Radiation Dose Management Requirements from MACRA and Joint Commission, Potential Effects on Reimbursement

Radiation dose requirements are being slowly integrated into key performance indicators and metrics tied to quality and reimbursement

Dominic Siewko, MBA CHP CSP
Global Product Manager
Philips Healthcare
Session Description:
Radiation dose tracking and awareness requirements continue to mount globally from various regulatory sources. This session will review some case studies in MACRA reimbursement laws and Joint Commission compliance standards as they relate to radiation dose management.

Learning Objectives:
- Understand new MACRA radiation dose metrics
- A review of Joint Commission radiation dose requirements
- Tools and technology to assist you in compliance
How did we get here?

October 2009
High profile CT overexposures for >200 patients

February 2010
FDA introduces “Initiative to Reduce Unnecessary Exposure to Radiation”

May 2011
ACR launches the Dose Index Registry

April 2013
MITA releases XR 29-2013 standard

July 2015
MACRA passed into law

January 2010
NY Times blog series “Radiation Boom” begins

September 2010
CA RBH enacts S.B. 1237

August 2011
JC issues Sentinel Event Alert Issue 47

April 2015
JC releases new Standards for CT dose

There were some significant events that caused the increased awareness of patient X-ray dose management

Source: The Advisory Board Company: Advancing Radiation Dose Risk Management
Radiation dose management is big news

Report: Thyroid cancer radiation a public threat
FORUM: Living with Cancer
ARCHIVES: It kills thyroid cancer, but is radiation safe?

July 31, 2010

After Stroke Scans, Patients Face Serious Health Risks
By WALT BOGDANICH

Is Computed Tomography Safe?
Rebecca Smith-Bindman, M.D.

The Uncritical Use of High-Tech Medical Imaging
Bruce J. Hillman, M.D., and Jeff C. Goldsmith, Ph.D.

Radiation overdoses from CT scans lead to maladies in patients
Published: Sunday, August 01, 2010, 4:00 AM

The New York Times
Low Dose is **Big Business**
Radiation dose management is **big regulation**

- CMS’ MACRA payment program
- American College of Radiology Appropriateness Criteria

- California SB AB510 – CT Dose Reporting
- Texas Administrative Code 25 TAC 289.227 CT Protocol Committee

- Image Wisely/Gently Awareness Program
- Medical Imaging & Technology Alliance (MITA) XR 29 Standard

- CT and Nuclear Medicine Standards
- Education requirements for Radiologic Technologists
What is the cancer risk of medical radiation?

- 1 CT scan (10 mGy) ~ 0.1% chance solid cancer
- Estimated 20% natural death rate from cancer in US
- Estimated 42% natural cancer incidence rate in US

Ref: BEIR VII Table 12-4
Joint Commission Requirements

- Diagnostic Imaging Services requirements
- Effective September 1, 2016
- New requirements for:
  - Hospitals
  - Critical Access Hospitals
  - Ambulatory Care Centers
Provision of Care, Treatment and Services

• **PI.01.02.15 Hospitals must document**
  • Documents CTDI\text{vol}, DLP or SSDE
  • Exam Specific
  • Easily Retrievable Format
  • Summarized by series or anatomic data

• **PI.01.02.15 Prior to study verify**
  – Correct Patient
  – Correct Imaging Site
  – Correct Patient Positioning
  – Correct Imaging Protocol (CT)
  – Correct Scanner Parameters (CT)
Provision of Care, Treatment and Services

• **PI.01.02.15 Exam Ordering**
  – Access to patient history
  – Evaluate patient age and exam history
  – Use this information to influence exam ordering

• **PI.01.02.15 Imaging Protocol Optimization**
  • Review protocols against current industry practice
  • Contrast administration
  • Patient age, size, habitus
  • Expected dose index range
  • Clinical indication
Performance Improvement

• **PI.02.01.01 Data Collection**
  • Review CT dose indexes (CTDIfvol, DLP, SSDE) to determine if diagnostic CT examinations exceeded expected dose index ranges identified in protocols
  • Compare to external benchmarks
  • ACR DIR will show compliance with this requirement

