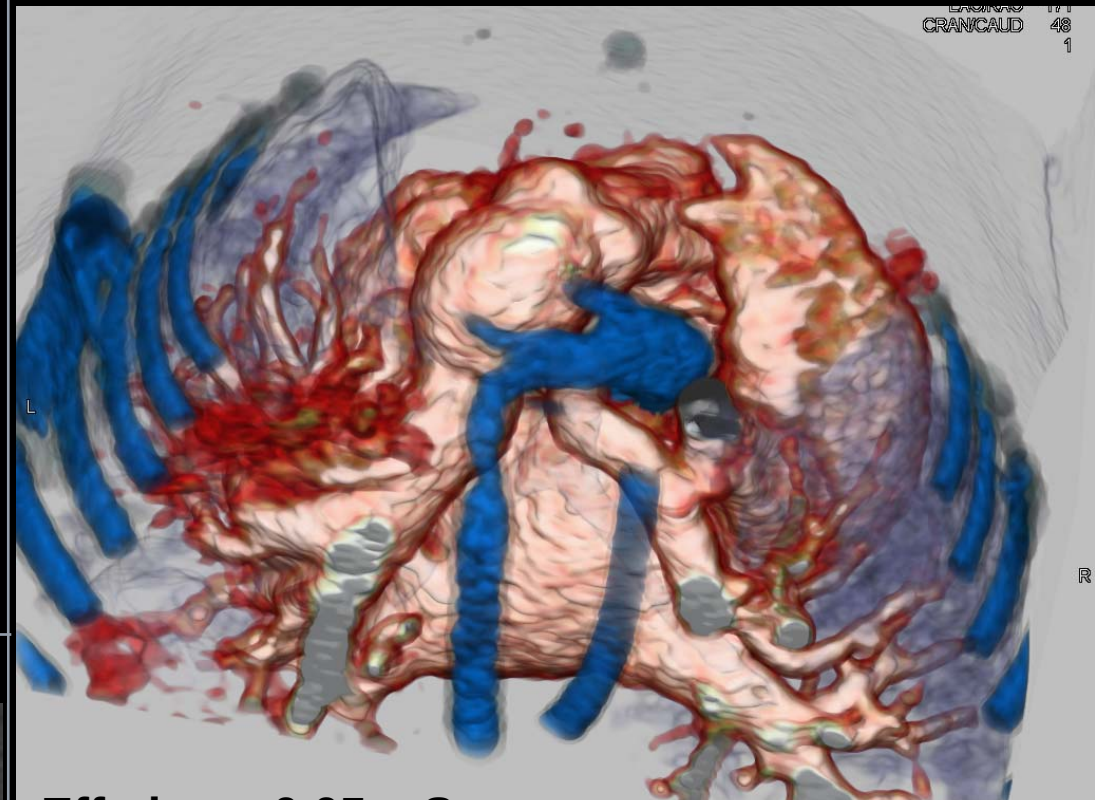
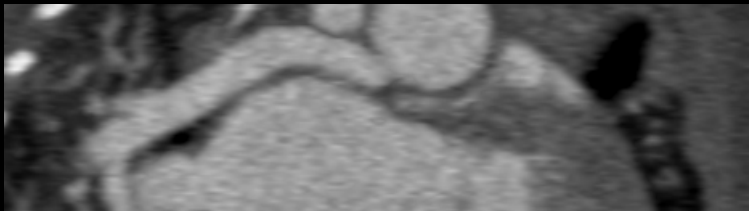
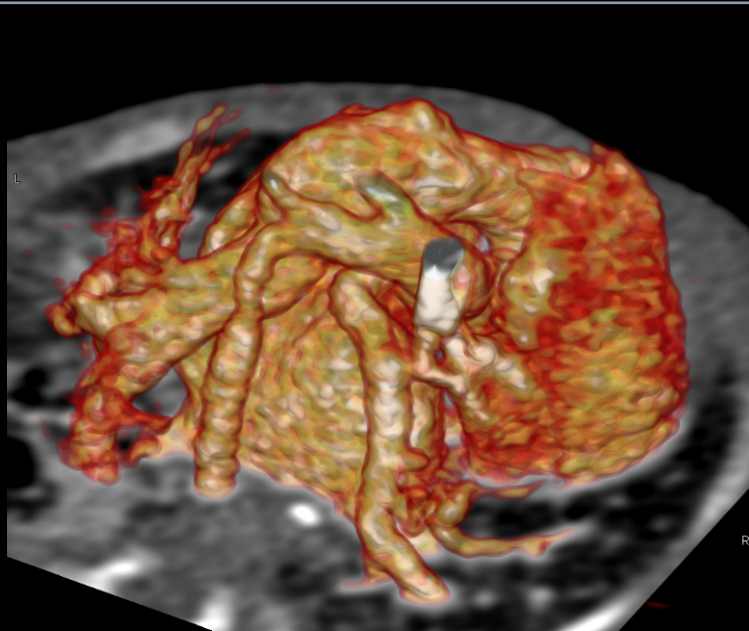
2.5 mSv

