



The Technologist's Role in CT Protocol Reviews

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Goal of a Protocol

- Communication of information such that a technologist can successfully perform a scan that meets the...
 - Imaging requirements of the exam
 - “Best practice” requirements
 - Appropriate dose (radiation and contrast material)
 - No errors, no repeats, etc.
 - Positive patient experience
- Assume reasonable technologist competency



Roles

Radiologist

Physicist





Radiologist's Protocol

ABDOMEN & PELVIS - ROUTINE

INSTRUCTIONS:

Abdomen & pelvis scan with contrast

ABDOMEN & PELVIS - ROUTINE

INSTRUCTIONS:

Scan from top of liver to pubic symphysis
5mm contiguous slices
Liver enhancement at 70s
Coronal recons at 3mm with 2.5mm spacing

- Some know scanners well, others not-so-much
- All know what they need for images



Physicist's Protocol

- Some know clinical well, others not-so-much
- Know technical specs for imaging goal

ABDOMEN & PELVIS - ROUTINE

INSTRUCTIONS:

Manufacturer	Siemens
Model	Sens-64
Software Version	VB40
Scan Type	Spiral
Rotation Time (s)	0.5
Det. Config.	64 x 0.6
Flying Focal Spot	Yes
Collimation (mm)	19.2
Pitch	1.2
Feed (mm/rot)	23
kVp	120
mA	576
Quality Ref. mAs	240
Slice Thickness (mm)	5
Interval (mm)	5
CARE Dose4D	On
Prep Delay (s)	70
Min. Retro (mm)	0.6
CTDI (mGy)	18
DLP (mGy-cm)	1080
Base Protocol	Abd Routine



Radiologist's & Physicist's Protocol

- Good start!
- Not quite complete
- Much room for error and variability
- What's missing?

ABDOMEN & PELVIS - ROUTINE

INSTRUCTIONS:

Scan from top of liver to pubic symphysis using the table below. Liver enhancement at 70s.

Coronal recons at 3mm with 2.5mm spacing.

Manufacturer	Siemens
Model	Sens-64
Software Version	VB40
Scan Type	Spiral
Rotation Time (s)	0.5
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Base Protocol	Abd Routine



Technologist's Role: Content

- Patient handling & positioning
 - “Special considerations” (IVs, catheters, etc.)
- Contrast issues (with nursing)
- Scheduling, billing, recons, image transfer, etc.
- Details and big picture of

ALL THINGS WORKFLOW!

- Speak “technologist”



Technologist's Role: Content Examples

GENERAL:

The angle of femoral version is defined as the angle between the axis of the femoral neck and the transcondylar plane of the distal femur. Anterior angulation of the neck relative to the transcondylar plane is anteversion (see figure on right); neck angulation posterior to this baseline is retroversion. Normal adult values range from 8-18 degrees of femoral anteversion.



Place patient in supine position with hips and knees extended and lower limbs in a horizontal and parallel position. It is critical to prevent motion or rotation of the legs between the proximal and distal image acquisitions. Use straps and keep feet together. Put a Beekley marker on the lateral side of the right hip and knee. In the event of an emergency downtime, film the axial images 20:1

Image both lower extremities whenever possible for comparison purposes.

Patients younger than 14 yrs old, use **PEDIATRIC PROTOCOLS**

SCHEDULING RULES: 3R scanner only in any clinical Chest slot. The 3V and 3Z can be the back-up scanners (Chest slots). Total of three participants in the study.

GENERAL: This study consists of 2 topograms and 3 scans.

Check to see if this the second visit for the patient in the study. If it is, check to see what the DFOV was used for the 5mm images and 1/20mm images. The 1/20mm images should have a smaller DFOV because you are only including the lungs (rib to rib).

Practice breathing the patient on Inspiration and Expiration.

Check images for motion before proceeding to next series. Repeat all scans which contain motion artifact. The same scanning parameters are used for all 3 groups.



Technologist's Role: Content Examples

GENERAL: The way this exam is performed may change depending on the indication. Please talk with radiologist before starting this exam. Timing of steps and coordination between the nurse and technologist is critical. Read through the protocol before starting.

Supine, feet first, arm arms up or across chest.

VENOUS PHASE ONLY. NO NON-CONTRAST SCANS

TIMEOUT: Please do a timeout before starting this procedure. Check scoop; IV location; IV contrast rate, amount, type

- Before injection,
 - Place an IV in a foot vein of the symptomatic leg.
 - Set up patient. Place patient's legs on a blanket to make them level. Tape down leg without IV in it.
 - Take topogram
 - Set up scan range. Typical scan range is top of kidneys to ankles. Check with radiologist.
 - Load exam and Move patient to start location.
 - Before injection is started place a tourniquet just above the ankle malleoli. This will drive contrast into the deep veins rather than just the superficial veins.
 - Keep tourniquet on for injection
- Injection,
 - Hand inject 100 cc's Omnipaque 300 mixed in 300 cc's normal saline. (Total 400cc injected.)
 - Immediately after the injection,
 - Remove tourniquet
 - Elevate leg
 - Ask the patient to Valsalva or "bear down". This will keep the contrast in the abdominal and lower extremity veins rather than draining out into the rest of the body.
 - Lower leg and scan.
- After the scan acquisition,
 - Flush leg with 60 cc's normal saline.