Provision of Care, Treatment and Services

• **PI.01.02.15 Imaging Protocol Optimization**
  – Frequent reviews of protocols
  – Frequency determined by hospital
  – Input from
    • Radiologist
    • Medical Physicist
    • Lead Technologist
Element of Performance (Ambulatory)

- HR.01.05.03 Education and Training
  - CT Technologist Annual Training
  - Radiation dose optimization techniques addressed in Image Wisely/Image Gently
  - Safe Procedures for operation of the types of CT equipment they use
Medication Management (Ambulatory)

• Radiopharmaceutical Administration
  • Before administering verify +/- 20%
  • Verify dose is administered in prescribed range
Provision of Care, Treatment and Services (Ambulatory)

• CT Exam dose must be documented
  • SSDE
  • DLP
  • CTDIvol
  • Must be exam specific, summarized by series or anatomical area and documented in a readily retrievable format
• Nuc Med attenuation coefficient studies exempt
• EMR next? (CA rule)
• Dose Justification requirements for CT, PET, Spect NM
  • Consider patient age and recent exam history
  • Focus on prevention of unnecessary duplication of these examinations
  • Gets back to the ICRP 103 principles:
    • Justification
    • Optimization
Provision of Care, Treatment and Services

Standard HR.01.02.05

• CT Technologists must have ARRT or NMTCB certification or
• State license, Radiography ARRT certification with training
• Nuc Med certification with documented training on the provision of CT scans
• Rad Therapy/Dental/cone beam CT excluded including Nuc Med attenuation coefficient studies

Standard HR.01.05.03

• CT Techs participate in education to achieve advanced CT certification by Jan 1, 2018
Provision of Care, Treatment and Services

Standard MS.03.01.01 (Hospitals/CAH Hospital only)
• Medical staff determines the qualifications of the radiology staff who use equipment and administer procedures

Standard PC.01.03.01
• Diagnostic CT imaging protocols are reviewed and kept current with input from:
  • Physician
  • Medical Physicist
  • Lead technologist

✓ Reviews are conducted at time frames identified by facility
✓ Study showing cost around $165K for 4 CTs with 30 protocols
Radiology and MACRA
Medicare Access and CHIP Reauthorization Act of 2015

- 15% of all high priority MACRA metrics are imaging related
- 22 out of 24 radiology metrics are registry based data submission (not EHR)
- In terms of # MACRA metrics to report, ACR leads all professional societies
- 10 metrics are directly related to radiation exposure
- https://qpp.cms.gov/
MACRA Focus Areas

There are three main focus areas for MACRA compliance in Radiology:

- Radiation Dose Management and Compliance
  - Tracking and reporting radiation exposure and participation in dose registries
- Recommendation follow-up compliance
  - Critical findings follow-up and integrated patient scheduling
- External image sharing
  - DICOM image sharing and track record of patient exam history to avoid repeat exams

The Cost of Doing Nothing...

A typical 20 Hospital IDN will lose between $1-3M if they do nothing...

*Estimates based on charges from Definitive Healthcare
MACRA Metric N/A/359

Subgroup:
Optimizing patient exposure to ionizing radiation

Subject:
Utilization of a standard nomenclature for CT imaging description

Metric:
Percentage of CT imaging reports for all patients, regardless of age, with the imaging study named according to a standardized nomenclature and the standardized nomenclature is used in institution's computer systems.

ACR Guidance Notes:
Numerator should be standardized nomenclature used in local CPUs including:
• Computerized physician ordering system
• Charge master
• Radiology Information System (RIS)
• Electronic Health Record (EHR)
MACRA Metric N/A/359

RadLex Playbook standardized naming convention, very useful for CT exam names
Radlex Playbook standardized naming convention for CT
MACRA Metric N/A/360

Subgroup:
Optimizing patient exposure to ionizing radiation

Subject:
Count of potential high dose imaging studies: CT/Cardiac CT

Metric:
Percentage of computed tomography and cardiac nuclear medicine (myocardial perfusion studies) imaging reports for all patients, regardless of age, that document a count of known previous CT (any type of CT) and cardiac nuclear medicine (myocardial perfusion) studies that the patient has received in the 12-month period prior to the current study

