Experiences and challenges with MPPGs and other living documents

2019 AAPM Spring Clinical Meeting

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Senior Advisor for Medical Physics
American College of Radiology

Outline

- MPPG 1a (2013)
- MPPG 6a (2017)
- Practice Parameters & Technical Standards
- Appropriateness Criteria

MPPG 1a (2013)

- CT Protocol Management and Review

TG-225 Members:

Dianna D. Cody, Chair, PhD, FAAPM
Tyler S. Fisher, MS
Dustin A. Gress, MS
Rick Robert Layman, Jr., MS
Michael F. McNitt-Gray, PhD, FAAPM
Robert J. Pizzutiello, Jr., MS, FAAPM
Lynne A. Fairobent, AAPM Staff


PHONE

2008

DiagnosticImaging

Search For...

TOPICS: CT | Low Do
Ultrasound | Women's

Home | Topics | Modalities | PACS and Informatics | Practice Management | Image IQ | Case Studies

Two-second CT scan turns into 65-minute ordeal for toddler

November 10, 2008
By Donna Domino

2009

Los Angeles Times

Cedars-Sinai investigated for significant radiation overdoses of 206 patients

The finding prompts the FDA to issue an alert urging hospitals nationwide to review their safety protocols for CT scans.

October 10, 2009 | Alan Zarembo

Safety Investigation of CT Brain Perfusion Scans: Initial Notification

Recommendations for Hospitals and CT Facilities:

**Thi
can

Date

FDA encourages every facility performing CT imaging to review its CT protocols and be aware of the dose indices normally displayed on the control panel. These indices include the volume computed tomography dose index (abbreviated $CTDI_{vol}$, in units of "milligray" or "mGy") and the dose-length product (*DLP*, in units of "milligray-centimeter" or "mGy-cm").

For each protocol selected, and before scanning the patient, carefully monitor the dose indices displayed on the control panel. To prevent accidental overexposure, make sure that the values displayed reasonably correspond to the doses normally associated with the protocol. Confirm this again after the patient has been scanned.

CT Dose Summit:

Scan Parameter Optimization

April 29-30, 2010

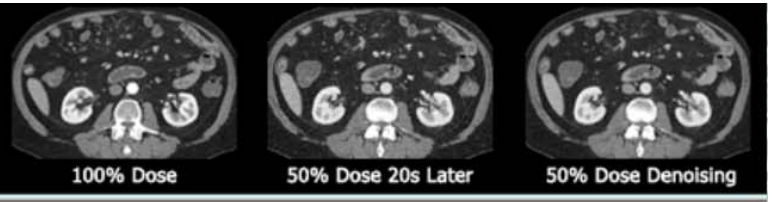
The Renaissance Concourse Atlanta Airport Hotel

Atlanta, GA

2011 AAPM CT Dose Summit

Interdisciplinary Program on Scan Parameter Optimization
for Imaging Physicians, Technologists and Physicists

October 7-8, 2011 • Westin Denver • Denver, CO



Welcome

An interdisciplinary approach to optimizing image quality and managing patient dose

Rapid developments in CT scanner technology over the last decade have yielded new clinical capabilities and substantial improvements in patient care. The greater complexity of today's CT scanners, however, creates considerable challenges for CT users, who must master a wide range of equipment features and clinical applications.

This summit will demonstrate how scan acquisition and image reconstruction parameters should be selected and managed to improve image quality and reduce radiation dose. Faculty members will explain the essential criteria for specific diagnostic tasks, and participants will have an opportunity to practice the selection of optimum scan protocols. The goal of the summit is to provide practical information for users that will help them operate their CT scanners wisely, improving the quality and usefulness of CT images while reducing the radiation dose to patients.

Now Available

- **Registration**
- **Housing**

Funding Organizations:

MITA MEDICAL IMAGING & TECHNOLOGY ALLIANCE A DIVISION OF NEMA

ACR® AMERICAN COLLEGE OF RADIOLOGY

RSNA®

Design, Implementation, Benefits and Costs of a CT Radiation Dose Optimization Committee, in a Medium Sized Community Hospital System

Jenifer RQW Siegelman, MD, MPH, Norwich Diagnostic Imaging at William W Backus Hospital, Norwich, CT and Yale New Haven School of Medicine New Haven, CT; Dustin A Gress, MS, Upstate Medical Physics, Victor, NY

Backus
The William W. Backus Hospital

PURPOSE

1. To establish a reproducible process to optimize the radiation dose-image quality continuum in CT scanning, and measure its value.
2. To improve quality of care for patients undergoing CT scans.
3. To reduce radiation dose, reduce variability of image quality, and reduce repeat rate.

