American College of Radiology National Radiology Data Registry

Qualified Clinical Data Registry Measures

January 2021

QCDR Measure Number	ACRad 15
Measure Title:	Report Turnaround Time: Radiography

Measure Description	Mean radiography report turnaround time (RTAT). (Does not include mammography.) This measure has been harmonized with MSN QCDR.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient Hospital, Inpatient hospital Imaging facility, ED, Other
Meaningful Measure Area	Patient's Experience of Care
Meaningful Measure Area Rationale	This measure is meant to ensure radiology reports are being written and completed in a reasonable timeframe from the completion of the exam. This means patients spend less time waiting for results and receive their reports promptly.
Denominator	Total number of radiography exams completed
Denominator Elements	Exam modality or CPT/HCPCS Code or ICD-10 PCS Code; Date/time of exam completion
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Mean time from exam completion to final signature on report, in hours
Numerator Exclusions	None
Numerator Data Elements	Date/time of exam completion; Date/time of report signed
Number of performance rates to be submitted	1
Performance Rate Descriptions	N/A
Indicate an Overall Performance Rate if more than 1	N/A
Measure Type (Process/Outcome)	Outcome
High Priority Measure	Yes
Outcome Measure	Yes

Inverse Measure	Yes
Proportion Measure	No
Continuous Measure	Yes
Ratio Measure	No
If continuous variable or ratio is chosen, what would be the range of the scores?	0.00-9999.00
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	This measure was approved by CMS for QCDR inclusion in 2014. The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification.
Rationale	This measure is modified to exclude mammography, because mammography is clinically distinct from other kinds of radiography procedures - it is overwhelmingly performed for screening asymoptomatic patients.) The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care

	to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification. ACR Practice Guideline for Communication of Diagnostic Imaging Findings
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 16
Measure Title:	Report Turnaround Time: Ultrasound (Excluding Breast US)

Measure Description	Mean ultrasound report turnaround time (RTAT). This measure has been harmonized with MSN QCDR.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, Imaging facility, ED, Other
Meaningful Measure Area	Patient's Experience of Care
Meaningful Measure Area Rationale	This measure is meant to ensure radiology reports are being written and completed in a reasonable timeframe from the completion of the exam. This means patients spend less time waiting for results and receive their reports promptly.
Denominator	Total number of ultrasound exams completed (excluding breast US)
Denominator Elements	Exam modality or CPT/HCPCS Code or ICD-10 PCS Code; Date/time of exam completion
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Mean time from exam completion to final signature on report, in hours
Numerator Exclusions	None
Numerator Data Elements	Date/time of exam completion; Date/time of report signed
Number of performance rates to be submitted	1
Performance Rate Description	N/A
Indicate an Overall Performance Rate if more than 1	N/A
Measure Type (Process/Outcome)	Outcome
High Priority Measure	Yes
Outcome Measure	Yes

Inverse Measure	Yes
Proportion Measure	No
Continuous Measure	Yes
Ratio Measure	No
If continuous variable or ratio is chosen, what would be the range of the scores?	0.00-9999.00
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	This measure was approved by CMS for QCDR inclusion in 2014. The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification.
Rationale	The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and

	improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification. ACR Practice Guideline for Communication of Diagnostic Imaging Findings
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 17
Measure Title:	Report Turnaround Time: MRI

Measure Description	Mean MRI report turnaround time (RTAT). This measure has been harmonized with MSN QCDR.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, Imaging facility, ED, Other
Meaningful Measure Area	Patient's Experience of Care
Meaningful Measure Rationale	This measure is meant to ensure radiology reports are being written and completed in a reasonable timeframe from the completion of the exam. This means patients spend less time waiting for results and receive their reports promptly.
Denominator	Total number of MRI exams completed
Denominator Elements	Exam modality or CPT/HCPCS Code or ICD-10 PCS Code; Date/time of exam completion
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Mean time from exam completion to final signature on report, in hours
Numerator Exclusions	None
Numerator Data Elements	Date/time of exam completion; Date/time of report signed
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Outcome
High Priority Measure	Yes
Outcome Measure	Yes
Inverse Measure	Yes
Proportion Measure	No

Continuous Measure	Yes
Ratio Measure	No
If continuous variable or ratio is chosen, what would be the range of the scores?	0.00-9999.00
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	This measure was approved by CMS for QCDR inclusion in 2014. The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification.
Rationale	The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics,

	using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification. Additional information is provided in Appendix. ACR Practice Guideline for Communication of Diagnostic Imaging Findings
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 18
Measure Title:	Report Turnaround Time: CT

Measure Description	Mean CT report turnaround time (RTAT). This measure has been harmonized with MSN QCDR.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, Imaging facility, ED, Other
Meaningful Measure Area	Patient's Experience of Care
Meaningful Measure Area Rationale	This measure is meant to ensure radiology reports are being written and completed in a reasonable timeframe from the completion of the exam. This means patients spend less time waiting for results and receive their reports promptly.
Denominator	Total number of CT exams completed
Denominator Elements	Exam modality or CPT/HCPCS Code or ICD-10 PCS Code; Date/time of exam completion
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Mean time from exam completion to final signature on report, in hours
Numerator Exclusions	None
Numerator Data Elements	Date/time of exam completion; Date/time of report signed
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Outcome
High Priority Measure	Yes
Outcome Measure	Yes
Inverse Measure	Yes

Proportion Measure	No
Continuous Measure	Yes
Ratio Measure	No
If continuous variable or ratio is chosen, what would be the range of the scores?	0.00-9999.00
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	This measure was approved by CMS for QCDR inclusion in 2014. The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification.
Rationale	The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings,

	enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification. Additional information is provided in Appendix. ACR Practice Guideline for Communication of Diagnostic Imaging Findings
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 19
Measure Title:	Report Turnaround Time: PET

