CT Tools and Protocols Available Through AAPM

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AAPM Working Group on Standardization of CT Nomenclature and Protocols

Cynthia McCollough
Workgroup Co-Chair

Dianna Cody
Workgroup Co-Chair

Charge

- Develop consensus protocols for frequently performed CT examinations, summarizing the basic requirements of the exam and giving several model-specific examples of scan and reconstruction parameters.
- Develop a set of standardized terms for use on CT scanners

Membership

- AAPM
  - Mike McNitt-Gray, Bob Pizzutiello, Dustin Gress, Jim Kofler, Mark Supanich, Michael Heard
- ACR
  - Mark Armstrong, Penny Butler, Dina Hernandez
- ASRT
  - Virginia Lester
- FDA
  - Thalia Mills

Manufacturers

- GE
  - John Jaeckle
- Hitachi
  - Mark Silverman
- Neusoft
  - Keith Mildenberger
- Neurologica
  - Donald Fickett
- Philips
  - Amar Dhanantwari
- Siemens
  - Christianne Liedecker
- Toshiba
  - Kirsten Boedecker
- MITA
  - Richard Eaton

Additional Members

Pediatric protocol experts

- Marilyn Goske
- Sjirk Westra

DICOM

- Kevin O'Donnell
- David Clunie

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CT Protocols

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Hello Dr. Cody...

AAPM Events that pertain to you...

Conference Calls - 4 Upcoming Call(s)

Conference call on 11/27/11 at 9:00 AM Eastern Time

- **Topic:** RSNA - Awards and Honors Committee Conf Call - Chicago Hilton, 720 S. Michigan Ave, Rm 4C / 4th Flr [8:00a-10:30a Chicago Time; 9:00a-11:30a Eastern Time]
- **Participant(s):** AH
- **Download to** Outlook | iCal [How to import to Outlook/iCal]
- Click here to send instructions to your email

Conference call on 11/27/11 at 9:00 AM Eastern Time

- **Topic:** TG200 meeting at RSNA (Room 4M, Chicago Hilton). Audio conference for those members unable to attend mtg.
- **Participant(s):** TG200
- **Download to** Outlook | iCal [How to import to Outlook/iCal]
- Click here to send instructions to your email

WebEx/Call on 12/1/11 at 11:00 AM Eastern Time

- **Topic:** WGCTNP Webex/Teleconference (8:00am Pacific, 10:00am Central, 11:00am Eastern, 5:00pm Germany)
- **Participant(s):** WGCTNP, neumannc@hitachimed.com
- **Download to** Outlook | iCal [How to import to Outlook/iCal]
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WebEx/Call on 12/15/11 at 11:00 AM Eastern Time

- **Topic:** WGCTNP Webex/Teleconference (8:00am Pacific, 10:00am Central, 11:00am Eastern, 5:00pm Germany)
- **Participant(s):** neumannc@hitachimed.com, WGCTNP
- **Download to** Outlook | iCal [How to import to Outlook/iCal]
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RSNA 2011 - 3 Upcoming Meeting(s)

Chapters Meeting - 1 Upcoming meeting(s)

What's New

Pay Your 2012 Dues Online [membership]

Latest AAPM Member Discussions
[see your discussion threads | all general discussions]:
ThF4 [forums | views: 30 | updated: 11/22/2011 12:55:43 PM]

Stage 1 of a new Educators Resource Guide available [education | posted: 11/17/2011 | sunset: 12/17/2011]

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CT Scan Protocols

Open to Public

Statement of Purpose

The American Association of Physicists in Medicine (AAPM) is a professional organization whose members include board-certified medical physicists who specialize in the safe and effective use of radiation in medicine. Medical physicists partner with radiologists, technologists, regulators, manufacturers, administrators and others to ensure that CT scans are performed using the minimum amount of radiation required to obtain the diagnostic information for which the CT scan was ordered.

The collection of settings and parameters that fully describe a CT examination is referred to as the exam *protocol*. These protocols specify how data collection and reconstruction, patient positioning and contrast administration are to be performed. The effect of these settings on the final exam quality or dose can be dramatic; a number of the settings are inter-related, where changing one parameter can require adapting several other parameters if image quality and/or dose are to be maintained at a specified level. Thus, the quality and dose of a CT exam are largely predetermined by the protocol used. In CT, there is however no single protocol that is "the correct protocol"; acceptable image quality and dose can be achieved using many different combinations of scan parameters.

In light of the increase in the number of CT exams performed in the US, concerns about variability in doses and/or image quality used by different practices or scanner models to accomplish similar diagnostic tasks, **and several unfortunate cases of patient injury due to the use of improper scan protocols**, the AAPM is committed to the publication of a set of *reasonable* scan protocols for frequently performed CT examinations, summarizing the basic requirements of the exam and giving several model-specific examples of scan and reconstruction parameters. This work is the charge of the **Working Group on Standardization of CT Nomenclature and Protocols**, whose membership includes academic and consulting medical physicists who specialize in CT imaging, representatives of each of the major CT scanner manufacturers, and liaisons to the American College of Radiology, American Society of Radiology Technologists, and the Food and Drug Administration.