Technologist's Role: Content Examples

RECON JOB	1	2	3*	4	5*	6	7	**8	**9
Series Description									
Start	Mastoid Tip	Mastoid Tip	* See instructions.	Mastoid Tip	* See instructions.	Posterior Mastoid	Posterior Mastoid	Mastoid Tip	Posterior Mastoid
End	Petrous Bone	Petrous Bone	SSC + Cochlea	Petrous Bone	SSC + Cochlea	Mid sella	Mid sella	Petrous Bone	Mid sella
Type	Bilat Axial	RT. Axial SPO	RT.SPO	LT. Axial SPO	LT.SPO	RT.SPO Coronal	LT.SPO Coronal	Bilat Axial	Bilat. Coronal SPO
Kernel	U70S	U70S	U70S	U70S	U70S	Add recon job to RT. axial. Change output box to coronal. Change label	Add recon job to LT. axial. Change output box to coronal. Change label	Add recon job to recon job 1, Change to U40	Add to recon job 8, (U40 bilat axials) U40
Slice (mm)	1.0	0.5	0.5	0.5	0.5	0.5	0.5	2	2
Increment (mm)	1.0	0.3	0.3	0.3	0.3	0.3	0.3	2	2
FOV (mm)	150	*See note(80)	*See note(70)	*See note(80)	*See note(70)	*See note(80)	*See note(80)	150	150
: -Q/-D	---	---	---	---	---	---	---	---	---
NETWORK	IAU & RADIOLOGIST								
FILMING									
Format	--	20:1	20: 1	20:1	20:1	20:1	20:1	20:1	20:1
WW, WC	4000,1000	4000,1000	4000,1000	4000,1000	4000,1000	4000,1000	4000,1000	350/40	350/40
Images	Not filmed	Every 3rd	all	Every 3rd	all	Every 3rd	Every 3rd	All	All

*Do not grab the pink box or you may change the FOV size. Loss of planning base requires a restart application. Close the exam and then do the restart.

** Recon jobs 8 & 9 are only done when contrast is given.

Use the preview button in the planning base to check for adequate coverage.



Technologist's Role: Content Examples

Axial SPO Instructions & examples on next page): Keep free mode off when entering.

1. Move blue line in coronal port to visualize the semicircular canal in the axial port.
2. Center the intersection of the green & red lines in the axial port to the center of the semicircular canal.
3. Turn on free mode. From the sagittal port, grab the blue line and tilt to visualize "donut". Range Mastoid Tip-top PB

SSC Instructions (see SAMPLES on next page): Keep free mode off when entering.

1. In Axial port (blue), move the green line to visualize the IAC in the Coronal port (green).
2. In Coronal port (green) move the blue line to just above the IAC to visualize the semicircular canals (two dots) in the Axial port (blue).
- 3a. Back to the axial port. Put the intersection of green (coronal) line & red line in between the semicircular canals (two dots).
- 3b. Still in the Axial port, align the semicircular canals (two dots) with the red (sagittal) line. Use the Sagittal port to visualize the results of your alignment. You will see a "donut".
4. Move back to the Coronal port. Adjust the red line to better visualize the "donut" in the sagittal port. Range is medial to lateral. SSC & Cochlea
5. Hit recon.

Coronal Instructions: Keep free mode off when entering.

RT. Coronal:

1. Click on RT. Axial SPO (Recon job 2). Right click & add recon job. Click on the coronal port to activate it. **Do not change angle!**
2. In the planning base click on the pink out put box (set FOV segment). Set images to be Posterior to Anterior.
3. Make sure free mode (tilt) is off. Adjust image range box to include posterior mastoid to mid Sella.
4. Change comment to **RT. Coronal. Description to RT coronal.**
5. Go to auto tasking & change the following: Filming every 3rd, turn on network destinations.
6. Hit recon.

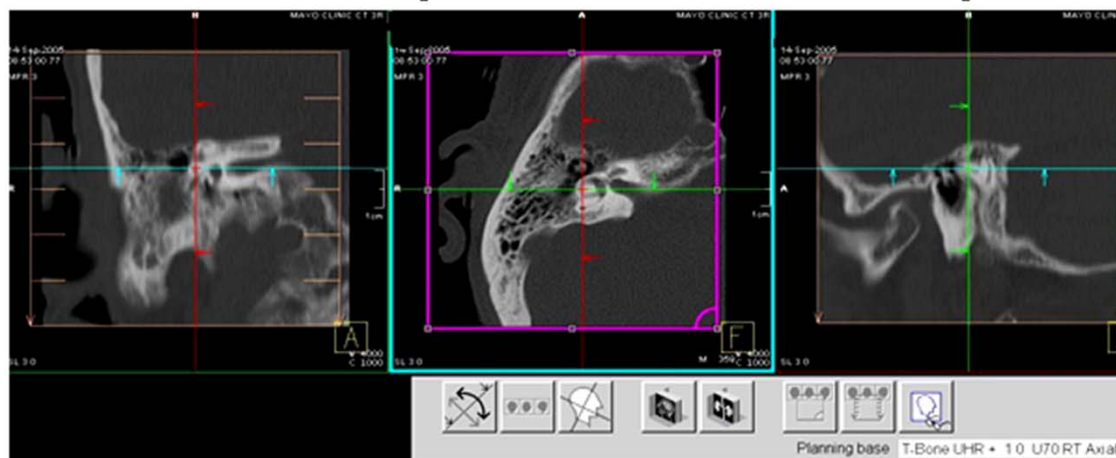
LT. Coronal:

1. Click on the LT. Axial SPO (Recon job 4). Right click & add recon job. Click on the coronal port to activate it. **Do not change angle!**
2. Follow the above steps but mark images **Left Coronal.**