Measure Description	Mean PET report turnaround time (RTAT). This measure has been harmonized with MSN QCDR.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, Imaging facility, ED, Other
Meaningful Measure Area	Patient's Experience of Care
Meaningful Measure Area Rationale	This measure is meant to ensure radiology reports are being written and completed in a reasonable timeframe from the completion of the exam. This means patients spend less time waiting for results and receive their reports promptly.
Denominator	Total number of PET exams completed
Denominator Elements	Exam modality or CPT/HCPCS Code or ICD-10 PCS Code; Date/time of exam completion
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Mean time from exam completion to final signature on report, in hours
Numerator Exclusions	None
Numerator Data Elements	Date/time of exam completion; Date/time of report signed
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Outcome
High Priority Measure	Yes
Outcome Measure	Yes
Inverse Measure	Yes

Proportion Measure	No
Continuous Measure	Yes
Ratio Measure	No
If continuous variable or ratio is chosen, what would be the range of the scores?	0.00-9999.00
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	This measure was approved by CMS for QCDR inclusion in 2014. The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification.
Rationale	The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings,

	enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification. ACR Practice Guideline for Communication of Diagnostic Imaging Findings
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 25
Measure Title:	Report Turnaround Time: Mammography

Measure Description	Mean mammography report turnaround time (RTAT). This measure has been harmonized with MSN QCDR.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, Imaging facility, ED, Other
Meaningful Measure Area	Patient's Experience of Care
Meaningful Measure Area Rationale	This measure is meant to ensure radiology reports are being written and completed in a reasonable timeframe from the completion of the exam. This means patients spend less time waiting for results and receive their reports promptly.
Denominator	Total number of mammography exams completed
Denominator Elements	Exam modality or CPT/HCPCS Code or ICD-10 PCS Code; Date/time of exam completion
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Mean time from exam completion to final signature on report, in hours
Numerator Exclusions	None
Numerator Data Elements	Date/time of exam completion; Date/time of report signed
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Outcome
High Priority Measure	Yes
Outcome Measure	Yes

Inverse Measure	Yes
Proportion Measure	No
Continuous Measure	Yes
Ratio Measure	No
If continuous variable or ratio is chosen, what would be the range of the scores?	0.00-9999.00
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	This measure was approved by CMS for QCDR inclusion in 2017. The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification.
Rationale	The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround of reports also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially

	important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each. While the definition of timeliness depends on setting or site characteristics, using comparative benchmarks from registry data provides radiologists with transparent feedback to optimize TAT at their sites. The American Board of Radiology includes "turnaround time" as one category from which radiologists may select to conduct a practice quality improvement (Part IV) for continued Maintenance of Certification. ACR Practice Guideline for Communication of Diagnostic Imaging Findings
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

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 2011 http://www.jointcommission.org/sea_issue_47/
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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

QCDR Measure Number	ACRad 36
Measure Title:	Incidental Coronary Artery Calcification Reported on Chest CT

Measure Description	Percentage of final reports for male patients aged 18 years through 50 and female patients aged 18 through 65 years undergoing noncardiac noncontrast chest CT exams or with and without contrast chest CT exams that note presence or absence of coronary artery calcification or not evaluable.
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital
Meaningful Measure Area	Preventive Care
Meaningful Measure Area Rationale	The purpose of this measure is to ensure that radiology reports make mention of any incidental coronary artery calcification found in a radiological scan. Capturing this information in the report can lead to early detection and prevention of more severe cardiovascular problems in the future.
Denominator	All final reports for male patients aged 18 years through 50 and female patients aged 18 through 65 years undergoing noncardiac noncontrast chest CT exams or with and without contrast chest CT exams
Denominator Elements	Patient age; Patient gender; Modality procedure; Body region; Contrast usage
Denominator Exclusions	Patients who have received prior coronary artery bypass grafts or prior percutaneous coronary intervention with stent
Denominator Exceptions	None
Numerator	Final reports that note presence or absence of coronary artery calcification or not evaluable
Numerator Exclusions	None
Numerator Data Elements	Final report findings
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A

Performance Rate Description	N/A
Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: [Coronary Artery Calcium (CAC)] should be evaluated and reported on all noncontrast chest CT examinations (Class I Recommendation) (SCCT/STR, 2016) 1. Hecht HS, Cronin P, Blaha MJ, et al. 2016 SCCT/STR guidelines for coronary artery calcium scoring of noncontrast noncardiac chest CT scans: A report of the Society of Cardiovascular Computed Tomography and Society of Thoracic Radiology. J Cardiovasc Comput Tomogr. 2017 Jan - Feb;11(1):74-84. doi: 10.1016/j.jcct.2016.11.003. Epub 2016 Nov 10. 3. Jairam PM, Gondrie MJA, Grobbee DE, Mali WP, Jacobs PCA, van der Graaf Y. Incidental imaging findings from routine chest CT used to identify subjects at high risk of future cardiovascular events. Radiology. 2014;3:700-708. 4. Chiles C, Duan F, Gladish GW, Ravenel JG, Baginski SG, Snyder BS, et al. Association of coronary artery calcification and mortality in the national lung screening trial: A comparison of three scoring methods. Radiology. 2015;276:82-90. 5. Uretsky S, Chokshi N, Kobrinski T, Agarwal SK, Po JR, Awan H, et al. The interplay of physician awareness and reporting of incidentally found coronary artery calcium on the clinical management of patients who underwent noncontrast chest computed tomography. Am J Cardiol.

2015;115:1513-1517.
6. Balakrishan R, Nguyen B, Raad R, Donnino R, Naidich DP, Jacobs JE, Reynolds HR. Coronary artery calcification is common on nongated chest computed tomography imaging. Clin Cardiol. 2017. https://doi.org/10.1002/clc.22685.