ABSTRACT

Radiologists educated through the 2010 AAPM CT Dose Summit were motivated to examine variability of radiation doses across CT scanners from different vendors, with varying detector configuration capabilities, and of differing ages within our community health system. Radiologists collaborated with expert medical physicists and senior CT radiologic technologists throughout the project.

METHODS

Process Development: We educated and cultivated stakeholders in hospital leadership to the potential scope of the endeavor and need for funded expert collaboration. We formed a roundtable CT Dose Optimization Committee of private practice diagnostic and interventional radiologists, outside consultant imaging medical physicists, hospital administrators, and three technologists: managing, senior and junior. We identified the most frequently performed examinations with available dose reference levels. Among them we chose the simplest protocol to modify as a pilot.

Consultant physicists performed thorough baseline performance surveys of all CT scanners, reviewed existing protocols submitted by the technologists, identified physical limitations of scanners, observed real time artifacts and image quality limitations side by side with radiologists during real time scanning of live patients of varying states of health, and observed technical and clinical processes within the health system. Technologists installed and tested protocols with volunteer radiologists interpreting exams. Thereafter we widely implemented approved protocols across all scanners, all technologists and all 9 clinical radiologists.

Quality Improvement/Cost: We collaborated with expert medical physicists to design novel protocols for main site and outpatient scanners using tube current modulation where appropriate. Identifying scan parameter limits to maintain appropriate levels of radiation dose (CTDIvol). We closely monitored image quality and CTDIvol over approximately one month. Feedback loops were created using group email communication. Based on these we made minor scan protocol and reformat modifications. Implementing a single methodology to track protocols and protocol changes. We quantified the repeat rate and CTDIvol in 108 consecutive patients scanned one month before and after the intervention. We quantified time spent on the project as a surrogate measure of cost. Hours of physician, consultant physicist, technologist and administrator time on the project were tracked. We applied accepted labor rates to estimate resource allocation.

RESULTS

Process: Over a period of 3 months, the full CT Dose Optimization Committee identified a modifiable issue (Head CT), met in-person twice, examined all 8 existing routine head CT protocols in the context of the institutive repeat rate and ACR criteria for CTDIvol. The specific traits of each scanner required individualized strategies to maintain similar image quality. Unique protocols for the exam type for each scanner were implemented. Radiologist consensus regarding acceptable image quality, equal to or superior to the pre-intervention scan quality was obtained for each scanner by iterative protocol minimization, via small group meetings with minutes communicated group emails (9m128).

Quality Improvement/Cost: The repeat rate and CTDIvol in 100 consecutive patients one month before and after the intervention, were quantified. In the sample group, repeat rate was reduced from 13% to 0. The percent improvement meeting ACR Reference Criteria for CTDIvol (75mGy) was 21%, (Fisher's exact 2 - tailed p=.09 meeting ACR Pass/Fail criteria for CTDIvol (80mGy) was 42% (Fisher's exact 2 - tailed p=.01) Committee work, culminating in protocol development and implementation required 67 person hours, including 10 radiologist, 18 physicist, 20 technologist, 5 administrator, and 4 clinical work hours. Measurement of the direct benefits of the intervention required an additional 8 radiologist and 8 technologist hours.

CONCLUSION

Through a round-table multidisciplinary team approach, we established an efficient and reproducible process for optimization of the radiation dose-image quality continuum. Utilizing widely accepted metrics, we successfully significantly reduced radiation dose, subjective variability in image quality, and repeat rate, improving quality of patient care. Our radiation dose metric translated towards significance for the more conservative ACR CTDIvol Reference Value of 75 mGy. We provide labor information that may be useful to calculate the internal resources and funding for consultants needed for a similar project. Given the success of the initial pilot, we are moving forward with dose optimization for additional examinations, and anticipating lower marginal cost.

INSTITUTIONAL DEMOGRAPHICS

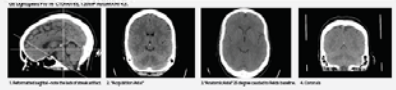
Three sites	GE Lightspeed Pro 16, 2003
Imaging center, acute care hospital, ED	Siemens Definition AS 40, 2009
16 CT technologists, 9 radiologists	GE QXI 4, 2004
213 bed hospital, 60,000 ED visits	Philips Brilliance 64, 2007
4 CT Scanners, No iterative reconstruction	"ASC features" as available at time of purchase

METHODS

Process Development: The methodology for development and process of the CT Dose Optimization Committee is depicted in the flow chart above.