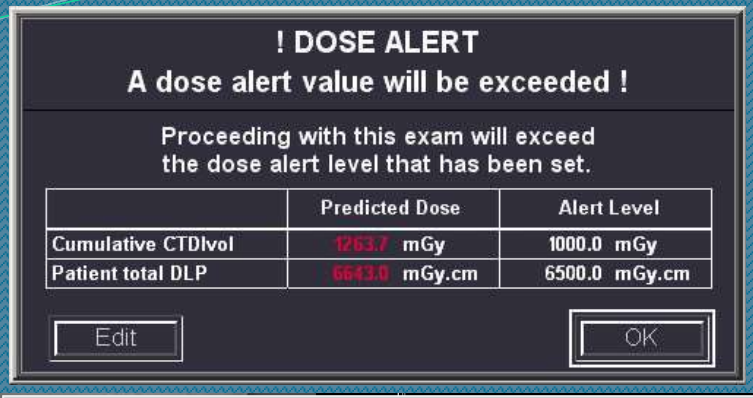
The provided protocols are considered by the Working Group to be reasonable and appropriate to the specified diagnostic task. The settings provided are representative of typical clinical values and they may not always match default protocols.

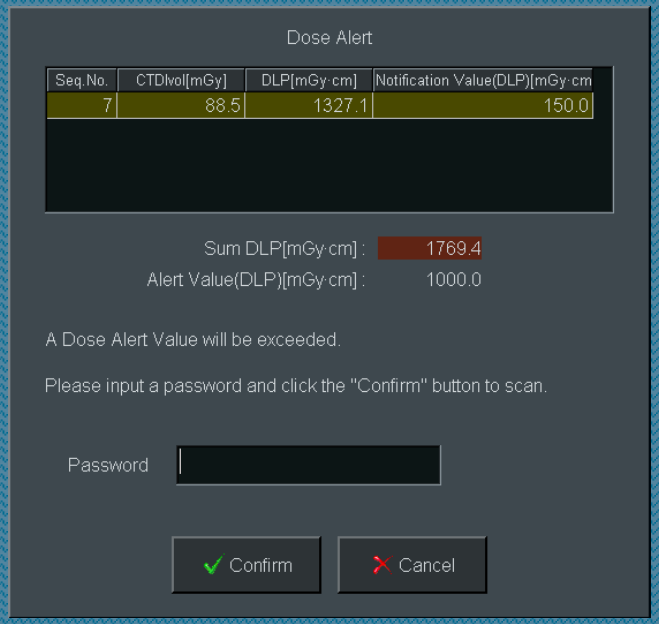
The provided protocols represent a *sampling* of currently available scanner models. They are not intended to provide comprehensive information for all available scanner models.