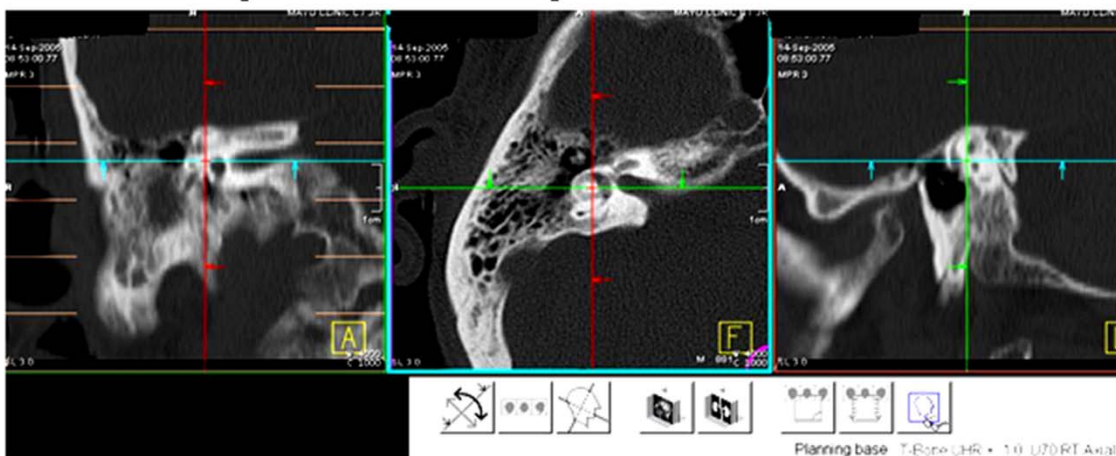


Technologist's Role: Content Examples

1. Turn free mode off. Move blue line in coronal port to visualize the semicircular canal in the axial port.



2. Center the intersection of the green & red lines in the axial port to the center of the semicircular canal.



3. Turn on free mode. From the sagittal port, grab the blue line and tilt to visualize "donut." Range Mastoid Tip-top PB





Technologist's Role: Content Examples

ABDOMEN ONLY CHARGES

CHARGE	# Charges	# Sequences	w/o contrast	with contrast	w & w/o contrast
Top of liver to crest: Abdomen	1	1	CT 4100	CT 4100	CT 4100
Abd Lmt'd (approx. < 10 cm scan length)	1	1	CT 4100	CT 4100	CT 4100

ABDOMEN and PELVIS CHARGES (each is 1 charge and 1 sequence)

ABDOMEN COMPONENT	PELVIS COMPONENT		
	+ Pelvis w/o contrast	+ Pelvis with contrast	+ Pelvis w & w/o contrast
Abd w/o contrast...	CT 4100	CT 4100	CT 4100
Abd with contrast...	CT 4100	CT 4100	CT 4100
Abd w & w/o contrast...	CT 4100	CT 4100	CT 4100