Dose Optimization Technical Process: Prior to and during the physics performance evaluation surveys, radiologists identified several recurring unobtrusive image features in clinical CT studies and shared with the medical physicists several clinical studies displaying these features. The physicists then considered what image acquisition and processing parameters could be adjusted to improve the negative image characteristics, measuring effects of parameter adjustment during the baseline physics survey. The medical physicists were then given permission from the facility to generate an entirely new brain protocol, intended to alleviate the recurring issues that had until that time interfered with clinical utility of acquired CT studies. Medical physicists educated radiologists about the differences between the old protocol and new protocol, identifying benefits and trade-offs. The new brain protocol was similar to the existing "trauma head" protocol, with improved dose reduction features, or it was therefore felt likely to be of clinical diagnostic quality. The medical physicists adjusted protocols iteratively with the committee, with a goal at each step of good image quality at reasonable CTDIvol, mindful of the many ways to achieve this endpoint. It is of vital importance to execute careful, stepwise adjustments in [effective] mAs, kVp, mA rotation time, slice collimation, pitch, scanning, and ASC Noise Index. For example, when the primary axial reconstruction from 5 mm to 10 mm, a corresponding increase in Noise Index on the GE CT system was required to maintain reasonable CTDIvol results.

1. Perform baseline performance survey of CT system(s).
   a. Evaluate existing protocol quantitatively and qualitatively.
   b. Identify potential protocol improvements and quantify effect of parameter adjustments.
2. Identify persistent negative image characteristics observed in clinical CT studies.
3. Limit initial scope to one CT unit to iteratively find a good general approach to the protocol.
4. Identify acquisition and processing parameters that can affect observed negative image characteristics.
   a. Be aware of potential trade-offs of adjustments.
5. Generate new protocol or adjust old protocol, as appropriate.
6. Test new protocol and evaluate resulting study, including multi-planar reconstructions.
7. Adjust protocol to eliminate or lessen negative results of study protocol.
8. Implement general protocol strategy across all facility CT systems, making an effort to exploit advantageous capabilities and/or compensate for limitations of the various manufacturer and vintage CT systems.
9. Iteratively evaluate and adjust protocols as necessary.



As the dose was slowly lowered over 4 weeks, per radiologist request, we added an "anatomic axial" reformat, to be sure comparison with old studies was facilitated. See figure above for new protocol images, with "acquisition" and "anatomic axials"

Quality Improvement/Cost:
We quantified the repeat rate and CTDIvol in 100 consecutive adult patients undergoing Head CT scan one month before and one month after the intervention, and compared these at two time points.

PACS filters for the date range, patient age, scan type were created. Dose Summary pages were sent to PACS and printed on paper; the CTDIvol was entered into a spreadsheet. Repeat rate was defined as any image repeated by the technologist because of patient motion, or any patient who was called back because of uncertainty thought to be due to correctable image quality features. The images from each case were reviewed by one radiologist, for repeated slices, or completely repeated exams within 24 hours. In the case of repeated exams, report was reviewed, as well as technologist notes and Tech Q notations, to verify the technical nature of the reason for repeat.

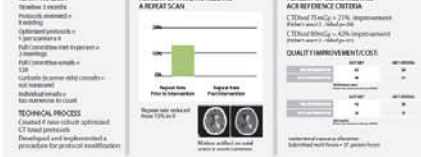
Project costs, from an institutional perspective, were measured and reported. Participant radiologists, technologists and physicists tracked time dedicated to the project in meetings and in additional hours and submitted timesheets. Administrator hours were based on participation during committee meetings only. Mean labor rates from accepted national databases were then applied to the project work hours by occupation.

RESULTS

TEAM PROCESS:
Timeline: 3 months
Protocols reviewed: 8
Modeling:
Optimized protocols: 8
1 per scanner x 8
Full committee met in person: 2 meetings
Full committee emails: 108
Curbside (scanner side) consults: not measured
Individual emails: 80
Non-numerous: to count

TECHNICAL PROCESS
Created 8 new robust optimized CT head protocols
Developed and implemented a procedure for protocol modification

QUALITY IMPROVEMENT



COST METRICS

	MEDICAL PHYSICIST	CT TECHNOLOGIST	CT TECHNOLOGIST	RAD ADMINISTRATOR	RADIOLOGIST	SECRETARY
$/HOUR/UNIT	Consultant Hourly	$97.5/HR	$70.00/HR	$117.7/HR	$80.00/HR	$15.00/HR
PROJECT COSTS						
HOURS/TASKS	$/HR	$/HR	$/HR	$/HR	$/HR	$/HR
HOURS ON PROJECT	TB	S	TB	S	TB	S
	$2,700	$140	$560	$267	$1,760	$60