Rationale

Coronary artery calcium scoring predicts cardiovascular risk. Any calcification that is present is a predictor of cardiovascular disease and can be described without specific scoring. In cases where CAC is present, a standard referral for clinical evaluation can be made. While patients undergoing noncardiac chest CTs are not undergoing an evaluation for coronary artery calcium scoring, there are cases where coronary artery calcifications are found. Studies have shown that these incidental findings have value and can be used to stratify patient cardiovascular risk based on findings in conjunction with patient history, which can lead to improved prognosis and outcome.

Documentation of the presence of coronary artery calcium on noncardiac chest CTs is often underreported in radiology reports, even though primary physicians would likely use this information to inform treatment decisions. In a retrospective review of non-gated noncontrast chest CTs, researchers found approximately one-third of the time, the presence of coronary artery calcium was not documented, even though it was present on the chest CT. This measure aims to improve the communication of CAC findings to referring physicians to improve patient's cardiovascular care management.

Specialty this measure applies to

Radiology

Measure Funding Source (Steward)

American College of Radiology

QCDR Measure Number	ACRad 37
Measure Title:	Interpretation of CT Pulmonary Angiography (CTPA) for Pulmonary Embolism

Measure Description	Percentage of final reports for patients aged 18 years and older undergoing CT pulmonary angiography (CTPA) with a finding of PE that specify the branching order level of the most proximal level of embolus (i.e. main, lobar, interlobar, segmental, subsegmental)
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Communication and Care Coordination
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, ED
Meaningful Measure Area	Transfer of Health Information and Interoperability
Meaningful Measure Area Rationale	This measure is meant to ensure that vital data is captured on the radiology report; physicians who perform well on this measure will be ensuring that important information about a patient's pulmonary embolus is recorded in the medical record.
Denominator	All final reports for patients aged 18 years and older undergoing CT pulmonary angiography (CTPA) with a finding of pulmonary embolism
Denominator Elements	Patient age; Modality Procedure; Modality Modifier; Body Region; Anatomy; Final Report Findings
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Final reports that specify that branching order level of the most proximal level of embolus (i.e. main, lobar, interlobar, segmental, subsegmental)
Numerator Exclusions	None
Numerator Data Elements	Final Report Findings; PE Documentation
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A

Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: Normal CT angiography safely excludes PE in patients with low or intermediate clinical probability or PE-unlikely. (Class I Recommendation; Level of Evidence A) (ESC, 2014) Normal CT angiography may safely exclude PE in patients with high clinical probability or PE -likely. (Class IIa Recommendation; Level of Evidence B) (ESC, 2014) CT angiography showing a segmental or more proximal thrombus confirms PE. (Class I Recommendation; Level of Evidence B) (ESC, 2014) Further testing to confirm PE may be considered in case of isolated sub-segmental clots. (Class IIb Recommendation; Level of Evidence C) (ESC, 2014)
Rationale	CoAn estimated 290,000 events of fatal pulmonary embolism (PE) and 230,000 events of nonfatal PE occur in the United States every year. CT pulmonary angiography (CTPA) is the primary imaging modality for evaluating patients suspected of having acute PE. Identification of the embolus and documentation of the location of the embolus influence treatment decisions. Massive central PE increases the risk for right ventricular overload and PE-related mortality. In contrast, subsegmental pulmonary emboli are often noted on CTPA but may not require treatment or

follow-up. More appropriate treatment stratification can occur to potentially reduce unnecessary costs and risks for bleeding. Additional level of specification at the subsegmental level will support avoidance of over treatment due to greater degree of prognosis.

Variation in care:
The practice for reporting CTPA varies between reporting only positive or negative PE finding without specifying proximal level of embolus, and inclusion of a more specific level of embolus.

A retrospective analysis of CTPA reports found that of 2,151 consecutive reports, 10% were definitively positive for PE but did not specifically describe the location of the PE. Also, 27% of the reports specifically documented the absence of PE down to the segmental artery level but did not specifically address the presence or absence of subsegmental PE. Anticoagulation treatment is recommended if PE is located proximal to the subsegmental level, whereas anticoagulation is controversial and not always recommended if the only level of PE is subsegmental.

One study (1) found patterns of reporting (from 2151 CTPA reports) varies on the basis of radiologists' subspecialties, experience and other factors as follows: " (1) PE conclusively positive (10%), (2) PE conclusively negative (29%), (3) PE negative to segmental arteries (27%), (4) PE negative to central pulmonary arteries (21%), (5) PE negative but suboptimal examination (8%), and (6) nondiagnostic examination (5%)"

Another study (2) indicated that "the location of emboli seems to be more important in predicting short-term mortality than the percent embolic obstruction of the pulmonary arterial bed. The study also found that specificity of pulmonary hypertension "increases to 100% if accompanied by findings of a segmental artery-to-bronchus ratio greater than one in three of four pulmonary lobes".

(1) Abujudeh HH, Kaewlai R, Farsad K, Orr E, Gilman M, Shepard JO. Computed tomography pulmonary angiography: an assessment of the radiology report. Acad Radiol. 2009;16:1309-1315
(2) Doğan H, de Roos A, Geleijins J, Huisman MV, Kroft LJM. The role of computed tomography in the diagnosis of acute and chronic pulmonary embolism. Diagn Interv Radiol. 2015;21:307-316.

Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 38
Measure Title:	Use of Low Dose Cranial CT or MRI Examinations for Patients with Ventricular Shunts

Measure Description	Percentage of patients aged less than 18 years with a ventricular shunt undergoing cranial imaging exams to evaluate for ventricular shunt malfunction undergoing either low dose cranial CT exams or MRI
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Patient Safety
Care Setting	Outpatient hospital, Inpatient hospital
Meaningful Measure Area	Preventable Healthcare Harm
Meaningful Measure Area Rationale	The purpose of this measure is to encourage low dose CT in pediatric patients with ventricular shunts. Because this patient population often requires multiple CT imaging studies, it is essential to reduce their radiation exposure as much as possible in order to prevent potential adverse outcomes.
Denominator	All patients aged less than 18 years with a ventricular shunt undergoing cranial imaging exams to evaluate for ventricular shunt malfunction
Denominator Elements	Patient Age; Body Region; Clinical Focus
Denominator Exclusions	Patients with an active diagnosis or history of cancer, Patients with a diagnosis of meningitis, Trauma patients
Denominator Exceptions	None
Numerator	Patients undergoing either low dose cranial CT exams or MRI Numerator Definitions: For this measure, "low-dose cranial CT" is defined as dose length product (DLP) < 300 mGy for patients aged 2 years and younger; DLP < 405 for patients aged 3 through 6; DLP < 492 for patients aged 7 through 10, DLP < 604 for patients aged 11 through 14, and DLP < 739 for patients aged 15 and up. *Note: The DLP value included within the measure definition is based on the median value for such procedures found within the ACR's Dose Index Registry.*

Numerator Exclusions	None
Numerator Data Elements	Procedure Modifier; Modality Procedure
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: Automated dose reduction techniques available on imaging equipment should be used whenever appropriate. If such technology is not available, appropriate manual techniques should be used. (ACR, 2015) CT examinations should be performed only for a valid medical reason and with the minimum exposure that provides the image quality necessary for adequate diagnostic information. (ACR, 2014) More aggressive dose reduction may be used for examinations that can tolerate higher noise, eg shunt evaluation. (AAPM, 2015)
Rationale	Advances in computed tomography (CT) technology that allow for faster scanning have led to an increase in CT scans as a modality of choice for many indications in children.

	However, studies have also suggested a greater risk of cumulative effects of ionizing radiation in children compared to adults. This risk is of particular concern in children with chronic or complex disorders that require multiple follow up scans, such as VP shunt monitoring in hydrocephalus. It has been demonstrated that patients with shunted hydrocephalus receive an average of 2 head CT scans per year. In an effort to mitigate the potential effects of repeated exposure to radiation, low-dose CT protocol studies have been developed and have demonstrated a reduction in radiation dose without the tradeoff of reduction in diagnostic yield that impacts management. However, many facilities do not make adjustments in CT scanning techniques, such as dose reduction, in pediatric patients. Single-sequence MRI has also been demonstrated as a useful technique to rule out VP shunt malfunction. This measure aims to decrease both patient and population radiation doses in VP shunt malfunction evaluations by substituting the use of low-dose CT or MRI examinations in place of standard head CT examinations. Gap: More than 40,000 CSF shunts are placed annually in the United States, the majority of which are for the treatment of hydrocephalus [1]. Shunt failure occurs in 40–50% of patients during the first 2 years after shunt surgery [2]. The initial study for evaluating the size of the ventricles, shunt location, and integrity of the visualized components varies by institution. Unenhanced CT is a common choice but exposes the patient to ionizing radiation. Low-dose shunt protocols, which reduce tube current, result in suboptimal image quality compared with standard-dose CT but are diagnostically acceptable in the evaluation of shunt failure
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 39
Measure Title:	Use of Low Dose CT Studies for Adults with Suspicion of Urolithiasis or Nephrolithiasis
Measure Description	Percentage of patients aged 18 years and older with a diagnosis of urolithiasis or nephrolithiasis undergoing CT imaging exams of the abdomen or pelvis to evaluate for urologic stones undergoing only low-dose CT exams of the abdomen or pelvis without intravenous contrast
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Patient Safety
Care Setting	Ambulatory, Outpatient hospital, Inpatient hospital, ED
Meaningful Measure Area	Preventable Healthcare Harm
Meaningful Measure Area Rationale	The purpose of this measure is to encourage low dose CT in patients undergoing CT imaging for kidney stones. CT exams are ordered often for this patient population, and it is essential that their radiation exposure is reduced as much as possible in order to prevent potential adverse outcomes.
Denominator	All patients aged 18 years and older with a diagnosis of urolithiasis or nephrolithiasis undergoing CT exams of the abdomen or pelvis without intravenous contrast to evaluate for urologic stones
Denominator Elements	Patient Age; Medical History; Body Region; Modality Procedure; Use of Contrast; Clinical Focus
Denominator Exclusions	Patients with a BMI of >35 or equivalent (ie, waist circumference >88cm in women and >102cm in men)
Denominator Exceptions	None
Numerator	Patients undergoing only low-dose CT exams of the abdomen or pelvis Numerator Definitions: For this measure, "low-dose CT" is defined as DLP < 650 mGy *Note: The DLP value included within the measure definition is based on the median value for such procedures found within the ACR's Dose Index Registry.*
Numerator Exclusions	None
Numerator Data Elements	Procedure Modifier; Modality Procedure; Body region

Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: If CT is being performed to evaluate for renal or ureteral stones, a low-dose protocol should be performed (ACR, 2015).35 Use low-dose CT technique for imaging scenarios such as the evaluation of nephrolithiasis, where fine detail is not needed, or when imaging younger patients <40 years old. (ACR, 2016) Patients who are suspected of having a ureteral stone frequently experience severe flank and occasionally abdominal pain. They desire to have a diagnosis made quickly, receive therapy to relieve symptoms and be informed about the most appropriate management strategies. Therefore, non-contrast CT (NCCT) is the preferred initial imaging study for the index patient (Level A Evidence). (AUA, 2012) Based on a review of the literature, there appears to be consensus that the upper threshold for low-dose CT is 4mSv. Low-dose CT is preferred for patients with a Body Mass Index (BMI) ≤ 30 as this imaging study limits the

potential long term side effects of ionizing radiation while maintaining both sensitivity and specificity at 90% and higher. However, low-dose CT is not recommended for those with a BMI > 30 due to lower sensitivity and specificity. (AUA, 2012)
Alternative imaging modalities are considered for specific patient groups. Renal ultrasonography (sono) and KUB are a viable option for a known stone former who has previously had radio-opaque stones. (Level C Evidence) (AUA, 2012)

Rationale

Renal stones affect 10% to 15% of people over their lifetimes [86-88]. Because of its diagnostic accuracy and quick turnaround time, CT is performed in up to 71% of patients diagnosed with kidney stones in the United States. Unenhanced CT is commonly performed for evaluating patients with suspected urolithiasis, increasing from 4% to 42.5% of emergency department patients between 1996 and 2007 and for 48.5% of patients in 2014. Because of concerns about radiation exposure, reduced-dose CT protocols have been devel- oped with high sensitivity (97%) and specificity (95%) for detecting urolithiasis. This measure is intended to promote the use of a low dose CT protocol or ultrasound when performing diagnostic imaging to identify the presence or absence of urologic stones.