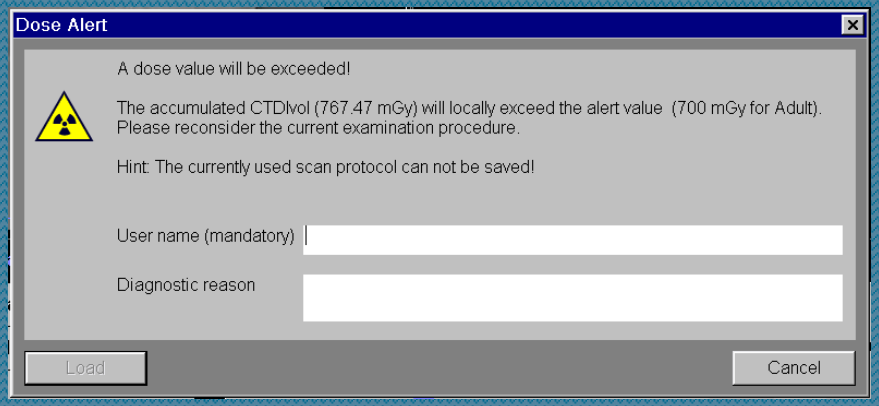
CT Dose Check Feature

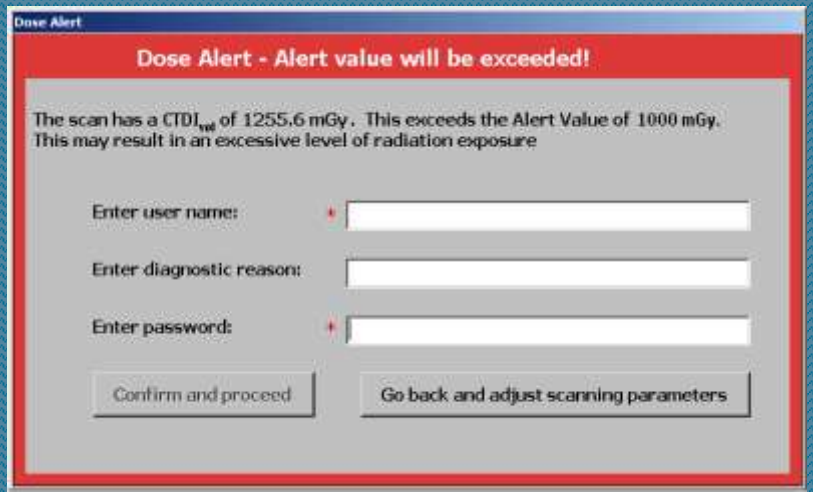
- New MITA Standard
- Intended to serve as safety feature on new scanners
- Two levels of dose checking:
  - Alert: 1 Gy (for entire exam)
  - Notification (for each pass over patient)
- Dose check levels are adjustable by site
- May include protocol parameter export feature

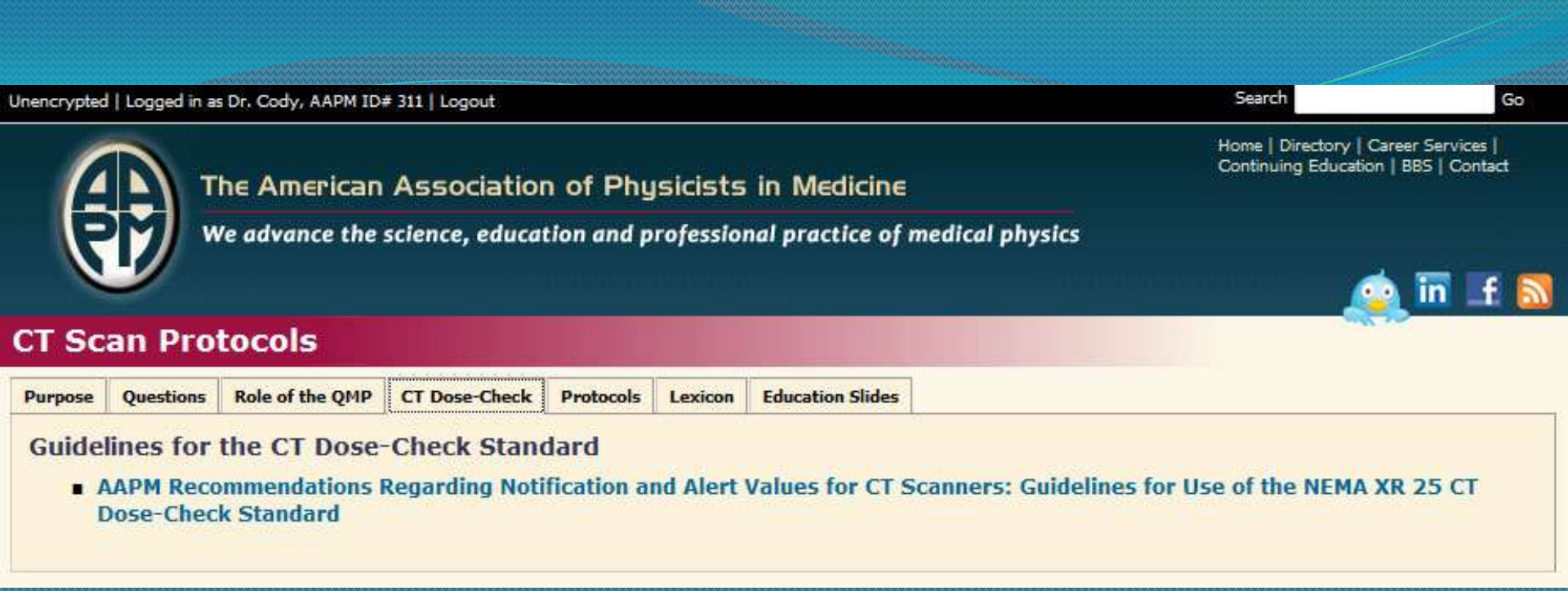
New Feature – CT Dose Check











Link opens document with information about the CT Dose Check software (how it is intended to be used, etc.), and a table of suggested notification values to use as a starting point.

Workflow impact

- Overall goal is to alert the CT technologist before a relatively high-dose exam is performed
- What is ‘relatively high’ may be site & exam specific
- Initial suggested notification values will likely need adjustment at each site in order to be useful.