COST OF MEASURING AND EVALUATING THE OUTCOME	
CTDIvol/EXAM — 1 MONTH	$680
RADIOLOGIST — 1 MONTH	$1,480
COST OF MEASURING VALUE OF COMMITTEE	$1,660
"SUNK" COST OF KYPHOSIX SURVEYS:	$7,000
COST OF COMMITTEE TIME:	$5,200
COST OF REVIEWING ONE PROTOCOL FOR 4 UNITS (INCL. PHYSICS SURVEY):	$10,540
PROJECTED COST OF IMPLEMENTATION FOR 4 UNITS: SET YEAR 3: 20 PROTOCOLS	$100,000
PROJECTED COST OF IMPLEMENTATION THEREAFTER	$137,070

The table below, based on available salary data from ASRT Salary Survey, AAPM, aunteminie.com, and from the United States Bureau of Labor Statistics gives ranges of cost per hour for each of the committee participants, and the value of the additional measurable work each participant contributed to the project.

CONCLUSIONS

This quality improvement initiative accomplished the following:

1. Determined the essential personnel needed for a functioning dose optimization committee;
2. Set priorities for protocol review;
3. Established measurable endpoints for a dose optimization committee;
4. Educated and empowered technologists at all levels as partners in the dose optimization process;
5. Engaged and integrated qualified physics personnel in novel ways into our infrastructure;
6. Introduced a culture of safety regarding the appropriate use of iterating radiation in a CT section in community not for profit hospital;
7. Increased radiologist, departmental and institutional enthusiasm for dose reducing changes;
8. Developed a reproducible process to quantify the task of protocol evaluation and optimization; and,
9. Explored initial steps for compliance with IL-RAD campaign.

The improvement in repeat rate measured resulted not only from new expedient protocols being used - quick scan times rather than slowest scan times, but also from the increased awareness of the few technologists about the need to have a patient still enough to scan as well as the enhanced confidence radiologists could exhibit because of the availability of higher quality multi-planar reformats.

DISCUSSION

Our initiative and study began prior to the recent Joint Commission (JCAHO) "sentinel Event Alert 47 recommendation that facilities "institute a process for the review of all dosing protocols either annually or every two years to ensure that protocols adhere to the latest evidence." Conservatively estimated, most institutions have upwards of 30 unique protocols per CT scanner. Even within a brand of CT scanner, the nuanced machine specifications, e.g. 40 vs. 64 detectors, or different software versions on the same scanner platform may result in varying capabilities for dose modulation, or time to complete a scan – both of which may result in different dose profiles and patient radiation exposures and will necessitate unique protocols for every single scanner.

Based on the actual time spent, we calculated the resources an institution with employed radiologists, consultant physicists and employed technical, administrative and secretarial staff would have to allocate to conduct a similar project for a four scanner department, 512,346. Given our results, resources required to review and modify thirty protocols would be calculated at $160,000 the first year. The expected costs in subsequent years would likely be similar, or only slightly less, as this vignette describes a first attempt with an intrinsic learning curve, but the protocol selected was unimpressionable in its simplicity. The learning effects may be offset by the additional complexity of other exams.

The challenges in optimization of the dose-image quality continuum are compounded by a lack of an automated mechanism to collect and modify protocols system-wide. The manual labor involved in marshalling the active protocols was not inconsequential in our organization and remains a work in progress. The consulting medical physicists in this project have observed similar circumstances across a large number of CT facilities. Innovative commercial solutions to the dose optimization challenge do exist, and with newly purchased equipment, nascent data collection software and participation in national dose registries, dose control and optimization and data collection will become less cumbersome.

Facilities that take advantage of our specific methods may reduce the radiation exposure for patients. Once unique processes to manage the change are in place, the CT protocols which are produced can target any expect of dose-reduction. We aimed to decrease the number of outlier exams, those with high dose or poor quality, rather than decreasing the "average patient's" radiation exposure, reducing variability.

It is our opinion that the cost of the latest generation of commercial solutions, iterative reconstruction and increased intrinsic z-axis collimation is justifiable given the labor costs for the modest gains our strategy provided for "average" patient, undergoing a "routine" exam. The majority of the scanners in the installed base cannot be retrofit with many of the new features. Furthermore, given the lack of audit function, or alert of recent modification, the need for protocol surveillance and review is likely to remain a necessary addition to departmental process.

