MPPG 1.a
CT Protocol Management and Review Practice Guideline

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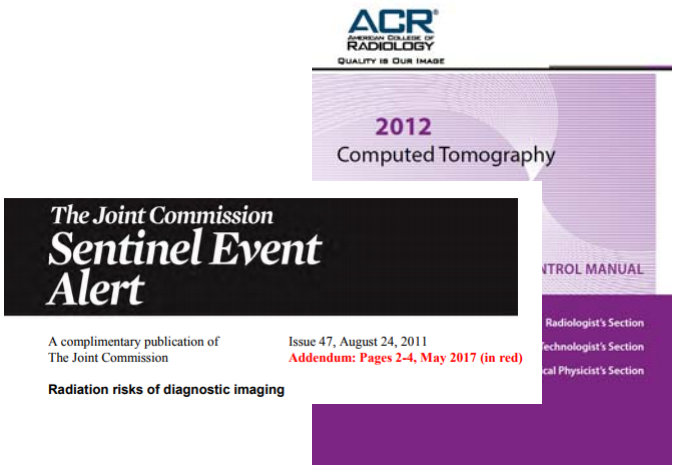
Disclosures

- Nothing to Disclose

Rationale for MPPG 1.a

- Provide guidance to practicing physicists on how to best perform CT Protocol Management and Review.
- Joint Commission Sentinel Event Alert #47
  - Published 8/2011
- 2012 ACR CT Quality Control Manual
  - Published 11/2012



Joint Commission Sentinel Event Alert #47

Right dose

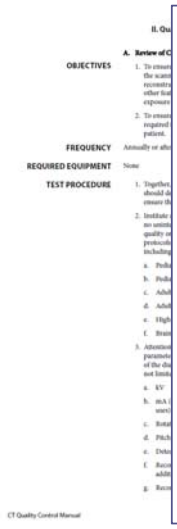
3. Adhere to ALARA guidelines as required by the Nuclear Regulatory Commission. The ALARA acronym stands f reasonably achievable" – are as low as possible wh purposes of the study.[18]
4. Adhere to the Image Gent *Gently*® guidelines when p radiation (or fluoroscopy) for adults, adhere to the *I* guidelines (developed by College of Radiology and Society of North America the American Association Medicine and the America Radiologic Technologists)
5. Provide physicians and te reference doses based or of the study, and patient s appropriate dose ranges f high-dose diagnostic imag
6. Radiologists should assur dosing protocol is in place treated.
7. Institute a process for the protocols either annually ensure that protocols adh evidence.
8. Investigate patterns outsi appropriate doses. Track exams repeated due to in quality or lack of availabili to identify the causes. Ad these problems through e measures.[4]
9. Record the dosage or exposure as part of the study's summary report of findings.

6. Radiol dosing treate
7. Institu protoc ensure eviden
8. Investi appro exams quality to ider these measu

Effective processes

10. Create and implement policies and procedures delineating those responsible for approving changes to password-protected diagnostic imaging protocols and for monitoring new developments in diagnostic imaging. Provide for oversight of these policies and procedures and related activities, including control of the password, by a multidisciplinary group with expertise in radiation (such as a radiation safety committee), including a medical physicist.[4]

ACR Requirement



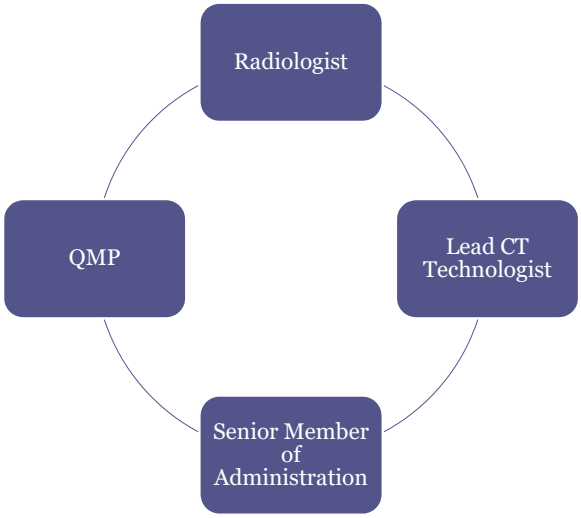
TEST PROCEDURE

1. Together, the lead radiologist, lead CT technologist, and QMP should design and review all new or modified protocol settings to ensure that both image quality and radiation dose are appropriate.
2. Institute a regular review process of all protocols to be sure that no unintended changes have been applied that may degrade image quality or unreasonably increase dose. Review at least 6 clinical protocols (more if required by state or local regulatory body), including:
   a. Pediatric head (1 year old)
   b. Pediatric abdomen (5 years old; 40-50 lb or approx. 20 kg)
   c. Adult head
   d. Adult abdomen (70 kg)
   e. High-Resolution chest
   f. Brain perfusion (if performed at the facility)