Roles

Desk Attendants

Scheduling

Radiologist

Physicist

Nursing

Billing

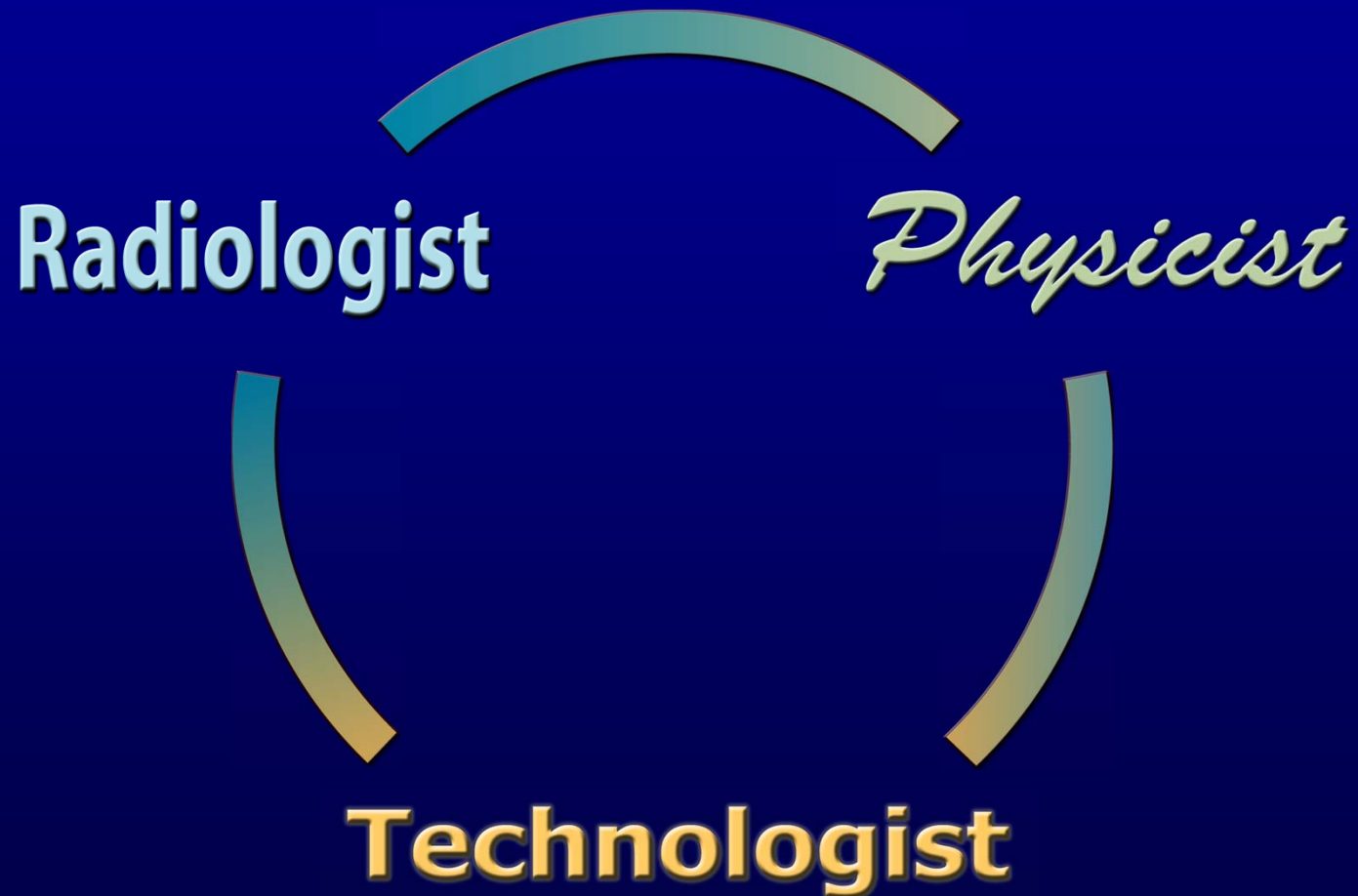
Assistants

Technologist





Core Team for all Protocols





Choosing the Core Team

- Varies by size of practice & resources
- Radiologist
- Physicist
- Protocol Technologist
 - One or a few protocol “specialists”
 - Mayo: Lead CT technologists (by division)
- Consistent group(s)



Protocol Process Overview

Proposal (new or modification)



Draft



Pre-flight or phantom testing



Approval



Implementation



Documentation



Protocol Process: Technologist's Role

- Center of the protocol process
- First contact for new protocols and modifications
 - Triage to appropriate people or group, if necessary
 - Centralizes protocol activity
- Author first drafts and iterations
 - Consulting with others
- Assist in pre-flights
 - Directly or indirectly



Protocol Process: Technologist's Role

- Seek appropriate approvals
 - Division chair, liaison, etc.
- Finalize and distribute protocol
 - To scanners (electronically or printed)
 - In scanners
 - Limit access to scanner protocols
 - Mayo: ONLY leads can change protocols



Protocol Process: Technologist's Role

- Responsible for all documentation
 - “Keeper” of all electronic files
 - File naming and directory structure convention
 - Limit access to “master” protocol files
 - Maintain history of protocol changes
 - Change, justification, date
 - Major changes, retired protocols archived
 - Tedious but essential



Protocol Process Overview

Proposal (new or modification)



Draft



Pre-flight or phantom testing



Approval



Implementation



Documentation

**Technologist's
Responsibility**



Conclusions

- The Protocol Technologist
 - Provide unique and valuable insight and experience.
 - Should be the center of the protocol process.
 - Caretaker of the protocol collection.
 - Is an integral member of the protocol team.



Protocol Process Overview

**Some Samples of
Mayo Protocol Materials**



Mayo Protocol

PROTOCOL 02_0

SIEMENS 16 40 64 Def 64 Def-AS+ F-128

04/06/10

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LIST

CHEST – ROUTINE

GENERAL: For patients equal to or less than 45 kgs, and under, use the **Pediatric technique**.

Patient supine, arms above head on pillow.

NOTES: Recon 2 is a volumetric high resolution chest CT.

An optional recon for nodule thin cuts per radiologist request is available (Recon 3) and the position of these should be directed by the radiologist.

Low dose techniques should be used if additional expiratory and/or prone high resolution images are requested. The full dose imaging should only be done at the specific request of the radiologist.

This protocol includes the parameters needed for all 3D reconstructions of the chest including Virtual Bronchoscopy, Super Dimension Bronchus and Breast Implant Evaluation. Recon 2, HiRes Chest needs to be networked to the 3D lab. The additional images performed by the 3D lab requires a 3D charge, but the acquisition and reconstruction protocols are the same as a routine chest CT.

CONTRAST: Oral. None.

IV. Use 80cc at 3.0 cc/s of Omnipaque 300 (all scanners) if indicated by radiologist.

TOPOGRAM: PA, 512; **STOP SCAN** when through lungs.

CHEST SCAN: Scan from top of lungs through the bottom of lungs. Scan through the adrenals if the indication is lung cancer or if requested by the radiologist. Instruct patient to hold breath at inspiration during entire scan.

SIEMENS	Sens-16	Sens-40	Sens-64	Def-64	Def-AS+	F-128
Scan Type	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral
Rotation Time (s)	0.5	0.5	0.33	0.33	0.33	0.28
Collimation	16 x 0.75	40 x 0.6	64 x 0.6	64 x 0.6	128 x 0.6	128 x 0.6
Pitch	1.1	1.15	0.9	0.9	0.9	0.9
Feed (mm/rot)	13.2	13.2	17.8	17.8	34.6	34.6
kVp	120	120	120	120	120	120
Quality ref. mAs	180	140	180	180	180	180
CARE Dose4D	ON	ON	ON	ON	ON	ON
API	Inspiration	Inspiration	Inspiration	Inspiration	Inspiration	Inspiration
Prep Delay (s)	20	20	20	20	24	24
Min. Retro (mm)	0.75	0.6	0.6	0.6	0.6	0.6
CTDI (mGy)	14.04	15.02	14	12.98	12.13	12.16
Base Protocol	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine

	RECON 1	RECON 2	RECON 3	RECON 4 (optional)*
Series description	Chest Routine	HiRes Chest	MIP Chest	Thin Nodule
Type	Axial	Axial	SPO-MIP Thins	Axial
Start	Top of Lungs	Top of Lungs	Top of Lungs	Above Nodule
End	Bottom of Lungs	Bottom of Lungs	Bottom of Lungs	Below Nodule
Angle	None	None	None	None
Image Order	Cranio-caudal	Cranio-caudal	Cranio-caudal	Cranio-caudal
Kernel	B40	B40	B50	B40
Slice (mm)	5	1.5	20	2
Increment (mm)	5	1.5	10	1
FOV (mm)	Patient	Patient	Patient	150
:-Q-D	---	---	---	---
Network	IAU and Rad	IAU and Rad A3D3 if 3D needed	IAU and Rad	IAU and Rad

FILMING

Format	20:1	20:1	---	20:1
WW, WC	400/40 & 1500/-600	1500/-600	1500/-600	400/40 & 1500/-600
Images	ALL	Every 10 th image	---	ALL

* To be done upon request by radiologist.