ACKNOWLEDGEMENTS

DOSE OPTIMIZATION COMMITTEE:

Tracie L. Jencks RT (R) (CT), Herbert Lustberg, MD, Keith A Stevens RT (R) (CT), Eric J Mundy RT (R), Kelly Shenski, Julius Kaczorsky MA

WWBH: Peter Shea, MD CMO, David Whitehead CEO, CT Technologists

Upstate Medical Physics: Robert J Pizzutiello, FACR, FAAPM, FACMP; Jessie A. Sturmioes, MS; Alphonsus Magri, PhD

Norwich Diagnostic Imaging: William Donovan MD MPH; Stacey L Spooner, MD; Felicia Cuomo, MD; Gail B Weingrad, MD; Jeff Rudikoff, MD; Jim Burch, MD; Phillip Rohrwild, MD; Nat Dueber, MD

Aaron Sudelsson, MD,PhD; Robert Siegelman MBA; Mark Willmarth, Julie Waldram

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Poster will be available on line at Upstate Medical Physics

UMP
UNIVERSITY Medical Physics Partner

References

2010 AAPM Dose Summit: Dose Parameter Optimization, co-sponsored by ACR and AAPM, April 28-30, 2010 Atlanta, GA

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May 2010 National Industry-Specific Occupational Employment and Wage Estimates NAICS 622100 General Medical and Surgical Hospitals US Department of Labor Bureau of Labor Statistics http://www.bls.gov/oes/current/naics4_622100.htm (accessed 11.11.11).

Radiologic Technologist Wage and Salary Survey 2010, conducted by the American Society of Radiologic Technologists June 2010 "several sources" (http://www.asrt.org/docs/publications/Media/publicrelations_magazinesurveypart1answer.pdf (accessed 11.11.11).

American College of Radiology

JACR | Journal of the American College of Radiology

Radiology Stewardship and Quality Improvement: The Process and Costs of Implementing a CT Radiation Dose Optimization Committee in a Medium-Sized Community Hospital System

Jenifer R. Q. W. Siegelman, MD, MPH[a,b], Dustin A. Gress, MS[c]

Purpose: The aims of this study were to measure the effectiveness of a multidisciplinary CT dose optimization committee and estimate its costs and to describe a radiation stewardship quality improvement initiative in one CT department at a medium-sized community hospital system that used a participatory design committee methodology.

Methods: A CT dose optimization committee was conceived, funded, and formed, consisting of the following stakeholders: radiologists, technologists, consultant medical physicists, and an administrator. Volume CT dose index (CTDIvol) and repeat rate were monitored for 1 month, for one scan type, during which iterative protocol adjustments were made through committee interaction. Effects on repeat rate and CTDIvol were quantified and benchmarked against national diagnostic reference levels after retrospective medical record review of 100 consecutive patients before and after the intervention. Labor hours were reported and wage resources estimated.

J Am Coll Radiol 2013;10:416-422.

Serendipitous timing

- Initial phase of CT protocol project wrapping up
- Interviewing and going to work for TG-225 Chair
- Projects were well aligned
- Manuscripts happening at same time

ii. Responsibilities of the QMP

In the context of CT Protocol Management and Review, the QMP's responsibilities may vary, depending on the type of facility being supported; regardless, the QMP **must** be involved in the review of all protocols. These considerations **should** be balanced with adequate response times to facility inquiries.

A QMP's time at a facility **should** include but not be limited to:

a. meeting with the CT Protocol Management and Review team;
b. clinical observation; phantom measurements;
c. side-by-side image review with radiologist(s);
d. artifact review with technologist(s) and/or radiologist(s); and
e. discussion of equipment performance and operation, etc.

While regular dialogue is important, the QMP **should** also remember that facility personnel themselves, in particular the Lead CT Radiologist, **should** lead the CT Protocol Management and Review process; the QMP is an integral member of the team. The QMP may elect to perform baseline dose measurements and image quality tests at the outset of the project, particularly if the QMP does not have personal historical experience with the scanner(s) in the facility.

iii. In-house QMP

For the in-house QMP, this ongoing CT protocol review project may consume much of his/her time, so the QMP **should** be sure to adequately communicate with his/her supervisor(s), with other team members, and with department/hospital management in this regard. The facility **should** understand that the CT Protocol Management and Review process is an ongoing investment in improved quality of patient care.

iv. Consulting QMP

It is important to note that CT Protocol Management and Review services are above and beyond normal QMPs consulting services (e.g., the annual physics survey), which have traditionally been limited to image quality, dosimetry, and basic protocol review for a few selected examinations. Consultant QMPs **should** make this clear to their clients, and negotiate their services appropriately.