MPPG 1.a CT Protocol Management and Review

- Definitions:
  - Protocol Management: the process of review, implementation, and verification of protocols within a facility's practice.
  - Protocol Review: the periodic evaluation of all aspects of CT exam protocols
  - CT Protocol: the collection of settings and parameters that fully describe a CT examination
- Management >> Review

Protocol Review and Management Team



Responsibilities of the QMP

- Should include:
  - meeting with the CT Protocol Management and Review Team
  - clinical observation; phantom measurements
  - side-by-side image review with radiologist(s)
  - artifact review with technologist(s) and/or radiologist(s)
  - discussion of equipment performance and operation
- The Lead CT Radiologist Should lead the CT Protocol Management and Review Process

Responsibilities of the QMP

- In-House QMP: "For the in-house QMP, this ongoing CT protocol review project may consume much of his/her time"
- Consulting QMP: "It is important to note that the CT Protocol Management and Review services are above and beyond normal QMP consulting services… Consultant QMPs should make this clear to their clients, and negotiate their services appropriately."

Protocol Management Review Process

- The team should design and review all new or modified protocol settings for existing and new scanners to ensure both image quality and radiation dose aspects are appropriate.
  - implement new and innovative technologies to improve image quality and/or lower dose
    - Iterative Reconstruction, kV Optimization
  - ensure maximum performance of each scanner is achieved, relative to its specific capabilities
  - review most current literature such as ACR practice guidelines, AAPM protocol list, peer-reviewed journals, etc.

Frequency of Review

- Must be consistent with federal, state, and local laws and regulations
- Should be no less frequent than 24 months
- Should include all new protocols added since last review
- Must Review the following 6 annually, if performed at the facility
  - Pediatric Head
  - Pediatric Abdomen
  - Adult Head
  - Adult Abdomen
  - High Resolution Chest
  - Brain Perfusion

Reference Dose Levels

- "The facility should explicitly review the expected CTDIvol values. For the limited set of protocols where reference values are available, the CTDIvol values should be compared to the reference values…"
  - "U.S. Diagnostic Reference Levels and Achievable Doses for 10 Adult CT Examinations" - Radiology: Volume 284: Number 1—July 2017
  - "ACR-AAPM Practice Parameter for Diagnostic Reference Levels and Achievable Doses in Medical X-Ray Imaging"
  - ACR Dose Index Registry
  - AAPM: The Alliance for Quality Computed Tomography
- Note: Reference dose levels should be set for "average" patients. Large patients should exceed these levels in some cases.

Radiation Dose Management Tools

- Tools that identify when potentially high-radiation dose scans are being prescribed should be implemented when available.
  - Dose Check, XR-29 Alert Levels
- Radiation dose management tools may be used to monitor doses and collect data from routine exams.
- Each facility should decide on the process by which protocol parameters are populated across additional scanners.
  - Tools are now commercially available for this process.
  - Current tools are vendor specific.

Verification

- The CT Protocol Review and Management team Must institute a regular review process of all protocols to be sure that no unintended changes have been applied that may degrade image quality or unreasonably increase dose.

Impact of MPPG 1.a

- Joint Commission Advanced Diagnostic Imaging Standards
  - Element of Performance for PC.01.03.01, A 26: "Diagnostic computed tomography (CT) imaging protocols are reviewed and kept current with input from an interpreting radiologist, medical physicist, and lead imaging technologist to make certain that they adhere to current standards of practice and account for changes in CT imaging equipment. These reviews are conducted at time frames identified by the hospital.

Current Practice - Consultant QMP

- ~70 CT systems over 40 facilities annually
- CT Protocol Review committee = Radiation Safety Committee
- Review the 6 Major protocols during annual survey
- Discuss findings with lead CT tech and radiologist if available
- Occasionally able to attend RSC meetings to review protocols.
- Access to Radimetrics at some facilities to provide additional analysis.

There are many in-house Physicists giving presentations at the annual meeting on their process for CT Protocol Review.

Additional Opportunities at AAPM 2018

- Tuesday, 7:30 - 9:30
  - CT Intensive II: Dose Monitoring Hands-On Workshop
- Tuesday, 1:45 - 3:30 & Wednesday, 10:15 - 11:50
  - CT Protocol Management and Distribution Tools Guided Exhibit Hall Tour (Space Limited, First come, First Served)
- Wednesday, 7:30 - 9:30
  - CT Intensive III: Protocol Development and Optimization
- Wednesday, 10:15 - 12:15
  - CT Intensive IV: Regulatory Requirements

Future Direction

- Revision of MPPG 1 is currently in process.
  - Changes will be minor.
- TG 309 - Protocol Management System Design
  - Addresses the software tools that are in use and/or development that help with protocol management.

Acknowledgements

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