Preferential use of low dose imaging techniques may reduce the risk of adverse outcomes from excessive radiation exposure. Because of its diagnostic accuracy and quick turnaround time, CT has been the modality of choice in 70% of diagnosed kidney stones in the US. However, concerns exist about the administered radiation dose inherent in standard CT examinations, particularly when it is used to diagnose conditions that are often recurrent such as urologic stones. Despite the wide availability of CT dose reduction technology, the proportion of kidney stone examinations performed with reduced-dose was found in only 2% of examinations in 2011-2012 and remains low at 10% between 2015 and 2016. An alternative modality to consider when evaluating renal colic is ultrasound. One 2014 randomized controlled study comparing US to CT at initial evaluations of suspected nephrolithiasis in the Emergency Department (ED) found no statistically significant differences in return ED visits, hospitalizations, or high-risk diagnoses with complications. The study also demonstrated that although ultrasound is less diagnostically sensitive than CT, ultrasound was sufficient for the purposes of an initial evaluation. Most patients who underwent US did not require further imaging via CT for the sake of diagnostic clarity. The purpose of this measure is to decrease abdomen and pelvis radiation exposure by increasing the use of low-dose CT or ultrasound studies in

	patients with a diagnosis of urolithiasis or nephrolithiasis with suspicion of stone disease. Variation in care: Despite the wide availability of CT dose reduction technology, the proportion of kidney stones examinations performed with reduced dose was found in only 2% of examinations in 2011 and 2012. The use of reduced-dose CT for the evaluation of kidney stones has increased since then but remains low, at 8% of examinations performed in 2015 and 2016.
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 40
Measure Title:	Use of Structured Reporting in Prostate MRI

Measure Description	Percentage of final reports for male patients aged 18 years and older undergoing prostate MRI for prostate cancer screening or surveillance that include reference to a validated scoring system such as Prostate Imaging Reporting and Data System (PI-RADS)
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Communication and Care Coordination
Care Setting	Outpatient hospital, Inpatient hospital
Meaningful Measure Area	Transfer of Health Information and Interoperability
Meaningful Measure Area Rationale	This measure is meant to encourage the use of structured reporting in MRI scans of the prostate. Structured reporting improves communication between radiologists and referring physicians and therefore increases efficiency in the transfer of health information from one provider to another..
Denominator	All final reports for male patients aged 18 years and older undergoing prostate MRI for prostate cancer screening or surveillance
Denominator Elements	Patient Age; Patient Gender; Modality Procedure; Anatomy; Clinical Focus
Denominator Exclusions	None
Denominator Exceptions	Medical reason(s) for not including reference to a validated scoring system (e.g. scenarios in which the study is non-diagnostic)
Numerator	Final reports that include reference to a validated scoring system such as Prostate Imaging Reporting and Data System (PI-RADS)
Numerator Exclusions	None
Numerator Data Elements	Structured Scoring System Method
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A

Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: Effective communication is a critical component of diagnostic imaging. Quality patient care can only be achieved when study results are conveyed in a timely fashion to those responsible for treatment decisions. An effective method of communication should: a) promote optimal patient care and support the ordering physician/health care provider in this endeavor; b) be tailored to satisfy the need for timeliness; and c) minimize the risk of communication errors. (ACR, 2014) The report should use appropriate anatomic, pathologic, and radiologic terminology to describe the findings. (ACR, 2014) Current guidelines strongly encourage radiologists to use the PI-RADSTM v2 to report prostate mpMRI findings. It is clear that prostate mpMRI is more commonly used for guiding biopsies rather than local staging. Accurate lesion mapping and dimension measurement are key steps in communicating the results to the referring physicians. (AUA, 2017) Following an initial negative biopsy, there is an ongoing need for strategies to improve patient selection for repeat biopsy as well as the diagnostic yield from repeat biopsies. Many options exist for men with a previously negative biopsy. If a biopsy is recommended, prostate MRI and subsequent MRI-targeted cores appear to facilitate the detection of [clinically

significant (CS)] disease over standardized repeat biopsy. Thus, when high-quality prostate MRI is available, it should be strongly considered in any patient with a prior negative biopsy who has persistent clinical suspicion for prostate cancer and who is undergoing a repeat biopsy. The decision whether to perform MRI in this setting must also take into account results of any other biomarkers, the cost of the examination, as well as availability of high quality prostate MRI interpretation. If MRI is done, it should be performed, interpreted, and reported in accordance with PI-RADS V2 guidelines. (SAR/AUA, 2016)

1. American College of Radiology. ACR practice parameter for communication of diagnostic imaging findings. https://www.acr.org/~/media/C5D1443C9EA4424AA12477D1AD1D927D.pdf. Revised 2014. Accessed March 24, 2017.
2. Bjurlin, MA, Carroll PR, Eggener S, et al. MRI of prostate, Standard operating procedure (SOP). http://www.auanet.org/guidelines/mri-of-the-prostate-sop. 2017. Accessed December 4, 2017.
3. American Urological Association and the Society of Abdominal Radiology's Prostate Cancer Disease-Focused Panel. Prostate MRI and MRI-targeted biopsy in patients with prior negative biopsy. http://www.auanet.org/guidelines/prostate-mri-and-mri-targeted-biopsy. 2016. Accessed December 4, 2017.
4. Magnetta, MJ, Donovan AL, Jacobs BL, Davies BJ, Furlan A. Evidence-based reporting: A method to optimize prostate MRI communications with referring physicians. AJR Am J Roentgenol. 2018 Jan;210(1):108-112. doi: 10.2214/AJR.17.18260.

