

SIEMENS Healthineers

Imaging - Fluoroscopy Dose Monitoring Systems
Partners In Solutions at AAPM 2018, Nashville


Dose Monitoring and Management with Siemens Healthineers

Markus Lendl, Ph.D.
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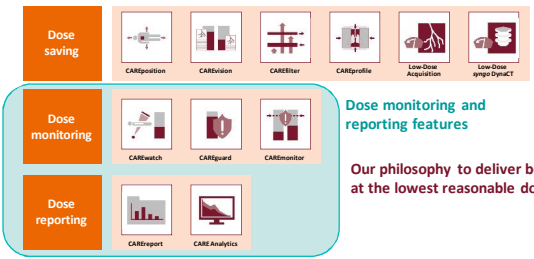
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- CARE (Combined Applications to Reduce Exposure)
- teamplay (departmental performance management solution)



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CARE Combined Applications to Reduce Exposure



Dose monitoring and reporting features


Our philosophy to deliver better care at the lowest reasonable dose.

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CAREwatch

CAREwatch displays the dose area product (DAP) the air kerma rate or the air kerma¹⁾ at the patient entrance reference point on the live display in the examination and control rooms.

During fluoroscopy/acquisition	Without radiation
Current value of the reference air kerma rate in mGy/min	Accumulated value of the reference air kerma in mGy
Accumulated value of the reference air kerma in mGy	Accumulated dose area product in μGy^2



CAREwatch makes dose visible

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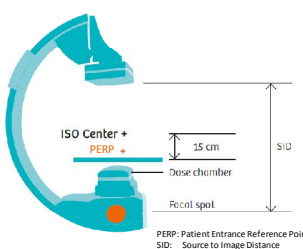
CAREwatch

Geometry and dose indicators according to IEC 60601-2-54

E.g. display for plane A:

mGy	A: 123	Displayed when footswitch is not pressed:
μGy^2	A: 567.8	Dose = 123 mGy DAP = 567.8 μGy^2

mGy/min	A: 321	Displayed when footswitch is pressed:
μGy^2	A: 567.8	Dose rate = 321 mGy/min DAP = 567.8 μGy^2



PERP: Patient Entrance Reference Point
SID: Source to Image Distance

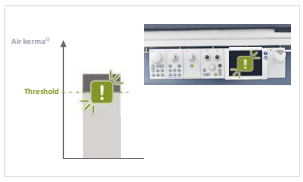
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CAREguard

Three thresholds for accumulated air kerma¹⁾ at the PERP (Patient Entrance Ref. Point) can be defined.

When a threshold is exceeded:

- An indicator on the live display flashes
- A warning pop-up is displayed on the tableside touch screen controller (TSC)



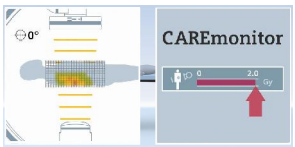
CAREguard provides effective patient entrance dose control

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CAREmonitor

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- Real-time visualization of accumulated peak air kerma¹⁾ according to current projection
- Automatic update of accumulated air kerma calculation upon every system change
- Warning message is displayed if the configured threshold has been reached in the current projection



Real-time patient entrance dose¹⁾ monitoring

¹⁾ air kerma = patient entrance dose; air kerma rate = patient entrance dose rate

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CAREmonitor

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Underlying model for CAREmonitor

- Model is based on combination of several simple shapes
- Scaling by age, weight, height
- Missing information estimated via WHO tables on age, height, weight, BMI
- Stand and table geometry is considered
- Table and mattress absorption is not considered (worst case scenario)


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CAREreport

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CAREreport provides detailed information on the dose applied in a case in a DICOM structured overview

- Review and optimize your dose
- Be prepared for dose reporting requests
- Easily obtain base data for more detailed analysis
→ e.g. teamplay, CAREanalytics



CAREreport provides a DICOM radiation dose structured report

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CAREreport

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Example of an examination report

Patient Info:		Exam Protocol	
Name:		Paxel: M ID: A0000	
26 , CARB	FIXED Cavo HR, new	10s	159/f/s 13-Jun-13 10:28:31
B 90KV 75mA	6.7ms 2.5C3 Large 9.00u 20cm	878.03µgpa*	188mgy 301AO 11CRA 151F
27 , CARB	FIXED Cavo HR, new	1s	159/f/s 13-Jun-13 10:35:25
A 92KV 767mA	6.7ms 1.0C1 Large 9.00u 20cm	123.01µgpa*	23.0mgy 403AO 2CRA 159F
27 , CARB	FIXED Cavo HR, new	1s	159/f/s 13-Jun-13 10:35:25
B 91KV 773mA	6.6ms 2.6C1 Large 9.00u 20cm	112.10µgpa*	21.5mgy 301AO 11CRA 159F
28 , CARB	FIXED Cavo HR, new	1s	159/f/s 13-Jun-13 10:36:32
B 90KV 792mA	6.5ms 2.7C1 Large 9.00u 20cm	52.34µgpa*	11.0mgy 301AO 11CRA 59F
29 , CARB	FIXED Cavo HR, new	8s	159/f/s 13-Jun-13 10:38:26
A 90KV 756mA	6.8ms 1.1C1 Large 9.00u 20cm	892.63µgpa*	150mgy 403AO 2CRA 122F
29 , CARB	FIXED Cavo HR, new	8s	159/f/s 13-Jun-13 10:38:26
B 91KV 759mA	6.7ms 2.8C1 Large 9.00u 20cm	729.06µgpa*	133mgy 301AO 11CRA 122F

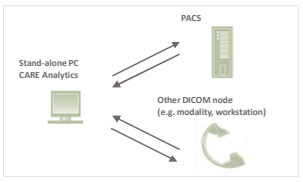
Full RDSR capabilities

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CARE Analytics

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- Enhanced in-house dose reporting and assessment
- Enhanced transparency regarding dose per case
- Improved reporting on patient dose history
- Improved cross-institutional reporting




CARE Analytics provides cross-institutional dose reporting

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teamplay¹⁾ is a departmental performance management solution for radiology and cardiology to advance digitalization in healthcare and human health

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¹⁾ The product/features/service offerings are not commercially available in all countries. If the services are not available in your country, due to regulatory or other reasons, the service offering cannot be guaranteed. Please contact your local Siemens organization for further details.

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teamplay Applications SIEMENS Healthineers

Home, Dose, Usage, Rad, Protocols, Images, Cardio, More to come

Constant update cycles

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teamplay Dose and AT – the perfect match to optimally adhere new guidelines SIEMENS Healthineers

Dose Events: 20 (Number of Events: -28.6%)
Patient Change Time: 42:29
Dose Events: 67 (Number of Events: -28.7%)
Exam Duration: 13:55
Dose Target: 72 (Percentage of all doses: +7.8%)
Patients & Exams: 413 (Number of patients: 448)

Set the national reference value
Define an internal reference value
Ensure dose values are within the pre-set target

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Summary
Dose monitoring and management SIEMENS Healthineers

Siemens Healthineers provides:

- CARE features
 - Dose indicators
 - Warning at dose thresholds
 - Local peak patient entrance dose
 - Detailed dose report, DICOM dose structured report
 - Processing tool for DICOM dose structured report
- teamplay
 - teamplay Dose module for easy and detailed analysis

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Thank you!

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Image Quality

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