For Virtual Bronchoscopy and Breast Implant Evaluation, call 3D Lab (4-1424).

CHARGE	# Charges	# Sequences	w/o contrast	with contrast	w & w/o contrast	with 3D recons requiring independent workstation
Lungs only: Chest	1	1	71250	71260	71270	---
Chest Lmtd (approx. < 10 cm scan length)	1	1	07213	NA	NA	---
Virtual Bronchoscopy	1	1	71250B	---	---	---
Breast Implantation Evaluation	2	1	71250	---	---	CT3D02
Lungs + adrenals: Chest with Lmtd Abd	1	1	CT510	CT511	CT512	---

Images read by radiologist scheduled on the scanner. The radiologist notes that additional 3D was performed, if applicable.



Title, Page Number, Scanners, Date

PROTOCOL 02_0

SIEMENS 16 40 64 Def_64 Def-AS+ F-128

04/06/10

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◀ LIST ▶

CHEST – ROUTINE

GENERAL: For patients equal to or less than 45 kg, and under, use the **Pediatric technique.**

[illegible]



General Info

GENERAL: For patients equal to or less than 45 kgs. and under, use the **Pediatric technique**.
Patient supine, arms above head on pillow.

NOTES: Recon 2 is a volumetric high resolution chest CT.

An optional recon for nodule thin cuts per radiologist request is available (Recon 3) and the position of these should be directed by the radiologist.

Low dose techniques should be used if additional expiratory and/or prone high resolution images are requested.

The full dose imaging should only be done at the specific request of the radiologist.

This protocol includes the parameters needed for all 3D reconstructions of the chest including **Virtual Bronchoscopy, Super Dimension Bronchus and Breast Implant Evaluation. Recon 2, HiRes Chest needs to be networked to the 3D lab.** The additional images performed by the 3D lab requires a 3D charge, but the acquisition and reconstruction protocols are the same as a routine chest CT.

CONTRAST: Oral: None

The screenshot shows a document with a red box highlighting a section. The highlighted section contains text that is partially legible, appearing to be a list of items or a table of contents. The text includes "Recon 2, HiRes Chest needs to be networked to the 3D lab." and "The additional images performed by the 3D lab requires a 3D charge, but the acquisition and reconstruction protocols are the same as a routine chest CT." The document also features a table with multiple columns and rows of data, likely representing technical parameters for the CT scan protocol.



Nursing

routine chest CT.

CONTRAST: Oral. None.

IV. Use 80cc at 3.0 cc/s of Omnipaque 300 (all scanners) if indicated by radiologist.

TOPOGRAM: PA. 512. **STOP SCAN** when through lungs.

Another example (bi-phase enterography)

CONTRAST: Oral. Nurse will give the following oral contrast to the patient.

Routine Patient	ER Patient
450mL Volumen, 60 min prior to CT	1.8-2.0 liters of water over 30min.
450mL Volumen, 45 min prior to CT	Scan the patient 75min after the start
450mL Volumen, 30 min prior to CT	of drinking water.
500 mL or 2 glasses of water, 15 min prior to CT	

IV. Use weight-based chart. Standard is 150ml Omnipaque 300 at 4cc/sec.

Needle must be in place BEFORE the patient is given oral contrast.

For large patients consult with radiologist regarding increasing contrast dosage.

Consult with radiologist regarding use of Reglan.

Good coordination is critical for this timed study.

TOPOGRAM: PA. 512. **STOP SCAN** when through pelvis.

