DISCLAIMER: TO THE EXTENT ALLOWED BY LOCAL LAW, THIS INFORMATION IS PROVIDED TO YOU BY THE AMERICAN ASSOCIATION OF PHYSICISTS IN MEDICINE, A NON-PROFIT ORGANIZATION ORGANIZED TO PROMOTE THE APPLICATION OF PHYSICS TO MEDICINE AND BIOLOGY, ENCOURAGE INTEREST AND TRAINING IN MEDICAL PHYSICS AND RELATED FIELDS ("AAPM"), 'AS IS' WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. AAPM SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, NONINFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE. SOME JURISDICTIONS DO NOT ALLOW EXCLUSIONS OF IMPLIED WARRANTIES OR CONDITIONS, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. YOU MAY HAVE OTHER RIGHTS THAT VARY ACCORDING TO LOCAL LAW.

TO THE EXTENT ALLOWED BY LOCAL LAW, IN NO EVENT WILL AAPM OR ITS SUBSIDIARIES, AFFILIATES OR VENDORS BE LIABLE FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES (INCLUDING LOST PROFIT, LOST DATA, OR DOWNTIME COSTS), ARISING OUT OF THE USE, INABILITY TO USE, OR THE RESULTS OF USE OF THE PROVIDED INFORMATION, WHETHER BASED IN WARRANTY, CONTRACT, TORT OR OTHER LEGAL THEORY, AND WHETHER OR NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. YOUR USE OF THE INFORMATION IS ENTIRELY AT YOUR OWN RISK. THIS INFORMATION IS NOT MEANT TO BE USED AS A SUBSTITUTE FOR THE REVIEW OF SCAN PROTOCOL PARAMETERS BY A QUALIFIED AND CERTIFIED PROFESSIONAL. USERS ARE CAUTIONED TO SEEK THE ADVICE OF A QUALIFIED AND CERTIFIED PROFESSIONAL BEFORE USING ANY PROTOCOL BASED ON THE PROVIDED INFORMATION. AAPM IS NOT RESPONSIBLE FOR A USER'S FAILURE TO VERIFY OR CONFIRM APPROPRIATE PERFORMANCE OF THE PROVIDED SCAN PARAMETERS. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

ROUTINE PEDIATRIC ABDOMEN and PELVIS CT PROTOCOLS

Indications (include but are not limited to)
- Evaluation of abdominal, flank, or pelvic pain, specifically in suspected appendicitis or urinary calculi
- Evaluation of abdominal infection or inflammation, bowel disease or possible obstruction
- Evaluation following abdominal or pelvic trauma
- Congenital abnormalities of abdomen and pelvic organs
- Evaluation of abdominal or pelvic masses or fluid collections
- Evaluation of mesenteric, omental cysts or cystic malformations
- Evaluation of liver and biliary system
- Assessment of vascular abnormalities
- Evaluation for suspected malignancy or treatment monitoring of known malignancies
- Post-surgical evaluation of resected abnormalities

These routine pediatric abdomen and pelvis CT protocols are provided as general guidelines to help in designing protocols applicable to their pediatric population. They were developed to encompass of a variety of indications, however it must be noted that pediatric protocols are generally more tailored to specific indications than adult protocols.

For reference, please see ACR–SPR Practice Parameter for the Performance of Computed Tomography (CT) of the Abdomen and Computed Tomography (CT) of the Pelvis.

Diagnostic Tasks (include but are not limited to)
- Detect soft tissue masses and abnormal fluid collections and determine sizes
- Identify abnormal collections of blood
- Identify air outside the intestinal tract
- Detect congenital abnormalities
- Detect nodules or soft tissue masses adjacent to vascular structures
- Characterize soft tissue edema around the organs of the abdomen and pelvis

Key Elements
- Patient positioning is especially important when using tube current modulation.
- Scanning should be performed helically whenever possible.
- Automatic Exposure Control (AEC): Each manufacturer has unique nomenclature and operating characteristics for their AEC system(s). Users must become very familiar with how the AEC systems on their particular scanners operate. See Singh et al. Automatic Exposure Control in CT: Applications and Limitations. JACR 2011;8(6):446-449.

Contrast
- **Oral**: Per radiologist
- **Injected:** Certain indications require administration of intravenous contrast media.
- Intravenous contrast enhancement should be performed as directed by the supervising radiologist using appropriate injection protocols and in accordance with the ACR-SPR Practice Guideline for the Use of Intravascular Contrast Media and the ACR Manual on Contrast Media.

Patient Positioning
- Center the patient within the gantry; this is critical for proper functioning of AEC systems.

- Patient supine, typically feet first.
- It is common practice to employ a variety of motion-restriction devices (patient safety straps, for example) when working with non-cooperative pediatric patients.

Scan Range
- Scan from top of liver to either iliac crest or pubic symphysis, depending on clinical indications.
- Limit the scan range to the anatomy of interest to avoid unintentional exposure of sensitive organs from overrranging.
- Limit the scan range to the anatomy of interest.