Sin sedación
Sin apnea

SOMATOM Definition Flash

0.05 mSv pediatric Imaging – Narrowing of desc. aorta

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Eff. dose: 0.05 mSv

1.5-2kg, HR 165 bpm

Temp resolution: 75 ms

Total mAs 38		Total DLP 1 mGycm			
Scan	KV	mAs / ref.	CTDIvol mGy	DLP mGycm	
Patient Position H-SP					
Topogramme	1	100	21 mAs		
DS_CorAdSeq	2D	80	22	0.18	1

Courtesy of CCML Paris (Dr. Paul, Dr. Sigal-Cinqualbre)

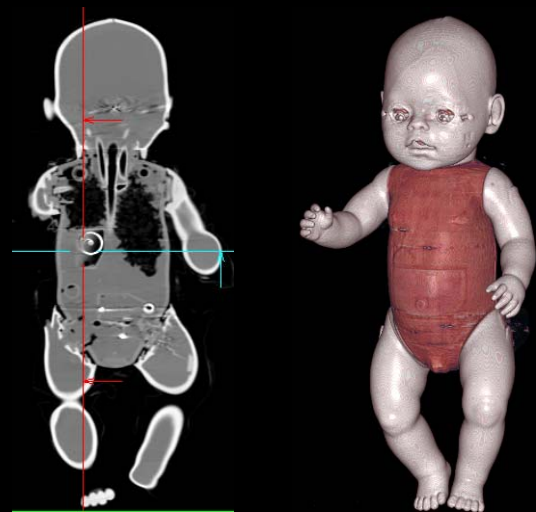
SOMATOM Definition Flash: 0.33 mm spatial resolution, Neonate (premature), 1.5-2kg, HR 165 bpm, 0.28 second rotation, 80 kV, 22 mAs / rotation

SOMATOM Definition Flash

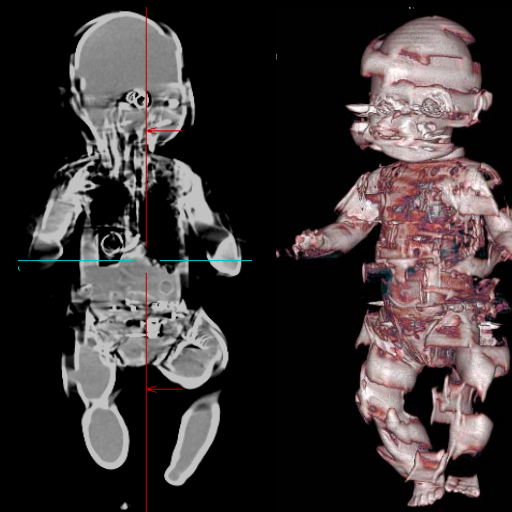
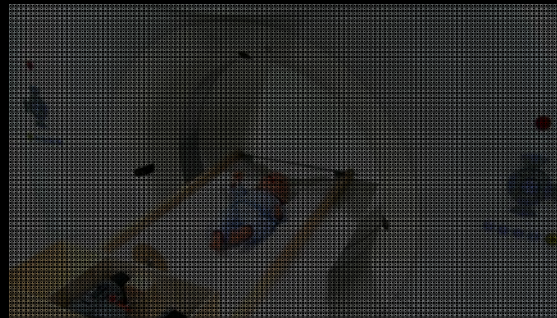
Pediatric motion simulation