A weight-based chart for contrast dosage, likely for CT scans. The chart is titled 'WEIGHT-BASED CHART' and includes columns for patient weight (kg and lbs), contrast volume (mL), and contrast rate (cc/sec). The chart is color-coded by weight ranges: 10-15 kg (blue), 15-20 kg (green), 20-25 kg (yellow), 25-30 kg (orange), 30-35 kg (red), 35-40 kg (purple), 40-45 kg (brown), 45-50 kg (pink), 50-55 kg (grey), 55-60 kg (light blue), 60-65 kg (light green), 65-70 kg (light yellow), 70-75 kg (light orange), 75-80 kg (light purple), 80-85 kg (light brown), 85-90 kg (light pink), 90-95 kg (light grey), 95-100 kg (light blue), 100-105 kg (light green), 105-110 kg (light yellow), 110-115 kg (light orange), 115-120 kg (light purple), 120-125 kg (light brown), 125-130 kg (light pink), 130-135 kg (light grey), 135-140 kg (light blue), 140-145 kg (light green), 145-150 kg (light yellow), 150-155 kg (light orange), 155-160 kg (light purple), 160-165 kg (light brown), 165-170 kg (light pink), 170-175 kg (light grey), 175-180 kg (light blue), 180-185 kg (light green), 185-190 kg (light yellow), 190-195 kg (light orange), 195-200 kg (light purple), 200-205 kg (light brown), 205-210 kg (light pink), 210-215 kg (light grey), 215-220 kg (light blue), 220-225 kg (light green), 225-230 kg (light yellow), 230-235 kg (light orange), 235-240 kg (light purple), 240-245 kg (light brown), 245-250 kg (light pink), 250-255 kg (light grey), 255-260 kg (light blue), 260-265 kg (light green), 265-270 kg (light yellow), 270-275 kg (light orange), 275-280 kg (light purple), 280-285 kg (light brown), 285-290 kg (light pink), 290-295 kg (light grey), 295-300 kg (light blue), 300-305 kg (light green), 305-310 kg (light yellow), 310-315 kg (light orange), 315-320 kg (light purple), 320-325 kg (light brown), 325-330 kg (light pink), 330-335 kg (light grey), 335-340 kg (light blue), 340-345 kg (light green), 345-350 kg (light yellow), 350-355 kg (light orange), 355-360 kg (light purple), 360-365 kg (light brown), 365-370 kg (light pink), 370-375 kg (light grey), 375-380 kg (light blue), 380-385 kg (light green), 385-390 kg (light yellow), 390-395 kg (light orange), 395-400 kg (light purple), 400-405 kg (light brown), 405-410 kg (light pink), 410-415 kg (light grey), 415-420 kg (light blue), 420-425 kg (light green), 425-430 kg (light yellow), 430-435 kg (light orange), 435-440 kg (light purple), 440-445 kg (light brown), 445-450 kg (light pink), 450-455 kg (light grey), 455-460 kg (light blue), 460-465 kg (light green), 465-470 kg (light yellow), 470-475 kg (light orange), 475-480 kg (light purple), 480-485 kg (light brown), 485-490 kg (light pink), 490-495 kg (light grey), 495-500 kg (light blue), 500-505 kg (light green), 505-510 kg (light yellow), 510-515 kg (light orange), 515-520 kg (light purple), 520-525 kg (light brown), 525-530 kg (light pink), 530-535 kg (light grey), 535-540 kg (light blue), 540-545 kg (light green), 545-550 kg (light yellow), 550-555 kg (light orange), 555-560 kg (light purple), 560-565 kg (light brown), 565-570 kg (light pink), 570-575 kg (light grey), 575-580 kg (light blue), 580-585 kg (light green), 585-590 kg (light yellow), 590-595 kg (light orange), 595-600 kg (light purple), 600-605 kg (light brown), 605-610 kg (light pink), 610-615 kg (light grey), 615-620 kg (light blue), 620-625 kg (light green), 625-630 kg (light yellow), 630-635 kg (light orange), 635-640 kg (light purple), 640-645 kg (light brown), 645-650 kg (light pink), 650-655 kg (light grey), 655-660 kg (light blue), 660-665 kg (light green), 665-670 kg (light yellow), 670-675 kg (light orange), 675-680 kg (light purple), 680-685 kg (light brown), 685-690 kg (light pink), 690-695 kg (light grey), 695-700 kg (light blue), 700-705 kg (light green), 705-710 kg (light yellow), 710-715 kg (light orange), 715-720 kg (light purple), 720-725 kg (light brown), 725-730 kg (light pink), 730-735 kg (light grey), 735-740 kg (light blue), 740-745 kg (light green), 745-750 kg (light yellow), 750-755 kg (light orange), 755-760 kg (light purple), 760-765 kg (light brown), 765-770 kg (light pink), 770-775 kg (light grey), 775-780 kg (light blue), 780-785 kg (light green), 785-790 kg (light yellow), 790-795 kg (light orange), 795-800 kg (light purple), 800-805 kg (light brown), 805-810 kg (light pink), 810-815 kg (light grey), 815-820 kg (light blue), 820-825 kg (light green), 825-830 kg (light yellow), 830-835 kg (light orange), 835-840 kg (light purple), 840-845 kg (light brown), 845-850 kg (light pink), 850-855 kg (light grey), 855-860 kg (light blue), 860-865 kg (light green), 865-870 kg (light yellow), 870-875 kg (light orange), 875-880 kg (light purple), 880-885 kg (light brown), 885-890 kg (light pink), 890-895 kg (light grey), 895-900 kg (light blue), 900-905 kg (light green), 905-910 kg (light yellow), 910-915 kg (light orange), 915-920 kg (light purple), 920-925 kg (light brown), 925-930 kg (light pink), 930-935 kg (light grey), 935-940 kg (light blue), 940-945 kg (light green), 945-950 kg (light yellow), 950-955 kg (light orange), 955-960 kg (light purple), 960-965 kg (light brown), 965-970 kg (light pink), 970-975 kg (light grey), 975-980 kg (light blue), 980-985 kg (light green), 985-990 kg (light yellow), 990-995 kg (light orange), 995-1000 kg (light purple).



Parameter Grid

IV. Use 80cc at 3.0 cc/s of Omnipaque 300 (all scanners) if indicated by radiologist.

TOPOGRAM: PA, 512; **STOP SCAN** when through lungs.

CHEST SCAN: Scan from top of lungs through the bottom of lungs. Scan through the adrenals if the indication is lung cancer or if requested by the radiologist. Instruct patient to hold breath at inspiration during entire scan.

SIEMENS	Sens-16	Sens-40	Sens-64	Def-64	Def-AS+	F-128
Scan Type	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral
Rotation Time (s)	0.5	0.5	0.33	0.33	0.33	0.28
Collimation	16 x 0.75	40 x 0.6	64 x 0.6	64 x 0.6	128 x 0.6	128 x 0.6
Pitch	1.1	1.15	0.9	0.9	0.9	0.9
Feed (mm/rot)	13.2	13.2	17.8	17.8	34.6	34.6
kVp	120	120	120	120	120	120
Quality ref. mAs	180	140	180	180	180	180
CARE Dose4D	ON	ON	ON	ON	ON	ON
API	Inspiration	Inspiration	Inspiration	Inspiration	Inspiration	Inspiration
Prep Delay (s)	20	20	20	20	24	24
Min. Retro (mm)	0.75	0.6	0.6	0.6	0.6	0.6
CTDI (mGy)	14.04	15.02	14	12.98	12.13	12.16
Base Protocol	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine