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Responsibilities of the Radiologist

2012
Computed Tomography

QUALITY CONTROL MANUAL

Radiologist's Section

Radiologic Technologist's Section

Medical Physicist's Section

A. The supervising radiologist's responsibilities relative to the optimization of patient dose in CT consist of the following:

1. Convene a team that includes the supervising radiologist, the medial physicist, and the lead CT technologist to design and review all new or modified CT protocol settings to ensure that both image quality and radiation dose are appropriate.
2. Develop internal radiation dose thresholds during any new CT protocol design.
3. Implement steps to ensure patient safety and to reduce future risk if an estimated dose value is above the applicable threshold for any routine clinical exam.
4. Institute a review process, which occurs at least annually, for all protocols to ensure no unintended changes have been applied that may degrade image quality or unreasonably increase dose. This review should be done by the same team of the supervising radiologist, the medical physicist, and the lead CT technologist.
5. Establish a policy stating that the CT dose estimate interface option is not to be disabled and that the dose information is displayed during the exam prescription phase.

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Responsibilities of the Qualified Medical Physicist

2012
Computed Tomography

QUALITY CONTROL MANUAL

Radiologist's Section

Radiologic Technologist's Section

Medical Physicist's Section

The responsibilities of the qualified medical physicist relate to equipment performance, including image quality and patient safety. A CT equipment performance review must take place at the time the equipment is installed and at least annually thereafter. The qualified medical physicist should repeat appropriate tests after major repair or upgrade to the CT system, which includes a tube change.

Specific tests include the following:

1. Review of clinical protocols . . .
    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)

#synergy

ACR CTAP Physics SC

- **Dianna Cody, PhD**
- Doug Pfeiffer, MS
- **Mike McNitt-Gray, PhD**
- Tom Ruckdeschel, MS
- Keith Strauss, MS

AAPM TG-225

- **Dianna Cody, PhD**
- Tyler Fisher, MS
- Dustin Gress, MS
- Rick Layman, PhD
- **Mike McNitt-Gray, PhD**
- Bob Pizzutiello, MS

Success

- Feb 2012 – Sep 2013 publication
- Things *can* go smoothly
- Regular calls
- Do your homework
- Work together

TG-257

- "Selection of a Patient Dose Monitoring System"

Received: 30 November 2016 | Revised: 30 November 2016 | Accepted: 20 January 2017

DOI: 10.1002/acm2.12089

AAPM REPORTS & DOCUMENTS

WILEY

AAPM medical physics practice guideline 6.a.: Performance characteristics of radiation dose index monitoring systems

Dustin A. Gress[1] | Renee L. Dickinson[2] | William D. Erwin[1] | David W. Jordan[3] | Robert J. Kobistek[4] | Donna M. Stevens[5] | Mark P. Supanich[6] | Jia Wang[7] | Lynne A. Fairobent[8]

TG-257

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AAPM REPORTS & DOCUMENTS

WILEY

AAPM medical physics practice guideline 6.a.: Performance characteristics of radiation dose index monitoring systems

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Issues (02/2014 – 01/2017 pub)

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- Shared cloud storage

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- Setting up the next call

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- Shared cloud storage
- Setting up the next call
- Have an agenda – also be flexible
- Reviews: divide & conquer, consistency is key
- JACMP submission

ACR

- Practice Parameters and Technical Standards

PP & TS – collaborative

- Free guidance, expert consensus
  - https://www.acr.org/Clinical-Resources/Practice-Parameters-and-Technical-Standards