Rationale

Prostate cancer is the most common cancer in men and the second leading cause of cancer-related death. Currently, prostate cancer is detected using prostate-specific antigen, digital rectal examination, and random transrectal ultrasound–guided biopsy. A major concern related to prostate cancer screening is overdiagnosis and overtreatment of indolent tumors. Multiparametric MRI of the prostate gland has been shown to achieve higher sensitivity than standard systematic biopsy for intermediate- to high-risk tumors whereas having lower sensitivity for low-grade tumors that are unlikely to affect longevity. As prostate MRI use continues to grow, there is a need for standard and consistent reporting to improve detection, characterization, localization, and risk stratification of prostate lesions. Use of prostate MRI structured reporting has been demonstrated to improve the clinical impact of the radiologist contribution to patient care.

Advances in prostate MRI technology along with growing interpreter experience have greatly expanded the clinical applications of this imaging modality to include the detection of prostate cancer. As prostate MRI use continues to grow,

there is a need for standard and consistent reporting to improve detection, characterization, localization, and risk stratification of prostate lesions. Use of prostate MRI structured reporting has been demonstrated to improve the clinical impact of the radiologist contribution to patient care. Adapting this method of reporting is also associated with a lower perceived need by the urologist to contact the interpreting radiologist for diagnostic clarification, thereby improving the quality and efficiency of provider communication. It is unclear how widespread is the use of structured reporting systems in prostate MRI. However, one study found that even after training and emphasis on its potential to improve report quality, only 36% of imaging studies included in the sample were compliant with the recommended reporting.

There is a large division/separation between PIRADS 2 (Low; clinically significant cancer is unlikely to be present) &3 (Intermediate; the presence of clinically significant cancer is equivocal) as delineated in the PIRADS scoring system.

Variation in care:
One study found that even after training and emphasis on its potential to improve report quality, only 36% of imaging studies included in the sample were compliant with the recommended reporting system. This measure aims to encourage the use of an evidence-based set of reporting guidelines that improves the accuracy of multiparametric MRI and helps triage patients to appropriate management.One study found the following results:
A total of 255 patients with 365 discrete lesions were analyzed. PIRADS score 1-2, 3, 4 and 5 yielded any prostate cancer in 7.7, 29.7, 42.3 and 82.4% of the cases, respectively, across all indications, while clinically significant cancer was found in 0, 8.9, 21.4 and 62.7%, respectively. The area under the receiver operative curves for the diagnosis of any significant cancer was 0.69 (95%CI: 0.64-0.74) and 0.74 (95%CI: 0.69-0.79) respectively. Men who have had a previous negative biopsy had lower detection rates for any prostate cancer for PIRADS 3 and 4 lesions compared to those that were biopsy-naïve or on active surveillance.

1. Which scores need a core? An evaluation of MR-targeted biopsy yield by PIRADS score across different biopsy indications Niranjan J. Sathianathen, Badrinath R. Konety, et al. Prostate Cancer and Prostatic Diseasesvolume 21, pages 573–578 (2018)
https://www.ncbi.nlm.nih.gov/pubmed/30038389

Specialty this measure applies to Radiology

Measure Funding Source (Steward) American College of Radiology

QCDR Measure Number	ACRad 41
Measure Title:	Use of Quantitative Criteria for Oncologic FDG PET Imaging
Measure Description	Percentage of final reports for all patients, regardless of age, undergoing non-CNS oncologic FDG PET studies that include at a minimum: a. Serum glucose (eg, finger stick at time of injection) b. Uptake time (interval from injection to initiation of imaging) c. One reference background (eg, volumetric normal liver or mediastinal blood pool) SUV measurement, along with description of the SUV measurement type (eg, SUVmax) and normalization method (eg, BMI) d. At least one lesional SUV measurement OR diagnosis of "no disease-specific abnormal uptake"
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Communication and Care Coordination
Care Setting	Outpatient hospital, Inpatient hospital
Meaningful Measure Area	Transfer of Health Information and Interoperability
Meaningful Measure Area Rationale	The purpose of this measure is to encourage final reports for patients undergoing FDG PET are as complete and accurate as possible in order to minimize the risk of diagnosis and treatment based on insufficient or incorrect evidence. Blood glucose level, SUV measurement, and the time from radiopharmaceutical injection to imaging are all key items which need to be present in the report but which are often left out.
Denominator	All final reports for all patients, regardless of age, undergoing non-CNS oncologic FDG PET studies
Denominator Elements	Modality Procedure; Nuclear Agent; Clinical Focus; Anatomy
Denominator Exclusions	None
Denominator Exceptions	None
Numerator	Final reports for FDG PET scans that include at a minimum: a. Serum glucose (eg, finger stick at time of injection) b. Uptake time (interval from injection to initiation of imaging) c. One reference background (eg, volumetric normal liver or mediastinal blood pool) SUV measurement, along with description of the SUV measurement type (eg, SUVmax) and normalization method (eg, BMI)

	d. At least one lesional SUV measurement OR diagnosis of "no disease-specific abnormal uptake"
Numerator Exclusions	None
Numerator Data Elements	FDG PET Measurements Documented
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A
Performance Rate Description	N/A
Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: The technique section of the report should contain the radiopharmaceutical (eg, 18F-FDG), the administered activity, route and site of administration, as well as any pharmaceuticals administered (eg, diuretics, benzodiazepines). The serum glucose level at the time of radiopharmaceutical administration should be reported as well as patient weight, time from injection to scanning, and technique for calculating SUVs (ie, body weight, lean body weight, or body surface criteria). (ACR, 2016) The findings section should include description of the location, extent, and intensity of abnormal FDG uptake in relation to normal comparable tissues and should describe the relevant morphological findings on the CT images.