Workflow impact

- If dose notification value is set too low, it will occur too frequently, will be readily ignored, ceasing to be a safety measure…
- If dose notification value is set too high, it will never occur, and will not act as a safety measure…

Table 1: Notification Values recommended by the AAPM Working Group on Standardization of CT Nomenclature and Protocols

CT Scan Region (of each individual scan in an examination)	CTDIvol Notification Value (mGy)
Adult Head	80
Adult Torso	50
Pediatric Head	
<2 years old	50
2 – 5 years old	60
Pediatric Torso	
<10 years old (16-cm phantom)[a]	25
<10 years old (32-cm phantom)[b]	10
Brain Perfusion (examination that repeatedly scans the same anatomic level to measure the flow of contrast media through the anatomy)	600
Cardiac	
Retrospectively gated (spiral)	150
Prospectively gated (sequential)	50

MDA: 53mGy abd/pelv

CT Dose Check

- This feature was recommended by the FDA in response to over exposure incidents
- Will very likely require careful consideration and regular review
- Appearing on newer model CT scanners
- Have list feature for all instances of exams exceeding the NV and AV
- Requires access at scanner (not available remotely)

Texas regulations

- Require sites to establish “reference” value for each CT exam
- Require sites to monitor patients and identify those whose dose has exceeded the “reference” value
- Have determined max CTDIvol for our GE CT scanners for most exams
- Intend to use 110% of that value as our notification value for both GE & Siemens CT scanners
- Will use CT Dose Check feature to comply with regs

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CT Scan Protocols

Available Protocols

Adult Protocols

- Routine Adult Chest CT (added 11/20/2012) [Give Feedback]
- Routine Adult Abdomen/Pelvis CT (added 10/17/2012) [Give Feedback]
- Routine Adult Head CT (added 06/01/2012) [Give Feedback]
- Routine Adult Brain Perfusion (updated 05/22/2012) [Give Feedback]

Your feedback regarding the content of this website is welcome. Feedback regarding this website will not be monitored daily. **Users experiencing problems in performing an exam should contact their service provider.**

Scanner Protocols

- Peer review process
- Protocol reference for sites to confirm their approach is reasonable
- NOT intended to reflect "optimized" set of parameters
- NOT intended to reflect "recommended" set of parameters

Reasonable Reference!

Manufacturers Represented

- General Electric
- Hitachi
- Neurologica
- Neusoft
- Philips
- Siemens
- Toshiba

- Newest model scanners, plus several previous models

ADULT BRAIN PERFUSION CT

Indications

Suspected acute infarction;
Assessment of reperfusion after treatment of acute stroke;
Vasculitis;
New neurological symptoms after subarachnoid hemorrhage suggesting vasospasm;
Evaluation of the hemodynamic significance of a carotid stenosis;
Transient ischemic attack;
Evaluation of the cerebral vascular reserve using acetazolamide challenge;
Evaluation of brain perfusion after significant head trauma;
Brain tumor.

Diagnostic Task

- Detect brain ischemia in stroke, transient ischemic attack, vasculitis;
- Distinguish already-infarcted brain from brain at risk of infarction;
- Identify regions of brain made ischemic by vasospasm;
- Detect altered brain perfusion downstream a significant carotid stenosis;
- Assess altered cerebral vascular reserve in patients with ischemic symptoms;
- Assess altered cerebral perfusion after traumatic brain injury;
- Identify early brain tumor recurrence and higher-grade tumor components.

Key Elements

- Time-resolved scans are used to track the flow of iodinated contrast media through the brain;
- Multiple images (20-40) are acquired over the same section of anatomy;
- Patients must be able to remain still during the exam in order to avoid motion misregistration;
- The table may remain stationary during the entire exam, or move back and forth between a few table positions;
- Whole-brain perfusion CT can be accomplished using CT systems with wide detector arrays (8-16 cm); alternatively, scan modes that move the patient back and forth over the desired scan volumes can be used;
- Acquisitions are repeated at predetermined time intervals (e.g. every second to every 2-3 seconds) for a predetermined duration (e.g. 40-90 seconds);
- Relatively thick image widths are used to minimize image noise (5-10 mm is common);
- Image quality is inferior to a routine head CT. That is, images are noisier and thicker.
- Data are used to generate color maps of hemodynamic significance:
  --Blood volume (BV) and flow (BF), mean transit time (MTT), time to peak perfusion (TPP);
- A non-contrast-enhanced head CT and/or a CT angiogram may be combined with a perfusion CT scan.