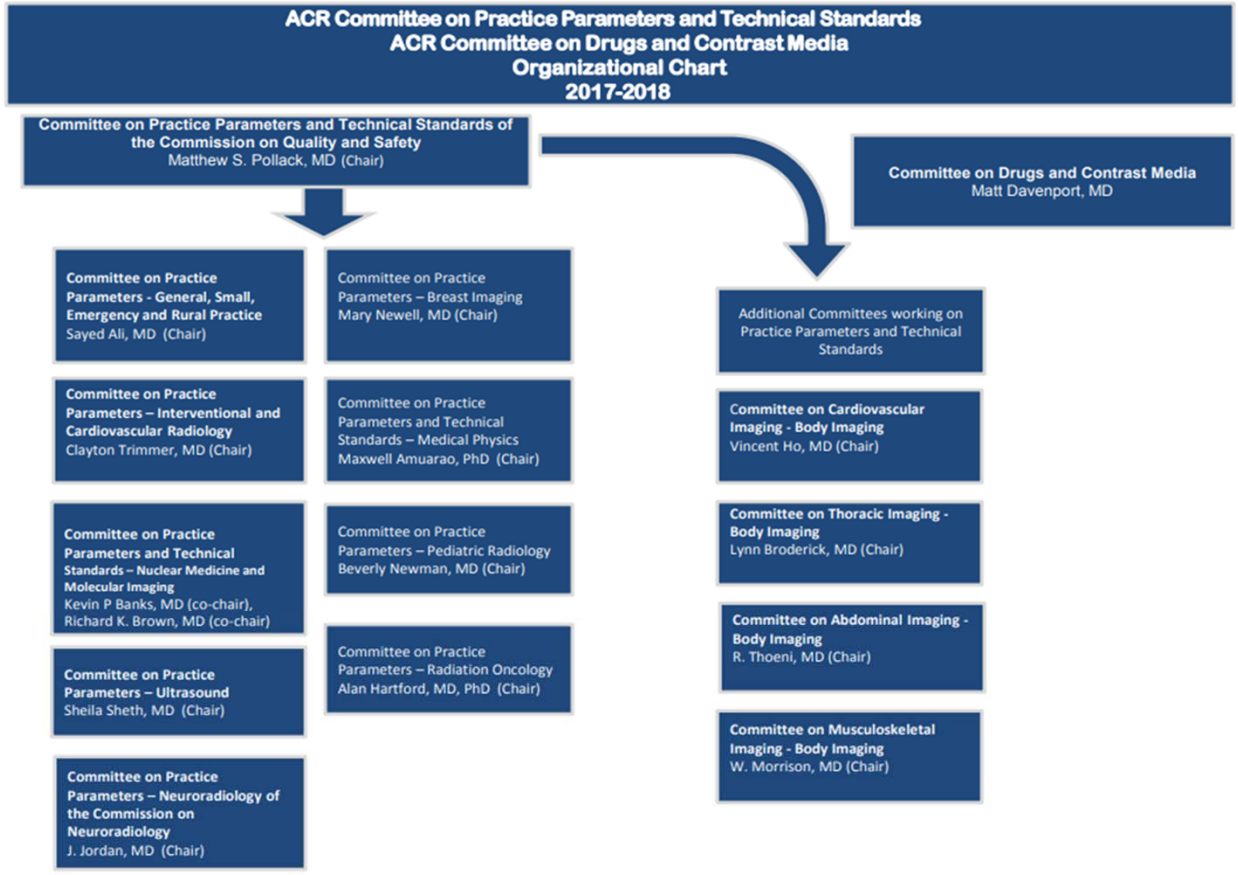
ACR–SPR PRACTICE PARAMETER FOR THE PERFORMANCE AND INTERPRETATION OF SKELETAL SURVEYS IN CHILDREN

ACR–SIR PRACTICE PARAMETER FOR RADIOEMBOLIZATION WITH MICROSPHERE BRACHYTHERAPY DEVICE (RMBD) FOR TREATMENT OF LIVER MALIGNANCIES

ACR PRACTICE PARAMETER FOR 3D EXTERNAL BEAM RADIATION PLANNING AND CONFORMAL THERAPY

Scope of PP & TS

- 5 year review cycle
- Several staff members
- 30-40 per year
- Investment


ACR Committee on Practice Parameters and Technical Standards
ACR Committee on Drugs and Contrast Media
Organizational Chart
2017-2018
Committee on Practice Parameters and Technical Standards of the Commission on Quality and Safety
Matthew S. Pollack, MD (Chair)
Committee on Drugs and Contrast Media
Matt Davenport, MD
Committee on Practice Parameters - General, Small, Emergency and Rural Practice
Sayed Ali, MD (Chair)
Committee on Practice Parameters – Breast Imaging
Mary Newell, MD (Chair)
Additional Committees working on Practice Parameters and Technical Standards
Committee on Practice Parameters – Interventional and Cardiovascular Radiology
Clayton Trimmer, MD (Chair)
Committee on Practice Parameters and Technical Standards – Medical Physics
Maxwell Amuarao, PhD (Chair)
Committee on Cardiovascular Imaging - Body Imaging
Vincent Ho, MD (Chair)
Committee on Practice Parameters and Technical Standards – Nuclear Medicine and Molecular Imaging
Kevin P Banks, MD (co-chair), Richard K. Brown, MD (co-chair)
Committee on Practice Parameters – Pediatric Radiology
Beverly Newman, MD (Chair)
Committee on Thoracic Imaging - Body Imaging
Lynn Broderick, MD (Chair)
Committee on Practice Parameters – Ultrasound
Sheila Sheth, MD (Chair)
Committee on Practice Parameters – Radiation Oncology
Alan Hartford, MD, PhD (Chair)
Committee on Abdominal Imaging - Body Imaging
R. Thoeni, MD (Chair)
Committee on Practice Parameters – Neuroradiology of the Commission on Neuroradiology
J. Jordan, MD (Chair)
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Appropriateness Criteria

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ACR Appropriateness Criteria Asymptomatic Patient at Risk for Coronary Artery Disease

