CARE Right
Computed Tomography, committed to the right dose
Ivo Driesser
Austin, July 22nd 2014

Is 1 mSv the right dose for every patient?
Male, 43 cranial CT to exclude lesion
Female, 59 CT scan of whole aorta to detect dissection
Female, 54 Abdominal CT

In this particular case, 0.9 mSv was the right dose.
In this particular case, 7.9 mSv was the right dose.
In this particular case, 2.4 mSv was the right dose.

Left: Courtesy of Inselspital Bern / Bern, Switzerland; Middle: Courtesy of Wexford General Hospital / Newtown, Ireland; Right: Courtesy of C.I.M. Laennec / Cesson Sevigne, France
For the ideal balance between radiation dose and image quality:

CARE Right
The unique Siemens approach

CARE Right
Committed to the Right Dose in CT

CARE Right
Committed to the Right Dose in CT
Right dose technology
Proven innovation and technological leadership

<table>
<thead>
<tr>
<th>1960s</th>
<th>1990s</th>
<th>2000s</th>
<th>2010s</th>
</tr>
</thead>
</table>

CARE Dose4D
Minimal dose, maximum quality and fully automated

Fully automated dose modulation in real-time
- Highest dose savings without IQ compromise
- Protocols automatically adapted
- Modulation based on the topogram and online
- Fully adjustable with CARE Dose Configurator

Different areas of the body have different shapes.
And therefore need customized dose (= table current)
CARE Dose4D
Minimal dose, maximum quality and fully automated

- Fully automated dose modulation in x, y and z direction in real-time
- Adjustments follow the configurable curve to best fit the clinical needs
- Every organ characteristic has a configurable curve

CARE kV
First automated voltage setting

- Allows contrast-to-noise ratio to be optimized
- Up to 60% dose reduction can be achieved without compromise in image quality
- Zero-click automated kV setting for each individual patient
- The three different modes of CARE kV:
  - On: Optimized tube voltage and tube current based on the patient’s size and clinical question
  - Off: The scan is performed with the kV setting defined in the respective scan protocol
  - Semi: A user-specified kV setting will be used and mAs-values will be adjusted

- Optimization of kV to minimize patient dose at maintained image quality

- same CNR = same image quality
CARE kV
First automated voltage setting

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December 2013

CARE kV
First automated voltage setting

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CARE kV
First automated voltage setting

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Pediatric Imaging with 70 kV
Aortic angiography

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**ADMIRE – Advanced Modeled Iterative Reconstruction**

**The latest generation iterative reconstruction**

**Improved IQ at excellent dose values**

- **On the fly** powerful dose reduction, excellent image quality and everyday suitability
- Potential to lower radiation up to 60% in all clinical applications
- Superb details, delineation and sharpness of organ borders
- Significant artifact reduction, e.g. streak artifacts in the shoulder region
- PACS-Ready workflow even for thick slices
- Reader-Ready reconstructions

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**ADMIRE – Advanced Modeled Iterative Reconstruction**

**The latest generation iterative reconstruction**

**CTDvol 0.04 mGy**

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**ADMIRE – Advanced Modeled Iterative Reconstruction**

**The latest generation iterative reconstruction**

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ADMIRE – Advanced Modeled Iterative Reconstruction

The latest generation iterative reconstruction

Collimation:
- 192 x 0.6 mm
- Scan time: 0.5s
- Scan length: 326 mm
- Rotation time: 0.25s
- Tube setting: 70 kV, 142 mAs
- CTDIvol: 1.67 mGy
- DLP: 82 mGy cm
- Effective dose: 1.2 mSv

SOMATOM Force

ADMIRE

FAST Planning

Radiation reduction starts with good planning

Safe, fast and standardized
- Automated organ-based scan range planning based on anatomical landmarks
- Dose saving by perfect planning
- Auto iso-center positioning
- Optimized workflow
Right dose technology

Right dose levels

Right dose management

Understanding of absolute dose values

Example: Comparison of radiation exposure due to reduction of flight level

Adult Imaging with 80 kV Aortic CTA

SOMATOM Sensation 64
Initial examination @ 120 kV

SOMATOM Definition Edge
Follow-up examination @ 80 kV

6.6 mSv

2.6 mSv
### Right dose levels
Regional reference values as a guidance

<table>
<thead>
<tr>
<th></th>
<th>Switzerland</th>
<th>Germany</th>
<th>Europe</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>65 mGy</td>
<td>65 mGy</td>
<td>60 mGy</td>
<td>75 mGy</td>
</tr>
<tr>
<td>Thorax</td>
<td>15 mGy</td>
<td>12 mGy</td>
<td>10 mGy</td>
<td>n.a.</td>
</tr>
<tr>
<td>Abdomen</td>
<td>15 mGy</td>
<td>20 mGy</td>
<td>35 mGy</td>
<td>25 mGy</td>
</tr>
</tbody>
</table>

### Right dose levels
Recommendations from experts

**SIERRA**

Siemens Radiation Reduction Alliance:
- 15 key opinion leaders in radiology
- Drive research to improve radiation reduction technologies
- Create recommendations for clinical practice everywhere

### Right dose levels
Base for Siemens CT standard scan protocols
CARE Right
Committed to the Right Dose in CT

Right dose management
The sustainable dose management

DoseMAP
Access, report and manage dose data

EduCARE
Continuous education of staff

Optimx CARE CT
Optimization of the current dose situation

Right dose management
The Siemens CT Dose Management Program - DoseMAP

Scan Protocol Lock
Dose Notification
Dose Alert

- DICOM Structured Dose Report
- Patient Protocol
- CARE Analytics
- CARE Dashboard
- CARE Profile
Analyze Dose
Assess the dose situation

Pre-examination dose checkup

- CARE Dashboard*: Overview of used dose features per scan
- CARE Profile*: Visualization of dose distribution prior to scan at every z-position

* Availability depending on scanner

Protect Dose
Manage access to scan protocols

Access Protection*

- Increased security by managing user administration rights with Scan Protocol Lock

* Availability depending on scanner

Protect Dose
Automated monitoring of dose values

Dose Notification* and Dose Alert*

- May help to protect patients from over radiation
- Warns the operator in case set dose thresholds are exceeded

* Availability depending on scanner
Right dose management
EduCARE

Large portfolio available to increase your skills
- Dedicated Siemens YouTube Channel
- "How to Guides"
- Webinars
- e-learnings
- Siemens Healthcare “Guide to right dose”

Right dose management
Optimize CARE CT – 4 steps to optimize CT Dose

Preparation
- Data collection and analysis of baseline CT dose status

Consulting
- Optimization of baseline status and change initialization

Monitoring
- Remote expert and auditor monitoring of project progress

Closure
- Presentation of results and project closure

Optimize CARE CT consulting project spans more than 10 weeks from start to end

Remote support and monitoring of change progress

Consulting
- Monitoring
- Closure

CARE Right
Committed to the Right Dose in CT

Right dose technology
Right dose software
Right dose management