RECON 1

RECON 2

RECON 3

RECON 4 (optional)*





Recons, Reformats, Network, Filming

	RECON 1	RECON 2	RECON 3	RECON 4 (optional)*
Series description	Chest Routine	HiRes Chest	MIP Chest	Thin Nodule
Type	Axial	Axial	SPO-MIP Thins	Axial
Start	Top of Lungs	Top of Lungs	Top of Lungs	Above Nodule
End	Bottom of Lungs	Bottom of Lungs	Bottom of Lungs	Below Nodule
Angle	None	None	None	None
Image Order	Craniocaudal	Craniocaudal	Craniocaudal	Craniocaudal
Kernel	B40	B46	B50	B40
Slice (mm)	5	1.5	20	2
Increment (mm)	5	1.5	10	1
FOV (mm)	Patient	Patient	Patient	150
:-Q/-D	---	---	---	---
Network	IAU and Rad	IAU and Rad A3D3 if 3D needed	IAU and Rad	IAU and Rad

FILMING

Format	20:1	20:1	---	20:1
WW, WC	400/40 & 1500/-600	1500/-600	1500/-600	400/40 & 1500/-600
Images	ALL	Every 10 th image	---	ALL

*** To be done upon request by radiologist.**

For Virtual Bronchoscopy and Breast Implant Evaluation, call 3D Lab (4-1424).

Series	Protocol	Series Description	Series Type	Series Start	Series End	Series Angle	Series Order	Series Kernel	Series Slice (mm)	Series Increment (mm)	Series FOV (mm)	Series :-Q/-D	Series Network
1	Chest Routine	Chest Routine	Axial	Top of Lungs	Bottom of Lungs	None	Craniocaudal	B40	5	5	Patient	---	IAU and Rad
2	HiRes Chest	HiRes Chest	Axial	Top of Lungs	Bottom of Lungs	None	Craniocaudal	B46	1.5	1.5	Patient	---	IAU and Rad A3D3 if 3D needed
3	MIP Chest	MIP Chest	SPO-MIP Thins	Top of Lungs	Bottom of Lungs	None	Craniocaudal	B50	20	10	Patient	---	IAU and Rad
4	Thin Nodule	Thin Nodule	Axial	Above Nodule	Below Nodule	None	Craniocaudal	B40	2	1	150	---	IAU and Rad



Charges

CHARGE	# Charges	# Sequences	w/o contrast	with contrast	w & w/o contrast	with 3D recons requiring independent workstation
Lungs only: Chest	1	1	---	---	---	--
Chest Lmt'd (approx. < 10 cm scan length)	1	1	---	NA	NA	--
Virtual Bronchoscopy	1	1	---	--	--	--
Breast Implantation Evaluation	2	1	---	--	--	---
Lungs + adrenals: Chest with Lmt'd Abd	1	1	---	---	---	--

Images read by radiologist scheduled on the scanner. The radiologist notes that additional 3D was performed, if applicable.

Division: THORACIC

1

The thumbnail shows a page from a medical report, likely a CT scan report, with various sections of text and a table at the bottom. A red box highlights the table, which appears to be a summary of findings or a list of measurements. The table has multiple columns and rows, with some cells containing numerical data and others containing text descriptions.



Protocol

PROTOCOL 02_0

SIEMENS 16 40 64 Def 64 Def-AS+ F-128

04/06/10

«Home»
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CHEST – ROUTINE

GENERAL: For patients equal to or less than 45 kgs. and under, use the **Pediatric technique**.

Patient supine, arms above head on pillow.

NOTES: Recon 2 is a volumetric high resolution chest CT.

An optional recon for nodule thin cuts per radiologist request is available (Recon 3) and the position of these should be directed by the radiologist.

Low dose techniques should be used if additional expiratory and/or prone high resolution images are requested.
The full dose imaging should only be done at the specific request of the radiologist.

This protocol includes the parameters needed for all 3D reconstructions of the chest including **Virtual Bronchoscopy, Super Dimension Bronchus and Breast Implant Evaluation**. **Recon 2, HiRes Chest needs to be networked to the 3D lab**. The additional images performed by the 3D lab requires a 3D charge, but the acquisition and reconstruction protocols are the same as a routine chest CT.

CONTRAST: Oral. None.

IV. Use 80cc at 3.0 cc/s of Omnipaque 300 (all scanners) if indicated by radiologist.

TOPOGRAM: PA, 512; **STOP SCAN** when through lungs.

CHEST SCAN: Scan from top of lungs through the bottom of lungs. Scan through the adrenals if the indication is lung cancer or if requested by the radiologist. Instruct patient to hold breath at inspiration during entire scan.

SIEMENS	Sens-16	Sens-40	Sens-64	Def-64	Def-AS+	F-128
Scan Type	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral
Rotation Time (s)	0.5	0.5	0.33	0.33	0.33	0.28
Collimation	16 x 0.75	40 x 0.6	64 x 0.6	64 x 0.6	128 x 0.6	128 x 0.6
Pitch	1.1	1.15	0.9	0.9	0.9	0.9
Feed (mm/rot)	13.2	13.2	17.8	17.8	34.6	34.6
kVp	120	120	120	120	120	120
Quality ref. mAs	180	140	180	180	180	180
CARE Dose4D	ON	ON	ON	ON	ON	ON
API	Inspiration	Inspiration	Inspiration	Inspiration	Inspiration	Inspiration
Prep Delay (s)	20	20	20	20	24	24
Min. Retro (mm)	0.75	0.6	0.6	0.6	0.6	0.6
CTDI (mGy)	14.04	15.02	14	12.98	12.13	12.16
Base Protocol	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine	ThoraxRoutine