SIEMENS

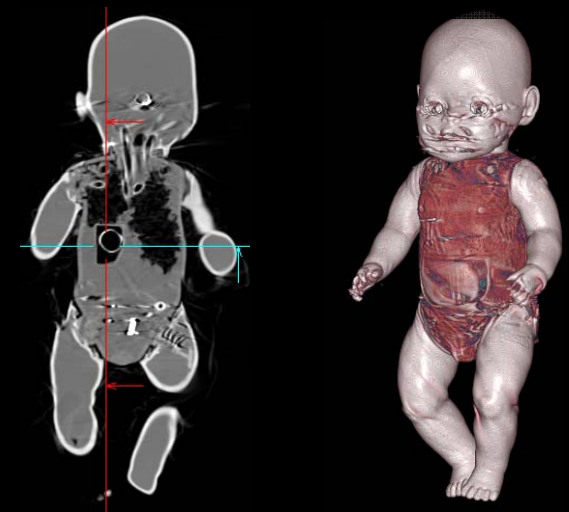
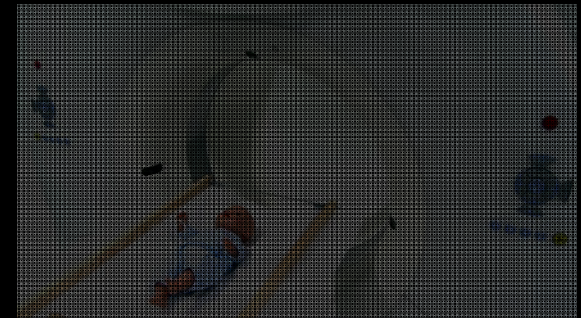
Standard Spiral
sedated