Ideally, image and series numbers should also be included. Additionally, background activity (eg, mediastinal blood pool and/or volumetric normal liver) should be measured to help compare SUV values. Often injection-site infiltrates, such as arms, or attenuation-correction errors can significantly alter SUV values in lesions, leading to false conclusions. An estimate of the intensity of FDG uptake can be provided with the SUV; however, the intensity of uptake may be described as mild, moderate, or intense in relation to the background update in normal hepatic parenchyma or the mediastinal blood pool. (ACR, 2016)

1. American College of Radiology. ACR-SPR Practice Parameter for Performing FDG-PT/CT in Oncology. https://www.acr.org/Quality-Safety/Standards-Guidelines/Practice-Guidelines-by-Modality/Nuclear-Medicine. 2016. Accessed December 10, 2017
2. Coleman RE, Hillner BE, Shields AF, et al. PET and PET/CT reports: observations from the National Oncologic PET Registry. J Nucl Med. 2010 Jan;51(1):158-63. doi: 10.2967/jnumed.109.066399. Epub 2009 Dec 15.
3. Niederkohr RD, Greenspan BS, Prior JO, et al. Reporting guidance for oncologic 18F-FDG PET/CT imaging. J Nucl Med. 2013 May;54(5):756-61. doi: 10.2967/jnumed.112.112177. Epub 2013 Apr 10.

Rationale

Results of imaging studies play an increasingly major role in oncology for diagnostic evaluation, development of treatment plans, and monitoring of treatment response. Results of FDG PET scans are communicated to referring health care providers and patients primarily via the diagnostic imaging report. However, there is significant variation in the format and content of final reports. Many important components of PET studies are often missing from final reports including blood glucose level, SUV measurement, and the time from radiopharmaceutical injection to imaging. Such information also helps with contextual interpretation of SUV measurements for abnormal lesions. These measurements are important for technical comparisons between studies and from one center to another for a more reliable diagnosis. Excluding these components may adversely affect comparison with subsequent and prior studies.

Including the quantitative criteria in the report for a current exam provides important technical details that are the basis for many of the physiologic manifestations seen on the study. There are accepted and established standards for how PET/CTs should be optimally performed and varying from these parameters can affect the physiology and therefore the imaging findings. Including technical information like glucose level and time from injection can help interpreting clinicians know if the study was performed optimally and if the findings are anticipated to be reliable.

	Second, particularly for cancer imaging, evaluation of change in disease/response to therapy is often dependent not only on size measurements of lesions, but also on the metabolic activity. The measurement of SUV values is a surrogate measure of relative metabolic activity and comparing SUV values between scans is frequently performed. However, the SUV measurement is a normalized value so it is important to mention the method of normalization (by weight, total mass etc). Furthermore, it is very dependent technical variables including glucose level, time for injection of FDG, scanner and processing algorithm etc. As such, it can be tricky to compare SUV values between scanners/imaging centers unless similar techniques and protocols are employed. One of the methods used to assess if, generally speaking, scans are acceptably similar and SUV values can be compared with decent reliability is by comparing a reference background measurement. This reference background measurement should always be obtained and ideally is one that is less susceptible to drug/disease related issues etc., such as the cerebellum as a standard measure. The reporting of these data helps ensure that standard and appropriate protocol was performed and hence the study is believed to be interpretable and the findings are assumed to be real. It also is primarily helpful for comparisons among many studies. On occasion, such numbers and data may influence interpretation of certain findings (ie SUV value [and implied aggressiveness] of a particular lesion etc) on the given scan. If the SUV is measured for a lesion, most physicians will automatically include a prior comparative SUV measurement to demonstrate any change. This is standard practice and not the intent of this measure. Furthermore, at the discretion of physicians in some cases there may not be a good comparison measurement or size changes may be most relevant (and the SUV values may be misleading), so they may choose to not include certain comparative measures.
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology

QCDR Measure Number	ACRad 42
Measure Title:	Surveillance Imaging for Liver Nodules <10mm in Patients at Risk for Hepatocellular Carcinoma (HCC)
Measure Description	Percentage of final ultrasound reports with findings of liver nodules < 10 mm for patients aged 18 years and older with a diagnosis of hepatitis B or cirrhosis undergoing screening and/or surveillance imaging for hepatocellular carcinoma with a specific recommendation for follow-up ultrasound imaging in 3-6 months based on radiological findings
QCDR Measure Type	Existing Approved QCDR Measure with No Changes
Does this measure belong to another QCDR?	No
NQF Number	N/A
NQS Domain	Efficiency and Cost Reduction
Care Setting	Ambulatory, Imaging facility, Outpatient hospital
Meaningful Measure Area	Appropriate Use of Heathcare
Meaningful Measure Area Rationale	This measure is meant to encourage appropriate imaging for patients at risk of hepatocellular carcinoma. In cases where patients are at risk for HCC, it is necessary to schedule regular surveillance imaging, but due to the frequency of imaging the results are often benign. Therefore it is not necessary or cost effective to order advanced imaging such as CT. In cases like these, ultrasound is the most appropriate imaging modality.
Denominator	All final ultrasound reports with findings of liver nodules < 1 cm for patients aged 18 years and older with a diagnosis of hepatitis B or cirrhosis undergoing screening and/or surveillance imaging for hepatocellular carcinoma
Denominator Elements	Patient Age; Medical History; Clinical Focus; Anatomy
Denominator Exclusions	Patients with an active diagnosis or history of cancer
Denominator Exceptions	None
Numerator	Final ultrasound reports with a specific recommendation for follow-up ultrasound imaging in 3-6 months
Numerator Exclusions	None
Numerator Data Elements	Final Report Follow Up Imaging Recommendations; Recommended Follow-up Imaging Modality; Recommended Follow-up Imaging Time Interval
Number of performance rates to be submitted	1
Indicate an Overall Performance Rate if more than 1	N/A