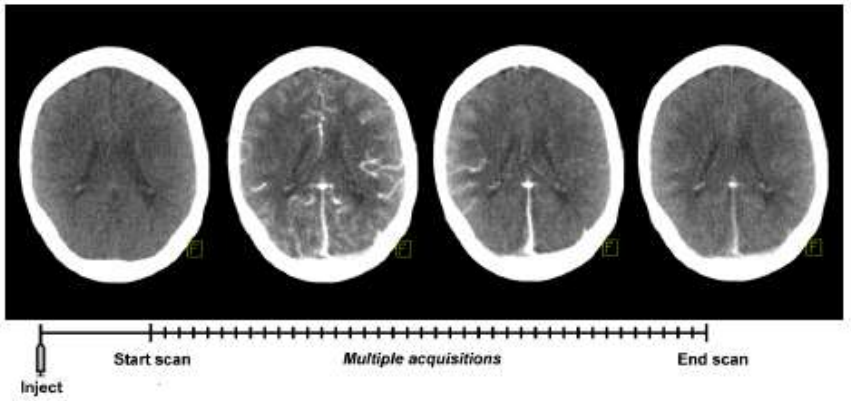
Dose Management

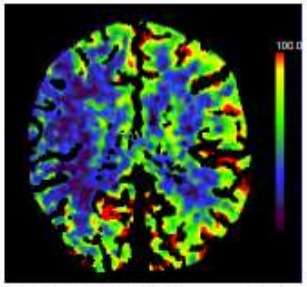
- 80 kV should be used to increase iodine signal brightness;
- Low dose per single scan (i.e. one tube rotation) is critical, since repeated scanning will result in a relatively high cumulative dose;
- Time interval between scans, and hence the total number of scans over the exam duration, should be set carefully, taking into account the analysis algorithm (some approaches require relatively dense data points);
- Dose (tube current) modulation should not be used, as it may interfere with the calculation of the BV and BF parameters;

Additional Resources

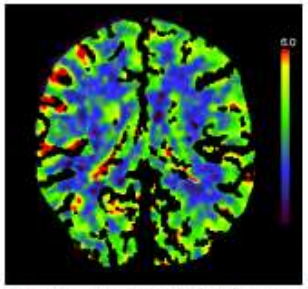
- ACR Practice Guideline for the Performance of Computed Tomography (CT) Perfusion in Neuroradiologic Imaging. (www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines/dx/head-neck/ct_perfusion.aspx);
- AJNR Special Collection. Radiation Dose in Neuroradiology CT Protocols. Collection Editors: Max Wintermark and Michael H. Lev (available at www.ajnr.org/specCol/specCollPCTToc.dtl).

BRAIN PERFUSION CT: Sample Images

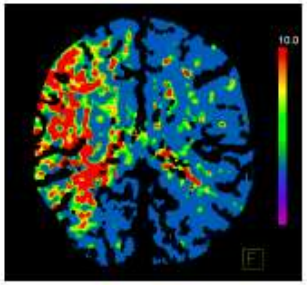




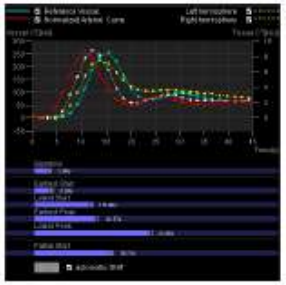
Cerebral Blood Flow (CBF, in mL/100 g/min)



Cerebral Blood Volume (CBV, in mL/100 g)



Mean Transit Time (MTT, in seconds)



Peak Enhancement Curves

Adult Head Protocol

AXIAL SCANS	CHARACTERISTICS	HELICAL SCANS
Slightly longer	Acquisition Time	Slightly shorter
Less artifacts in some cases, especially for < 16 detector row scanners	Artifacts	More artifacts for < 16 detector row scanners; close to or equivalent to axial for ≥ 64 detector row scanners
Better in some cases, especially for < 16 detector row scanners	Image Quality	Equivalent in many cases; close to or equivalent to axial for ≥ 64 detector row scanners
Depends more on protocol than on axial or helical	Radiation Dose	Depends more on protocol than on axial or helical
Present in both helical and axial scans	Over Beaming (x-ray beam extending beyond the edge of active detector rows)	Present in both helical and axial scans
None or very little over ranging (limited to that caused by over beaming)	Over Ranging (irradiation of tissue inferior and superior to desired scan range)	Helical scans all have over ranging[2]. Some scanners have features that minimize this
Detector configuration is often narrower than for body scans	Detector Configuration (N x T mm)	Detector configuration is often narrower than for body scans
Limited to thicknesses allowed by detector configuration	Image Thickness	Limited to thicknesses allowed by detector configuration

Characteristic	Single Acquisition	Split Acquisition
X-ray tube load	May be too high for some patient/scanner combinations	Usually can accommodate larger patients more readily
AEC	Usually a single image quality parameter is required for the entire image span (future scanners may allow for different Image Quality settings in each region)	Image quality and radiation dose can be customized for each region (chest/abd/pelvis) of the exam
Anatomic discontinuities	Not an issue – a single acquisition guarantees smooth transitions between regions (chest/abd/pelvis) in axial, coronal, and sagittal views	May be some anatomic discontinuities at the boundaries of the different regions (chest/abd/pelvis) in axial and reformatted images, reformatted image sets might be split
IV contrast timing	May require a compromise of IV contrast for all regions (chest/abd/pelvis)	Can be adjusted for optimal IV contrast in each region (chest/abd/pelvis)
Scan (exposure) overlap	Not an issue	Overlap of scan regions results in an increase in overall radiation exposure
Exam splitting for interpretation by different radiologists.	May require manual intervention by the CT technologist	Likely to be a more efficient process
Breath hold	May be too difficult for patients to hold their breath during the entire acquisition interval, resulting in some motion artifact	Patients should more readily perform a breath hold for each separate acquisition event

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BRAIN PERFUSION CT (Selected SIEMENS Scanners)

GENERAL: This protocol may include an optional, non-contrast-enhanced head scan and/or an optional head CT angiogram
Center the table height, such that the external auditory meatus is located at the center of the gantry.
The patient's chin should be tilted toward the chest (i.e. in a "tucked" position).