Standard Spiral
not sedated



Flash Spiral
not sedated

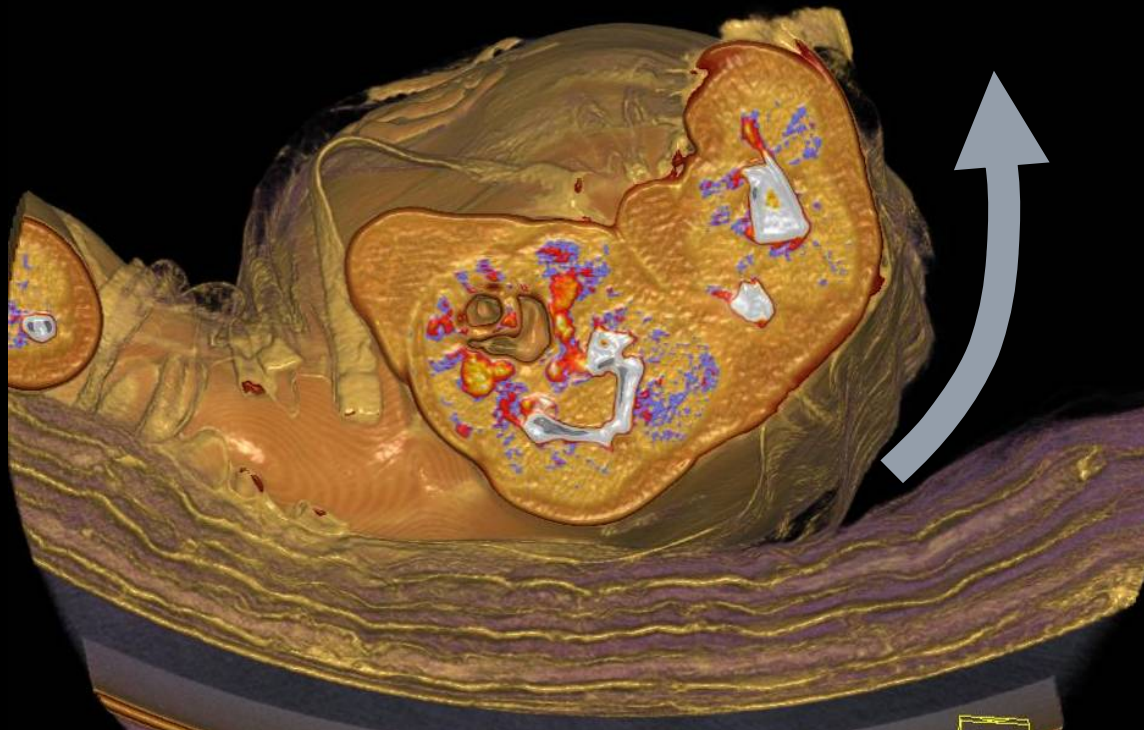


SOMATOM Definition Flash

Pediatric imaging – Extrapulmonary sequester

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- No breath hold
- Not compliant
- 0.57 mSv eff. dose



Courtesy of Friedrich-Alexander University Erlangen-Nuremberg

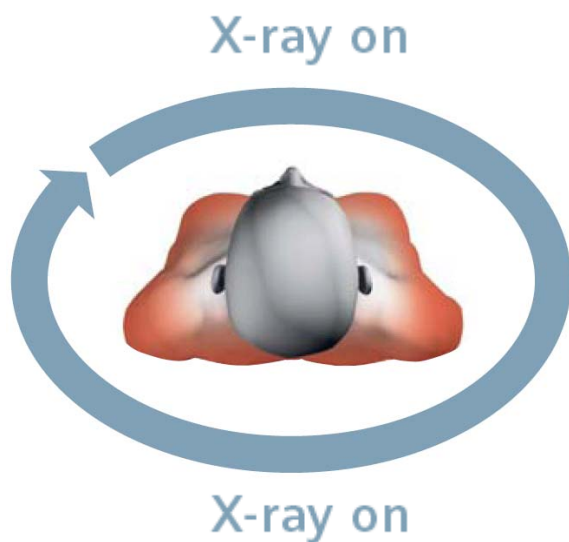
SOMATOM Definition Flash: 0.33 mm spatial resolution, 0.28 second rotation, 0.57 mSv eff dose