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Atherosclerotic cardiovascular disease is the leading cause of death for both men and women in the United States. Coronary artery disease has a long asymptomatic latent period and early targeted preventive measures can reduce mortality and morbidity. It is important to accurately classify individuals at elevated risk in order to identify those who might benefit from early intervention. Imaging advances have made it possible to detect subclinical coronary atherosclerosis. Coronary artery calcium score correlates closely with overall atherosclerotic burden and provides useful prognostic information for patient management. Our purpose is to discuss use of diagnostic imaging in asymptomatic patients at elevated risk for future cardiovascular events. The goal for these patients is to further refine targeted preventative efforts based on risk. The following imaging modalities are available for evaluating asymptomatic patients at elevated risk: radiography, fluoroscopy, multidetector CT, ultrasound, MRI, cardiac perfusion scintigraphy, echocardiography, and PET.

The ACR Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed every 2 years by a multidisciplinary expert panel. The guideline development and review include an extensive analysis of current medical literature from peer-reviewed journals and the application of a well-established consensus methodology (modified Delphi) to rate the appropriateness of imaging and treatment procedures by the panel. In those instances where evidence is lacking or not definitive, expert opinion may be used to recommend imaging or treatment.

Key Words: Appropriateness criteria, coronary artery calcium score, coronary artery disease, asymptomatic, multidetector CT (MDCT)

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SUMMARY OF LITERATURE REVIEW

Introduction/Background

knowledge, and medications have led to a decrease in death rates, the burden of disease remains very high

APPROPRIATE USE CRITERIA

Patient-Friendly Summary of the ACR Appropriateness Criteria: Asymptomatic Patient at Risk for Coronary Artery Disease

Casey Quinlan

There are many imaging tests that can detect the signs of early heart disease in people without any symptoms. Finding heart disease early can help doctors and patients treat it and may prevent future events. These imaging tests are usually not appropriate for patients if they have low risk scores on common heart risk assessment tests like the Framingham risk score or the Systematic Coronary Risk Evaluation.

For low-risk patients who don't have any symptoms but have strong family histories of heart disease, it may be helpful to use CT to determine the coronary artery calcium score (CACS). The CACS is a measure of the calcium buildup on the walls of the arteries around the heart and has been found to be a good indicator of future cardiac events such as heart attacks. For intermediate-risk patients without symptoms, measuring the CACS is usually appropriate because it helps find people who are at higher risk than suggested by their calculated heart risk assessment scores.

There are several imaging tests that may be appropriate for people at high risk who don't have any symptoms. This group includes people with type 2 diabetes, who have a higher risk for heart disease than people without diabetes. These tests include coronary CT angiography, a test that can detect blockages in the arteries around the heart, a heart stress test using MRI, myocardial perfusion imaging (a nuclear medicine test), and echocardiography, a type of ultrasound test of the heart.

Original Article: ACR Appropriateness Criteria Asymptomatic Patient at Risk for Coronary Artery Disease (https://acsearch.acr.org/docs/3082570/Narrative/). Lead Author: James P. Earls.

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Inside the AC

- RRLs
- Published guidance balances benefit and risk

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ACR Appropriateness Criteria®
Breast Cancer Screening

Variant 1: **Breast cancer screening. Average-risk women: women with <15% lifetime risk of breast cancer.**

Procedure	Appropriateness Category	Relative Radiation Level
Mammography screening	Usually Appropriate	☢☢
Digital breast tomosynthesis screening	Usually Appropriate	☢☢
US breast	May Be Appropriate	O
MRI breast without and with IV contrast	Usually Not Appropriate	O
MRI breast without IV contrast	Usually Not Appropriate	O
FDG-PEM	Usually Not Appropriate	☢☢☢☢
Tc-99m sestamibi MBI	Usually Not Appropriate	☢☢☢

Variant 2: **Breast cancer screening. Intermediate-risk women: women with personal history of breast cancer, lobular neoplasia, atypical ductal hyperplasia, or 15% to 20% lifetime risk of breast cancer.**

Procedure	Appropriateness Category	Relative Radiation Level
Mammography screening	Usually Appropriate	☢☢
Digital breast tomosynthesis screening	Usually Appropriate	☢☢
MRI breast without and with IV contrast	May Be Appropriate	O

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~~Outline~~ Summary

- MPPG 1a (2013)
- MPPG 6a (2017)
- Practice Parameters & Technical Standards
- Appropriateness Criteria

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- All of our QC manuals are now available for our members on the Medical Physics Resources web page:
  - https://www.acr.org/Clinical-Resources/Medical-Physics-Resources

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