CONTRAST: **Oral:** None.
IV: 40 mL of 350 mg/cc concentration contrast media at 4 mL/sec followed by 30 mL saline at 4 mL/sec
Preferred injection site: 18–20 gauge IV placed in right antecubital vein

TOPOGRAM: PA and Lateral, 512 mm coverage, 120 kV, 1
(CT Radiograph)

BRAIN PERFUSION CT:
This scan is performed for a continuous 40 or
The radiologist will determine the scan range
No Gantry Tilt for the periodic spiral (ada

SIEMENS	Sensation 64	
Scan Type	Multiscan (Cine)	
Rotation Time (s)	1.0	
Table Motion	None	In
Collimation	24 x 1.2 mm	
Coverage per Rotation (mm)	28.8	
Scan Range (mm)	28.8	
Cycle Time	1.0 (continuous)	
Pitch	---	
Feed (mm/rot)	---	
kVp	80	
Effective mAs	270	
CARE Dose 4D	OFF	
Scan Field (mm)	200	
Prep Delay (s)	5	
Scan time (s)	40	
CTDI-vol (mGy)	433	
Base Protocol	NeuroPCT	

RECONSTRUCTION	
Kernel	
Slice (mm)	
Increment (mm)	
FOV (mm)	
Window width/window center	

Perfusion computations are performed on an image-processir

BRAIN PERFUSION CT (Selected GE Scanners)

GENERAL: This protocol may include an optional, non-contrast-enhanced head scan and/or an optional head CT angiogram.
Center the table height, such that the external auditory meatus is located at the center of the gantry and the landmarked at the level of the canthomeatal line (S0). The patient's chin should be tilted toward the chest (i.e. in a "tucked" position) to minimize the amount of tilt needed to better avoid the eyes especially for modes that do not support tilt.
Perfusion protocols are for adults; modifications must be done for pediatrics.

CONTRAST: **Oral:** None.
IV: 40 ml of 350 -370 mg/cc concentration contrast media at 4 ml
Preferred injection site: 18–20 gauge IV in right antecubital vein
Optional second level can be examined after a 5 to 10 min delay.

SCOUT: PA and Lateral, 200 mm coverage, 120 kV, 10 mA.
(CT Radiograph)

BRAIN PERFUSION CT:
The radiologist will determine the scan range, referring to any pre
The injection rate and volume of contrast directly affects the durat
these factors and patient cardiac output for appropriate scan delay
If a second location is desired, the start location of this group will

Perfusion computations are performed on an image-processing wo

Option 1: Axial mode (non-continuous axial acquisitions).

GE	LightSpeed and BrightSpeed 4/8 slice	LightSpee BrightSpeed
Scan Type	Axial	Axia
Rotation Time (s)	1	1
Detector Rows	16	16
Exam Duration (s)	44	44
Total Exposure Time (s)	22	22
kVp	80	80
Manual mA	150	150
AutomA/SmartmA	OFF	OFF
SFOV	Head	Head
Prep Delay (s)	5	5
ISD (s)	1	1
DFOV (cm)	25	25
Image Thickness	5mm x 4i	5mm x
Interval (mm)	0	0
Reconstruction Algorithm	Standard	Standa
ASiR		
Coverage (mm)	20	20
Temporal Sampling (s)	2	2
CTDI-vol (mGy)	200 @ 150 mA	220 @ 15

BRAIN PERFUSION CT (Selected PHILIPS Scanners)

GENERAL: These protocol parameters should not be used for pediatric patients.

CONTRAST: **Oral:** None.
IV: For Non-Jog scans: 40–50 mL contrast, followed by 20–40 mL saline
For Jog Mode scans: 70 mL contrast, followed by 45 mL saline
For all scans: Injection rate of 4–6 mL per second, 18–20 gau

Option 1: Non-Jog Mode.