SOMATOM Definition Flash

Protección de dosis órgano sensible

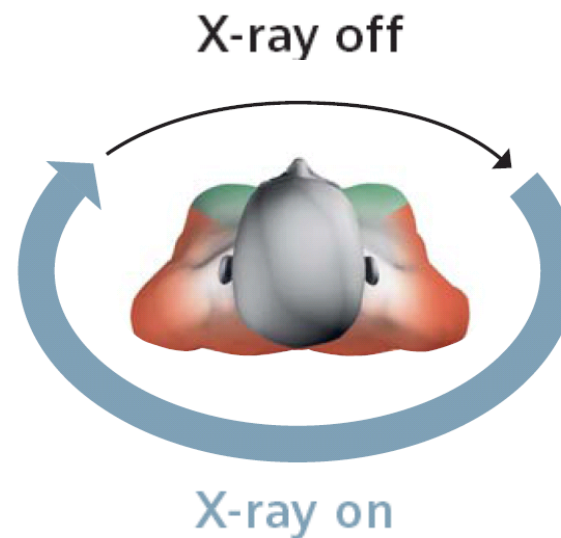
SIEMENS

Tecnología convencional



- Radiación total de la mama

DSCT con X-CARE

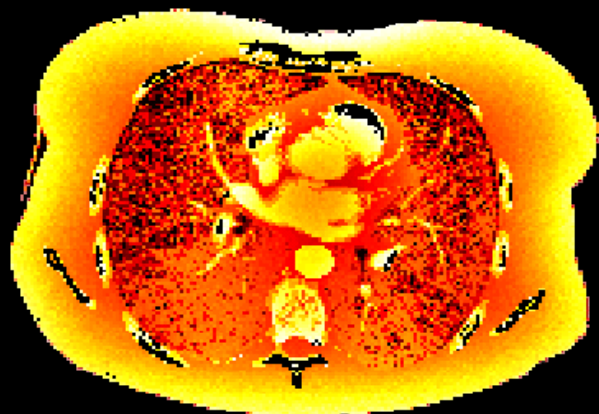


- 40% de reducción de dosis en la mama

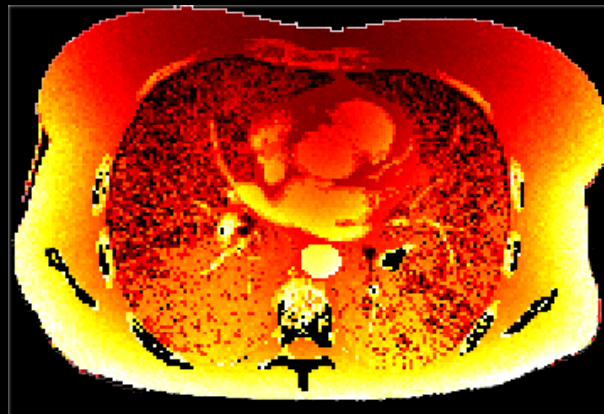
SOMATOM Definition Flash

Hasta 40% de reducción de dosis con X-CARE

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sin X-CARE



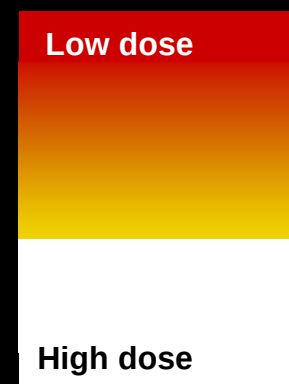
con X-CARE

**Hasta 40%
reduccion de dosis**