	RECON 1	RECON 2	RECON 3	RECON 4 (optional)*
Series description	Chest Routine	HiRes Chest	MIP Chest	Thin Nodule
Type	Axial	Axial	SPO-MIP Thins	Axial
Start	Top of Lungs	Top of Lungs	Top of Lungs	Above Nodule
End	Bottom of Lungs	Bottom of Lungs	Bottom of Lungs	Below Nodule
Angle	None	None	None	None
Image Order	Craniocaudal	Craniocaudal	Craniocaudal	Craniocaudal
Kernel	B40	B46	B50	B40
Slice (mm)	5	1.5	20	2
Increment (mm)	5	1.5	10	1
FOV (mm)	Patient	Patient	Patient	150
:-Q-D	---	---	---	---
Network	IAU and Rad	IAU and Rad A3D3 if 3D needed	IAU and Rad	IAU and Rad

FILMING

Format	20:1	20:1	---	20:1
WW, WC	400/40 & 1500/-600	1500/-600	1500/-600	400/40 & 1500/-600
Images	ALL	Every 10 th image	---	ALL

* To be done upon request by radiologist.

For Virtual Bronchoscopy and Breast Implant Evaluation, call 3D Lab (4-1424).

CHARGE	# Charges	# Sequences	w/o contrast	with contrast	w & w/o contrast	with 3D recons requiring independent workstation
Lungs only: Chest	1	1	71250	71260	71270	---
Chest Lmtd (approx. < 10 cm scan length)	1	1	07213	NA	NA	---
Virtual Bronchoscopy	1	1	71250B	---	---	---
Breast Implantation Evaluation	2	1	71250	---	---	CT3D02
Lungs + adrenals: Chest with Lmtd Abd	1	1	CT510	CT511	CT512	---

Images read by radiologist scheduled on the scanner. The radiologist notes that additional 3D was performed, if applicable.



CT Protocol Directory

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Change History Sample

09/09/05: Recreated home links due to link back to server. ~JMK

06/16/05: Consolidated all Head and Neck Protocols (GE, Siemens 16, 64, peds-64). Removed GE-16 since it wasn't complete. Existing files moved to discontinued folder. ~JMK

■ Head & Neck (Default) (Siemens 64) -----06_0

- 01/21/11: Per the 1/20/11 Neuro Protocol meeting. Increments changed from 3mm to 2mm. A sagittal was added at 2mm x 1.8 range is entire neck. Pdf.d cat
- 06/11/09: per the Neuro protocol meeting of 6/11/09, the contrast administration was changed. Previous version was placed on 6/1/09 in discontinued folder. E-mail sent to Bill Stromme & Paula Smith regarding the change. Pdf.d cat
- 05/06/09: Added "to top of" sella per Dr. DeLone.~nlw
- 02/13/09: Per 1/29/09 Editor's meeting. I deleted the "Additioinal Information" Row, Moved the Network row to below :- Q/-D. pdf.d cat.
- 01/13/09: Moved the :-Q/-D column from filming to under FOV. Deleted the DLP row. Pdf.d cat
- 04/22/08: Added the word "variable" to the CTDI information. This better describes the CTDI with Care Dose on. Pdf.d cat
- 03/21/08: Filming was changed from 12:1 to 20:1 per phone conversation with Dr. DeLone. Pdf.d cat
- 01/02/07: Changed wording in contrast section from 100cc(total) Omnipaque to 100cc Omninque to make this clearer to all. Approval via e-mail came from DR. DeLone on 1/2/06. pdf.d cat
- 11/8/06: Via phone conversation with Dr DeLone & a request from Nancy Watrud, I have added a PA scout to the protocol. Pdf.d cat.
- 10/09/06: Fixed pitch info on SEQ portion of head. Error was in the pitch input. Also, I adjusted the feed info to be consistent with the 12x 24 collimation. Not the old 12 X20 collimation. Pdf.d cat.
- 07/05/06: Corrected CTDI values to the new. Was 27.5 neck, 48.0 for head. Now it is 30.73 neck, 28.5 for head. pdf.d cat.
- 03/31/06: Added -D to .75mm/.7mm column. Per 3/24 Neuro meeting & Excell sheet that Dr. DeLone Approved. Pdf.dcat
- 02/10/06: Formatted contrast in 3 rows for easier viewing. Pdf.d cat.
- 01/07/06: Fixed formatting: header/footer .9/8. Inserted page #, Put in division. Looked for any red underlines. Pdf.d. cat
- 09/16/05: Per CT radiology protocol meeting, put in verbiage for VB- 20, FOV. Contacted Dr. DeLone about decision. Will give him a start & end list. Pdf.d cat
- 06/20/05: Added to GE protocols a line about if only a neck is ordered. Put in prep delay. Pdf'd cat
- 06/16/05: Consolidated all Head and Neck Protocols (GE, Siemens 16, 64, peds-64). Removed GE-16 since it wasn't complete. Existing files moved to discontinued folder. ~JMK
- 04/29/05: Effective mass from 350 MaS to 400MaS per DR. Lindell. CAT pdf
- 04/20/05: Corrected scan delay to 80 sec. cat.pdf'd
- 04/05/05: Corrected tilt for head component. ~NMW. Pdf'd ~JMK

■ Head & Neck (Default) (Siemens 40) -----06_0

- 01/21/11: Per the 1/20/11 Neuro Protocol meeting. Increments changed from 3mm to 2mm. A sagittal was added at 2mm x 1.8 range is entire neck. Pdf.d cat
- 06/11/09: per the Neuro protocol meeting of 6/11/09, the contrast administration was changed. Previous version was placed on 6/1/09 in discontinued folder. E-mail sent to Bill Stromme & Paula Smith regarding the change. Pdf.d cat
- 05/06/09: Added "to top of" sella per Dr. DeLone.~nlw
- 02/13/09: Per 1/29/09 Editor's meeting. I deleted the "Additioinal Information" Row, Moved the Network row to below :-