	Brilliance 16 slice	Brilliance 40/64 slice	
Rotation Time (s)	0.5	0.5	
Collimation	16 × 1.5 mm	32 × 1.25 mm	32
Coverage (mm)	24	40	
kVp	90	80	
mAs	125	125	
ACS/DOM	OFF	OFF	
Cycle Time (s)	2.0	2.0	
Cycles	30	30	
Thickness (mm)	6.0	5.0	
Increment (mm)	0.0	0.0	
Resolution	Standard	Standard	
FOV (mm)	250	250	
Filter	UB	UB	
WC/WL	80/40	80/40	
CTDI-vol (mGy)	240	132	

Option 2: Jog Mode (Table moves back and forth between two position

	Brilliance 16 slice	Brilliance 40/64 slice	
Rotation Time (s)	0.5	0.5	
Collimation	16 × 1.5 mm	32 × 1.25 mm	32
Coverage (mm)	48	80	
kVp	90	80	
mAs	125	125	
ACS/DOM	OFF	OFF	
Cycle Time (s)*	4	4	
# of Jog Cycles	15	15	
Thickness (mm)	6.0	5.0	
Increment (mm)	0.0	0.0	
Resolution	Standard	Standard	
FOV (mm)	250	250	
Filter	UB	UB	
WC/WL	80/40	80/40	
CTDI-vol (mGy)	120	66	

* Cycle time represents the time from the start of one scan to t
over the same piece of anatomy (i.e., the sampling interval of
For the 4 s cycle time, the manufacturer's perfusion analysis s
rather than absolute, perfusion parameters. Absolute, quantita
are reported for cycle times less than or equal to 2.5 s.

BRAIN PERFUSION CT (Selected TOSHIBA Scanners)

GENERAL: This protocol may include an optional, non-contrast-enhanced head scan and/or an optional head CT angiogram
Center the table height, such that the external auditory meatus is located at the center of the gantry.

CONTRAST: **Oral:** None.
IV: 50 mL of 370 mg/cc concentration contrast media @ 5-6 mL/sec followed by 50 mL saline at 5-6 mL/sec
Preferred injection site: 18–20 gauge IV placed in right antecubital vein

SCANOGRAM: PA and Lateral, 240 mm coverage, 120 kV, 50 mA. caudo-cranial direction.
(CT Radiograph)

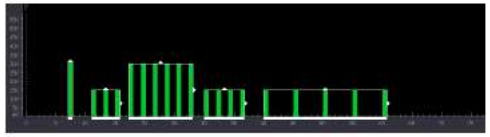
BRAIN PERFUSION CT:
This scan is performed for 60 seconds.
The radiologist will determine the scan range, referring to any previously-acquired (optional) scanned series for the Aquilion Premium. For the Aquilion ONE, the entire head is covered.

Toshiba	Aquilion Premium	Aquilion ONE
Scan Type	Dynamic Volume Intermittent	Dynamic Volume Intermittent
Rotation Time (s)	0.75	0.75
Table Motion	None	None
Collimation	160 x 0.5mm	320 x 0.5 mm
Coverage per Rotation (mm)	80	160
Scan Range (mm)	80	160
Acquisition Interval*	2 s initially, then 5 s	2 s initially, then 5 s
kVp	80	80
mA*	150	300 (arterial phase), 150 (elsewhere)
SURE Exposure	OFF	OFF
Scan Field (mm)	240	240
Delay after injection (s)	7	7
Scan Time (s)	53	53
CTDI-vol (mGy)	122	162

RECONSTRUCTION	Aquilion Premium	Aquilion ONE
Start	Radiologist selects location	Below base of skull
End		Vertex
Kernel	41	41
Slice (mm)	0.5	0.5
Increment (mm)	0.5	0.5
FOV (mm)	240	240

Perfusion computations are performed on an image-processing workstation after scan completion.

*The image below shows the scan protocol for the Aquilion ONE. Each green bar represents a volume scan. The mA is increased for the arterial portion of the scan to provide improved image quality for the digitally subtracted angiogram (DSA) image.



Work in progress…

- More routine CT exams:
  - Lung Screening CT
  - Chest-Abdomen-Pelvis CT
  - Pediatric Head CT
- On the to-do list:
  - Pediatric Chest CT
  - Pediatric Abdomen-Pelvis
  - CT Coronary Calcium Scoring CT

The American Association of Physicists in Medicine

We advance the science, education and pro ional practice of medical physics

CT Scan Protocols

Purpose | Questions | Role of the QMP | CT Dose-Check | Protocols | Lexicon | Education Slides

Statement of Purpose

The American Association of Physicists in Medicine (AAPM) is a professional organization whose members include board-certified medical physicists who specialize in the safe and effective use of radiation in medicine. Medical physicists partner with radiologists, technologists, regulators, manufacturers, administrators and others to ensure that CT scans are performed using the minimum amount of radiation required to obtain the diagnostic information for which the CT scan was ordered.

The collection of settings and parameters that fully describe a CT examination is referred to as the exam *protocol*. These protocols specify how data collection and reconstruction, patient positioning and contrast administration are to be performed. The effect of these settings on the final exam quality or dose can be dramatic; a number of the settings are inter-related, where changing one parameter can require adapting several other parameters if image quality and/or dose are to be maintained at a specified level. Thus, the quality and dose of a CT exam are largely predetermined by the protocol used. In CT, there is however no single protocol that is "the correct protocol"; acceptable image quality and dose can be achieved using many different combinations of scan parameters.