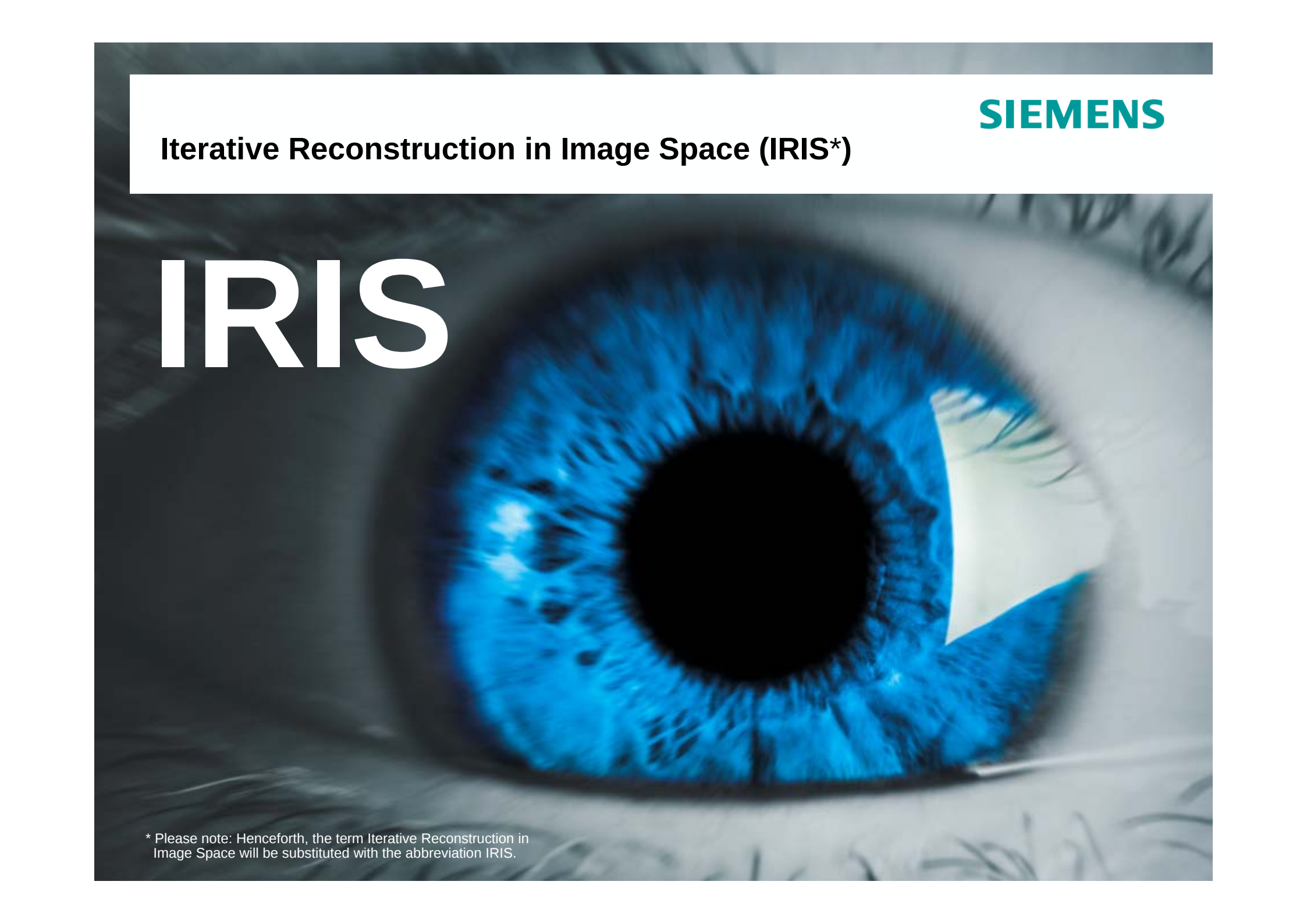
SOMATOM Definition Flash

Flash speed.
Lowest dose.

X-CARE
Spatial res. 0.33 mm



Dose distribution



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Iterative Reconstruction in Image Space (IRIS*)

IRIS

* Please note: Henceforth, the term Iterative Reconstruction in Image Space will be substituted with the abbreviation IRIS.

Iterative Reconstruction in Image Space

**Mejora la
calidad de
imagen**

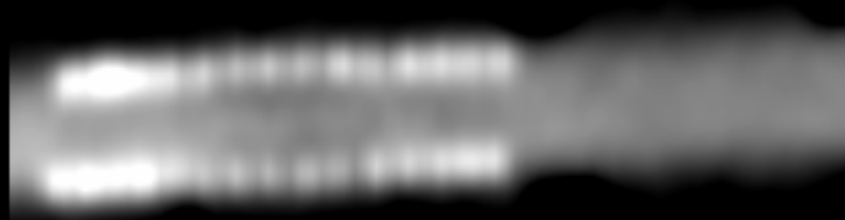
hasta 60%*
**Reducción
De dosis**

*Results may vary. Data on file.