Performance Rate Description	N/A
Measure Type (Process/Outcome)	Process
High Priority Measure	Yes
Outcome Measure	No
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 (General Radiology Improvement Database)
Clinical Recommendation Statement	The following evidence statements are quoted verbatim from the referenced clinical guidelines and other sources, where applicable: Follow-up or additional diagnostic studies to clarify or confirm the impression should be suggested when appropriate. (ACR, 2014) The panel recommends screening with US (every 6 months) and optional AFP testing for patients at risk for HCC…Liver masses less than 10 mm are difficult to definitively characterize through imaging. If nodules this size are found then US and AFP should be repeated in 3 to 6 months. (NCCN, 2017) For LI-RADS Category US-2 (Subthreshold) observation(s) < 1 cm in diameter, not definitely benign, short-term US surveillance is recommended in 3-6 months. (US LI-RADS v2017) Diagnostic tests are used to further characterize positive screening or surveillance tests or to characterize incidentally detected observations. Similar to screening and surveillance, the accuracy of diagnostic tests relies on the pre-test probability of disease. Hence, diagnostic algorithms should be applied only in high-risk populations. • Ideally, diagnostic tests should have high specificity so the presence of HCC can be confirmed. • In North America, the imaging modalities used most

commonly for HCC diagnosis are multiphase contrast-enhanced CT and MRI. These modalities cover the entire liver and assess the extent (stage) of HCC.
• Another modality used for HCC diagnosis is contrast-enhanced ultrasound (CEUS). This modality typically permits detailed characterization of a limited number of targeted observations but it may not reliably visualize the entire liver; hence, it is suitable for diagnosis but not usually for staging.
• Multiphase imaging is a requirement for HCC diagnosis; hence, single-phase imaging exams are not considered diagnostic tests for HCC. CT/MRI LI-RADS and CEUS LI-RADS address the use of the corresponding modalities for diagnosis. (US LI-RADS v2017)

1. National Comprehensive Cancer Network. NCCN Guidelines Version 4.2017- Gallbladder cancer. https://www.nccn.org/professionals/physician_gls/default.aspx#detection. Accessed December 9, 2017.
2. American College of Radiology. Liver imaging reporting and data system. www.acr.org/Quality-Safety/Resources/LIRADS. Accessed January 12, 2018.
3. El-Serag HB. (2012). Epidemiology of Viral Hepatitis and Hepatocellular Carcinoma. Gastroenterology. 2012 May;142(6):1264-1273.e1. doi: 10.1053/j.gastro.2011.12.061.
4. Singal AG, Pillai A, Tiro J. Early detection, curative treatment, and survival rates for hepatocellular carcinoma surveillance in patients with cirrhosis: a meta-analysis. PLoS Med. 2014 Apr 1;11(4):e1001624. doi: 10.1371/journal.pmed.1001624. eCollection 2014 Apr.
5. Wong GL, Wong VW, Tan GM, et al. Surveillance programme for hepatocellular carcinoma improves the survival of patients with chronic viral hepatitis. Liver Int. 2008 Jan;28(1):79-87. Epub 2007 Sep 26.
6. Stravitz RT, Heuman DM, Chand N, et al. Surveillance for hepatocellular carcinoma in patients with cirrhosis improves outcome. Am J Med. 2008 Feb;121(2):119-26. doi: 10.1016/j.amjmed.2007.09.020.
7. Kim TK, Lee E, Jang H-J. Imaging findings of mimickers of hepatocellular carcinoma. Clinical and Molecular Hepatology. 2015;21(4):326-343. doi:10.3350/cmh.2015.21.4.326.
8. ACR Appropriateness Criteria: Liver Lesion—Initial Characterization. https://acsearch.acr.org/docs/69472/Narrative/. Revised 2014. Accessed November 17, 2017.

Rationale

Because of the associated increased risk of developing HCC in patients with cirrhosis or hepatitis B14, current guidelines recommend surveillance imaging at regular intervals. Patients with cirrhosis receiving this kind of regular screening have been demonstrated to have increased access to transplant, improved survival, and lower mortality.

	Ultrasound surveillance for hepatocellular carcinoma (HCC) in patients at high risk for developing this cancer reduces HCC-related mortality by 37%. Imaging surveillance also detects earlier disease, allowing small HCCs to be cured with an appreciable frequency. Although imaging techniques such as CT and MRI have improved the detection of small liver lesions, they often detect incidental benign liver lesions and nonhepatocellular malignancy that can be misdiagnosed as HCC. Moreover, lesions less than 1 cm are unlikely to represent HCC. The American Association for the Study of Liver Diseases (AASLD) has developed evidence-based guidelines for screening and surveillance of patients at high risk for developing HCC, advocating for the use of ultrasound with or without serum a-fetoprotein every 3 to 6 months. Given that the majority of liver lesions <1 cm identified on ultrasound are benign, there exists a significant burden on patients and health systems in terms of financial cost and resource use when high-cost advanced imaging tests such as CT and MRI are recommended or performed to further evaluate these lesions. The evidence-based recommendation cited in this quality measure was developed to reduce inappropriate high-cost imaging by recommending that liver lesions measuring <1 cm be followed up with ultrasound in 3 to 6 months rather than CT or MRI in patients at risk for developing HCC. Many subcentimeter nodules found in a cirrhotic liver are not HCCs and should not require immediate intervention or call back for multiphase cross-sectional imaging. Nevertheless, these nodules should continue to be monitored using ultrasound per surveillance Despite evidence-based recommendations for ultrasound follow-up of liver lesions measuring <1 cm in patients at high risk for developing HCC, there is significant potential for radiologists to recommend CT or MRI given the improved diagnostic accuracy of these modalities [69]. In a study evaluating adherence to the AASLD guidelines, the authors found that only 60% of patients were treated according to the guidelines [70]."
Specialty this measure applies to	Radiology
Measure Funding Source (Steward)	American College of Radiology