Guidance Notes:
Increased CT use has resulted in growing rates of repeat or multiple imaging. Physicians may lack important information that could inform their decisions in ordering imaging exams that use ionizing radiation. Ordering physicians may not have access to patients’ medical imaging or radiation dose history. Due to insufficient information, physicians may unnecessarily order imaging procedures that have already been conducted.
In general CT/Cardiac CT exam data is readily available however cardiac nuclear medicine is not for SPECT imaging. A DICOM standard is now being finalized to make this possible.
MACRA Metric N/A/361

**Subgroup:**
Optimizing patient exposure to ionizing radiation

**Subject:**
Reporting to a radiation dose index registry

**Metric:**
Percentage of total CT studies performed for all patients, regardless of age, that are reported to a radiation dose index registry AND that include at a minimum selected data elements.

**Guidance Notes:**
CT studies performed that are reported to a radiation dose index registry that is capable of collecting at a minimum all of the following data elements:
- Manufacturer, study description, model name
- Patient weight, size, sex, age
- Exposure time, tube current, kV, CTDIvol and DLP
MACRA Metric N/A/361
ACR Dose Index Registry

Summary Stats for Facility Median Value

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<th># of facilities</th>
<th>Median (mGy)</th>
<th>Mean (mGy)</th>
<th>Min (mGy)</th>
<th>Max (mGy)</th>
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MACRA Metric N/A/362

Subgroup:
Optimizing patient exposure to ionizing radiation

Subject:
CT Images available for patient follow-up and comparison purposes

Metric:
Percentage of final reports for CT studies performed for all patients, regardless of age, which document that DICOM format image data are available to non-affiliated external healthcare facilities or entities on a secure, media free, reciprocally searchable basis with patient authorization for at least a 12-month period after the study.

Guidance Notes:
Core functional requirements for an Internet-based system for sharing medical records:
a) methods to ensure privacy and confidentiality of data;
b) capability to move and store large data files (e.g., images) with the same efficiency and reliability as possible with small data files (e.g., text);
c) construction of registries, which contain “knowledge” of all fragments of medical information (and their physical location) from all sources for a given patient;
d) an ability to match records and accurately reconcile patient identities without a common patient identifier;
e) a means to regulate access to data and audit the access;
f) a method for moving blocks of data from one location to another; and
g) a method to aggregate and consume the data at the point of care.
MACRA Metric N/A/363

**Subgroup:**
Optimizing patient exposure to ionizing radiation

**Subject:**
Search for prior CT studies through a secure, authorized, media-free, shared archive

**Metric:**
Percentage of final reports of CT studies performed for all patients, regardless of age, which document that a search for DICOM format images was conducted for prior patient CT imaging studies completed at non-affiliated external healthcare facilities or entities within the past 12-months and are available through a secure, authorized, media-free, shared archive prior to an imaging study being performed.

**Guidance Notes:**
Core functional requirements for an Internet-based system for sharing medical records:

a) methods to ensure privacy and confidentiality of data;
b) capability to move and store large data files (e.g., images) with the same efficiency and reliability as possible with small data files (e.g., text);
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e) a means to regulate access to data and audit the access;
f) a method for moving blocks of data from one location to another; and
g) a method to aggregate and consume the data at the point of care.
MACRA Metric N/A/364

Subgroup:
Optimizing patient exposure to ionizing radiation

Subject:
Appropriateness: Follow-up CT imaging for incidentally detected pulmonary nodules according to recommended guidelines

Metric:
Percentage of final reports for CT imaging studies of the thorax for patients aged 18 years and older with documented follow-up recommendations for incidentally detected pulmonary nodules (e.g., follow-up CT imaging studies needed or that no follow-up is needed) based at a minimum on nodule size AND patient risk factors.

Guidance Notes:
Since the decision to perform follow-up studies relies on size, lesion characteristics (e.g., morphology), and growth rates (typically described as doubling time), an understanding of these features and their relationship to malignancy should dictate further evaluation. In addition, the patient's risk profile, including age and smoking history, needs to be integrated into the diagnostic algorithm.
## Lung Pulmonary Nodule Exams

### April 23-26, 2017

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<th>kVp</th>
<th>Average mA</th>
<th>DLP</th>
<th>CTDIvol</th>
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<td>0.5</td>
<td>3220</td>
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MACRA Metric N/A/415

Subgroup: Emergency Medicine

Subject: Emergency Department Utilization of CT for Minor Blunt Head Trauma for Patients Aged 18 Years and Older

Metric: Percentage of emergency department visits for patients aged 18 years and older who presented within 24 hours of a minor blunt head trauma with a Glasgow Coma Scale (GCS) score of 15 and who had a head CT for trauma ordered by an emergency care provider who have an indication for a head CT.