Iterative Reconstruction in Image Space

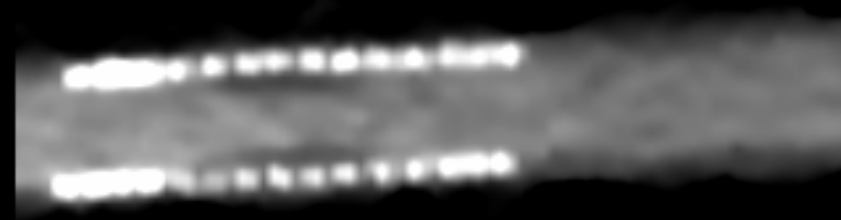
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Filtered Back Projection



4 mm stent

IRIS



4 mm stent

Iterative Reconstruction in Image Space

60% dose reduction

SIEMENS

Full dose without IRIS



60% less dose with IRIS



Iterative Reconstruction in Image Space

Significantly decreased image noise at same dose

SIEMENS

Filtered Back Projection



Decreased noise with IRIS



SOMATOM Definition Flash

Energía Dual con dosis de 1 tubo

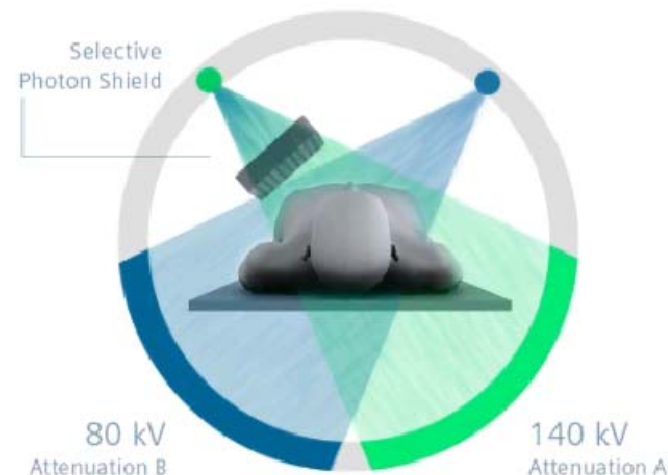
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Tecnología convencional



- Limitada a **un contraste**
- Sólo **información morfológica**

DE con colimador selectivo de Fotones



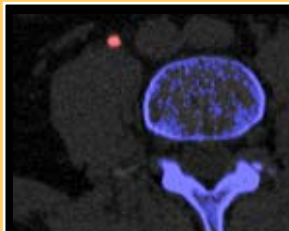
- **Caracterización tisular**
- **Misma dosis** que un escaner con 120 kV

Single Dose Dual Energy

Three main application categories

SIEMENS

Caracteriza



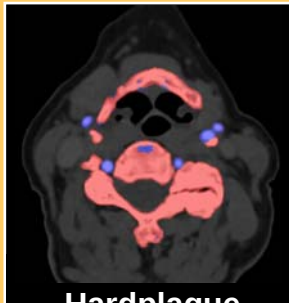
**Calculi
Characterization**



Gout

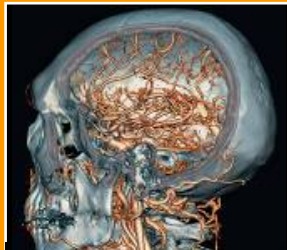


Musculoskeletal



**Hardplaque
Display**

Remarca



Direct Angio



Lung Vessels

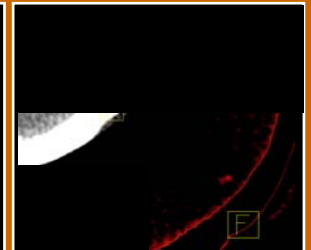
Cuantifica



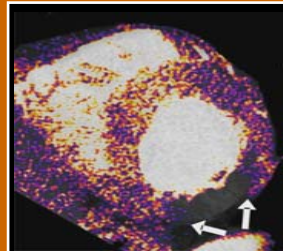
Lung PBV



**Virtual
Unenhanced**



**Brain
Hemorrhage**



Heart PBV



Lung Nodules



Xenon

Monoenergetica

Computed Tomography. Answers for life.