

QCDR Measure Number	ACRad 34
Measure Title:	Multi-strata weighted average for 3 CT Exam Types: Overall Percent of CT exams for which Dose Length Product is at or below the size-specific diagnostic reference level (for CT Abdomen-pelvis with contrast/single phase scan, CT Chest without contrast/single phase scan and CT Head/Brain without contrast/single phase scan)
Measure Description	Weighted average of 3 former QCDR measures, ACRad 31, ACRad 32, ACRad 33.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	
NQS Domain	Patient Safety
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, Imaging facility
Meaningful Measure Area	Preventable Healthcare Harm
Meaningful Measure Area Rationale	The rationale for including this measure in the Preventable Healthcare Harm area is based on the measure quality action as shown below: Quality action for a group: to implement and monitor CT protocols to ensure dose optimization.
Denominator	Number of CT Abdomen-pelvis exams with contrast (single phase scans), CT Chest exams without contrast (single phase scans), and CT Head/Brain (single phase scans)
Denominator Elements	Study description; Exam date; Acquisition protocol
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Number of CT Abdomen-Pelvis exams with contrast (single phase scan), CT Chest exams without contrast (single phase scan), and CT Head/Brain exams without contrast (single phase scan) for which Dose Length Product is at or below the size-specific exam-specific diagnostic reference level.
Numerator Exclusions	None
Numerator Data Elements	Dose length product; CTDIw Phantom Type; Effective Diameter (calculated from localizer image)
Number of performance rates to be submitted	3
Indicate an Overall Performance Rate if more than 1	Weighted average

Performance Rate Description

This measure will be calculated using the weighted average of three performance rates:

Rate 1: Percent of CT Abdomen-pelvis exams with contrast (single phase scan) for which Dose Length Product is at or below the size-specific diagnostic reference level

Rate 2: Percent of CT Chest exams without contrast (single phase scan) for which Dose Length Product is at or below the size-specific diagnostic reference level

Rate 3: Percent of CT Head/brain exams without contrast (single phase scan) for which Dose Length Product is at or below the size-specific diagnostic reference level

Measure Type (Process/Outcome)

Outcome

High Priority Measure

Yes

Outcome Measure

Yes

Inverse Measure

No

Proportion Measure

Yes

Continuous Measure

No

Ratio Measure

No

If continuous variable or ratio is chosen, what would be the range of the scores?

N/A

Is the measure risk adjusted?

No

If risk-adjusted, which score is risk-adjusted?

N/A

Is the QCDR measure able to be abstracted?

Yes

Data Source

Registry (Dose Index Registry)

Clinical Recommendation Statement

This measure is a composite of three previously approved QCDR measures, ACRad 31, ACRad 32, and ACRad 33.

There has been a considerable rise in use of Computed Tomography (CT) over the past 10 years. With that, there is also a significant increase in the population's cumulative exposure to ionizing radiation. A CT study should use as little radiation as possible, while still meeting the image quality needs of the exam. Dose Length Product (DLP) is a standardized parameter to measure scanner radiation output to a patient and is a useful index to compare protocols across different practices and scanners. Providing comparative data across exam types to a physician or site will help adjust imaging protocols to obtain diagnostic images using the lowest reasonable dose. This measures the CT scanner

radiation output specific to a patient and exam, comparing and benchmarking the actual dose index delivered to patients. While DLP itself is not a measure or estimate of actual patient radiation dose, it is closely related to doses received by patients. DLP is a measure of scanner output received and experienced by patients and not simply documentation of whether DLP was recorded. This measure is calculated at the facility level because protocol optimization is the combined effort of physicians, medical physicists and technologists in the practice, and change needs to be driven by the interpreting physicians as a team. Physicians see this information when interpreting an image and can participate actively with the rest of their team to manage the dose while maintaining diagnostic quality images.

The determination of ionizing radiation dose to a living human is very complex and poses many challenges for referring physicians, radiologists, radiologic technologists, medical physicists, equipment vendors, regulators, and patients. To determine the absorbed radiation dose, the initial x-ray beam exposure and the absorption in each organ must be known. It is the latter quantity that complicates this determination. This absorption is dependent on the amount and properties of each tissue encountered by the x-ray beam, and these parameters vary widely among patients. The situation is further complicated because it is not practical to insert radiation detectors into each organ of every patient. It is important to understand that the reported numerical values for individual radiation doses may vary by factors of 5 to 10 depending on individual patients and the manner of image acquisition.

There are many challenges in dose monitoring, including collection of accurate data with minimal effort on the part of the facility, standardization of procedure names so that benchmarks can be applied appropriately, and adjustment for patient sizes. Dose registries would enable facilities to compare their radiation doses to those delivered in other facilities for the same exam, and such comparisons over time could assist in optimizing patient radiation doses for medical imaging. The goals of tracking imaging exams and the associated radiation exposure include: (1) providing information at the point-of-care for the referring practitioner (i.e. supporting justification); (2) promoting development and use of diagnostic reference levels (DRLs) (i.e. supporting optimization); (3) providing information for assessment of radiation risks; and (4) establishing a tool for use in research and epidemiology.

References:

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4. The Joint Commission Sentinel Alert Issue 47 – Radiation risks of diagnostic imaging, August 24

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<http://www.fda.gov/downloads/RadiationEmittingProducts/RadiationSafety/RadiationDoseReduction/UCM200087.pdf>

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11. Goske MJ, Strauss KJ, Coombs LP et al. Diagnostic reference ranges for pediatric abdominal CT. *Radiology* 2013;268:208-18.

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Rationale

There has been a considerable rise in use of Computed Tomography (CT) over the past 10 years. With that, there is also a significant increase in the population's cumulative exposure to ionizing radiation. A CT study should use as little radiation as possible, while still meeting the image quality needs of the exam. Dose Length Product (DLP) is a standardized parameter to measure scanner radiation output to a patient and is a useful index to compare protocols across different practices and scanners. Providing comparative data across exam types to a physician or site will help adjust imaging protocols to obtain diagnostic images using the lowest reasonable dose. This measures the CT scanner radiation output specific to a patient and exam, comparing and benchmarking the actual dose index delivered to patients. While DLP itself is not a measure or estimate of actual patient radiation dose, it is closely related to doses received by patients. DLP is a measure of scanner output received and experienced by patients and not simply documentation of whether DLP was recorded. This measure is calculated at the facility level because protocol optimization is the combined effort of physicians, medical physicists and technologists in the practice, and change needs to be driven by the interpreting physicians as a team.

Physicians see this information when interpreting an image and can participate actively with the rest of their team to manage the dose while maintaining diagnostic quality images.

Specialty this measure applies to

Radiology

Measure Funding Source (Steward)

American College of Radiology