Guidance Notes: The Glasgow Coma Scale is a grading system for neurological scale. It is an objective score based on the response to three factors (eye, verbal and motor skills). It is worth noting that GCS of 15 is a “perfect score” of alertness while a score of 3 would be near death/deep coma.
MACRA Metric N/A/416

Subgroup:
Emergency Medicine

Subject:
Emergency Department Utilization of CT for Minor Blunt Head Trauma for Patients Aged 2 through 17 years

Metric:
Percentage of emergency department visits for patients aged 2 through 17 years who presented within 24 hours or a minor blunt head trauma with a Glasgow Coma Scale score of 15 and who had a head CT for trauma ordered by an emergency care provider which are classified as low risk according to the Pediatric Emergency Care Applied Research Network prediction rules for traumatic brain injury.

Guidance Notes:
The Glasgow Coma Scale is a grading system for neurological scale. It is an objective score based on the response to three factors (eye, verbal and motor skills). It is worth noting that GCS of 15 is a “perfect score” of alertness while a score of 3 would be near death/deep coma. The GCS is questionable in children as they have limited verbal response.
Glasgow Coma Scale Metric

- Looking for inappropriate overutilization of CT in pediatrics and adult patients who have low clinical risk of serious intracranial injury
- Rule is saying if you score a perfect “15” you should not have a CT exam
- Emergency rooms may need to change policies
- Keys is to correlate EHR information:
  - Glasgow coma scale
  - Patient age
  - Descriptors of minor trauma
- Start with head CTs and correlate backwards using EHR data
MACRA Metric N/A/436

Subgroup:
Radiation Consideration for Adult CT

Subject:
Utilization of dose lowering techniques

Metric:
Percentage of final reports for patients aged 18 years and older undergoing CT with documentation that one or more of the following dose reduction techniques were used: AEC, adjustable mA/kV according to patient size, and use of iterative reconstruction techniques

Guidance Notes:
CT dose reduction features such as these are all standard issue as of 2015 forward production (and retrofitted in many cases) based on the MITA XR29 standard. Most CT systems can show via the log files that these features were used to justify compliance.
MACRA Metric N/A/436

Most manufacturers have CT dose modulation in private DICOM tags

**Brain**

- If needed start peripheral line
- Routine Brain: Scan to include the Base of the Skull through the Vertex of the Head. Position head 25° caudal to Reid’s baseline, and ISO centered in scanner
- If contrast is ordered: inject 80ML OMNIPAQUE300, if eGFR 45-59 SUBSTITUTE 80 ML VISIPAQUE 320 X 1Dose @1-2 ml/sec using a 3 minute post injection delay.
- If the patient is a Brain Attack, do an AP scout through the Chest to check for a Pacemaker
- Reform a set of Coronal images 2mm x 2mm off of thinnest STD(VCT) or J37 Medium Smooth(Siemens) set of images

**VCT:**
- Scan – Helical
- mA – 155
- kV – 120
- Detector Config: 20mm
- Algorithm: STD
- Rotation Time: 1.0

**ASiR** – ON
- Dose Reduction – ON
- Slice: 2.5x2.5
- Speed: 10.62
- Pitch: 0.531:1
- Window: Head
MACRA Metric N/A/145

Subgroup: Radiology

Subject: Exposure Time Reported for Procedures Using Fluoroscopy

Metric:
Final reports for procedures using fluoroscopy that document radiation exposure indices, or exposure time and number of fluorographic images (if radiation exposure indices are not available).

Guidance Notes:
If you have a dose tracking software system this can help aid in justifying compliance. In most cases modern fluoroscopy systems will export all cine runs and images as series level data that can be measured using a PACS analytics package.
Dose tracking software makes it easy to pull data together as needed to export or save as a template.
Thank You

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Philips Healthcare
Dominic.Siewko@Philips.com