In light of the increase in the number of CT exams performed in the US, concerns about variability in doses and/or image quality used by different practices or scanner models to accomplish similar diagnostic tasks, **and several unfortunate cases of patient injury due to the use of improper scan protocols**, the AAPM is committed to the publication of a set of *reasonable* scan protocols for frequently performed CT examinations, summarizing the basic requirements of the exam and giving several model-specific examples of scan and reconstruction parameters. This work is the charge of the **Working Group on Standardization of CT Nomenclature and Protocols**, whose membership includes academic and consulting medical physicists who specialize in CT imaging, representatives of each of the major CT scanner manufacturers, and liaisons to the American College of Radiology, American Society of Radiology Technologists, and the Food and Drug Administration.

The provided protocols are considered by the Working Group to be reasonable and appropriate to the specified diagnostic task. The settings provided are representative of typical clinical values and they may not always match default protocols.

The provided protocols represent a *sampling* of currently available scanner models. They are not intended to provide comprehensive information for all available scanner models.

CT Nomenclature

- Many CT scan parameters are quite vendor specific
- Results in major challenges for operators (physicists & radiologists) facing deployment of a scanner from a vendor new to them
- Long term goal – to work with the CT vendors and develop a common generic vocabulary of parameters
- Short term goal – to develop an easily accessible translator (lexicon) for current CT terminology

Table of Contents

1. Scan acquisition and user interface basics

Generic description	GE	PHILIPS	SIEMENS	TOSHIBA	HITACHI	NEUSOFT	NEUROLOGICA
The portion of the **user interface** where scans are prescribed	Exam Rx	Scan Procedure	Examination	eXam Plan	Scan Protocol	Scan Procedure (Neuviz 16); Main Scan Interface (Neuviz DUAL)	Scan protocol
Other portions of the **user interface**, such as were reconstructed images are viewed	Desktop	Active viewer	Various "task cards", such as "Viewing"	Active display	Image Viewer	Image Display Area (Neuviz 16); Viewer (Neuviz DUAL)	Desktop
CT localizer radiograph (i.e. the scanned projection radiograph, often acquired by the CT system to allow the user to prescribe the start and end locations of the scan range)	Scout	Surview	Topogram	Scanogram	Scanogram	Surview	Scout
Axial scan mode: Data acquisition while the patient table remains stationary; the table position may be incremented between x-ray exposures to collect data over a longer z axis range.	Axial	Axial	Sequence	Scan & View, Scan & Scan, Volume, Wide Volume (Aquilion One)	Normal	Axial	Axial
Helical or Spiral scan mode: Data acquisition while the patient table is continuously moving along the z axis.	Helical	Helical	Spiral	Helical	Volume	Helical	Helical

CT Lexicon is Publicly Available

- Useful when learning the ropes on a scanner new to the clinic (translating terms across vendors)
- Useful as teaching points for technologists

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Educational Materials

- Publicly available
- Specific to radiation dose in CT – generic version is now available for download
- Future (VERY SOON) - From each vendor
- How the acquisition parameters work
  - What can you expect when this parameter is increased or decreased?
  - What is the impact of each parameter to image quality and dose?

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Computed Tomography Radiation Dose Education Slides

The Power Point slides that are accessible through the following link deal with factors that affect radiation dose in CT studies. They may be used as a resource for developing presentations on this topic.

AAPM Computed Tomography Radiation Dose Education Slides 09/06/2012

AAPM Working Group on Standardization of CT Nomenclature and Protocols

CT Safely

AAPM Computed Tomography Radiation Dose Education Slides

Many of the terms used in these slides can be found in the CT Terminology Lexicon

http://www.aapm.org/pubs/CTProtocols/documents/CTTerminologyLexicon.pdf

Topics covered in slide set

- What is dose?
  - CTDIvol vs patient dose
  - Patient size and dose
- CT scan acquisition parameter settings
- Tube current modulation
- CT Dose display

Purpose?

- Use these slides!
- Edit them at will! (Vendor version – more restricted)
- Save them!
- Re-use them!
- Supplement (or replace) your current presentation materials

FDA Award – June 10, 2013

- CDRH Director's Special Citation Award
- "For developing CT imaging radiation safety instructional materials through a collaboration of end-users, CT manufacturers, and the Food and Drug Administration"

- "… outstanding example of what can be accomplished through collaboration of key stakeholders…"

Brian Abraham (MITA) Cody (AAPM) Don Fickett (Neurologica) Thalia Mills (FDA)


Center for Devices and Radiological Health
CDRH
2013
DIRECTOR'S SPECIAL
CITATION AWARD
presented to the
Computed Tomography
(CT) Nomenclature
Working Group
FDA