Suspension of Respiration
- Patient should be instructed to hold his/her breath at end of inspiration

Additional Image Reconstructions
- The provided protocols are to be considered as a baseline for CT imaging of the pediatric abdomen and pelvis. Additional customization for specific indications may be required.
- Certain indications may require that images be reconstructed in coronal and/or sagittal planes.
- Very thin images (approximately ≤ 1 mm) may need to be reconstructed to serve as source images for MPR, sagittal and/or coronal reformatted images.
- Creation, use, and archival of these additional images are at the discretion of the supervising radiologist and/or departmental policy. Very large datasets may result from these additional reconstructions.

Radiation Dose Management
- In children, it is especially important to use the lowest dose necessary to achieve the specified diagnostic task.
- AEC should be used whenever possible.
- Reduce tube potential, especially in smaller pediatric patients. The resulting dose reduction is accompanied by an improvement in subject contrast in the image.
- Pay careful attention to the values selected to define the desired level of image quality (eg, Noise Index, Quality Reference mAs, Standard Deviation).
- Repeated scans and delayed scans discouraged unless medically indicated.
- Each manufacturer will have recommendations unique to their systems and system features. Be sure to work with your CT equipment manufacturer and a qualified medical physicist to ensure safe and appropriate operation of AEC systems.
    - If more than one CT localizer radiograph is acquired, AEC systems from different manufacturers can differ with respect to which one is used to determine mA and/or kV settings. Please refer to individual manufacturer protocol instructions.
    - Organ-based tube current modulation and an overall reduction in tube current are recommended as dose reduction techniques, when applicable.
    - Diagnostic Reference Levels (DRLs) are broad indicators of patient doses compiled for a standard patient and diagnostic task, across a multitude of scanner manufacturers. DRLs were developed as guidelines for the process of dose optimization and protocol development[1]. The ACR CT Accreditation Program has specified a pediatric abdomen (40-50 lb) DRL of 15 mGy (16 cm phantom) CTDIvol[2]. If your scanner reports CTDIvol using a 32 cm CTDI phantom, the DRL is 7.5 mGy [ACR 2017].

- Dose Reference Ranges (DRRs) based on actual patient data have been developed to provide a set of CTDIvol values below which image quality is compromised and above which the dose is unnecessarily high. Compared to the ACR DRL which can be used as an upper limit, a toddler DRR is 8.5-14 mGy CTDIvol (16 cm phantom) and 3.4-5.6 mGy CTDIvol (32 cm phantom)[3] .
- In Annex B of the 2013 report titled "Sources, effects and risks of ionizing radiation", UNSCEAR[4] discusses the effects of radiation exposure of children. This publication presents scientific findings on the risk of cancer induction in children, which can be higher, the same or lower than adults, depending on several factors.
- Consult a qualified medical physicist when developing protocols to ensure optimal image quality, dose, scan range and to avoid repeated exams. Overzealous efforts in dose reduction such as inappropriate use of lead aprons to shield the genitals can result in an increase in mAs.

References:

[1] Diagnostic reference levels in medical imaging: review and additional advice. Ann ICRP 2001; 31(4):33–52.
[2] Diagnostic reference ranges and the American College of Radiology Dose Index Registry: the pediatric experience. Goske MJ. Pediatr Radiol. 2014 Oct; 44 Suppl 3:506-10
[3] Diagnostic Reference Ranges for Pediatric Abdominal CT. Goske MJ1, Strauss KJ, Coombs LP, Mandel KE, Towbin AJ, Larson DB, Callahan MJ, Darge K, Podberesky DJ, Frush DP, Westra SJ, Prince JS. Radiology. 2013 Jul;268(1):208-18.
[4] http://www.unscear.org/unscear/en/publications/2013_2.html

CTDI measurements and calculations

- Some manufacturers utilize a z-axis “flying focal spot”, in which two unique projections are acquired at the same z-axis table position. When this technique is used, we identify it with **. The CTDIvol on the console accurately accounts for use of this feature.

Volume scanning

- With the introduction of wide detectors, new scanning options are possible which can decrease radiation dose and time.
- With these scanner configurations, some artifacts such as cone-beam artifacts and motion artifacts are more prevalent.

Axial CT protocols

- AEC is preferred for pediatric chest but in some cases a manual technique chart may be appropriate. The Image Gently website provides guidance on axial techniques http://www.imagegently.org/Procedures/Interventional-Radiology/Protocols.
- Manufacturers may provide manual mA values if they are available.
- AEC values may also require different quality parameter for different patient sizes.
- When using AEC in pediatric abdomen and pelvis scans, it should be noted that due to the smaller body habitus and smaller voxel size, some anatomy might be difficult to visualize

Approximate Volume CT Dose Index (CTDIvol) Ranges

Average Age	CTDI-vol (mGy) 32 cm CTDI phantom
<1	2.5-3.5
1-5 y	3.5-4.6
5-10 y	4.2-5.9
10-15 y	4.9-6.7
>15 y	6.6-11.2

The approximate CTDIvol ranges are for reference only and represent a dose to the CT Dose Index phantom under very specific conditions. The CTDIvol displayed on the scanner for a patient of a given size should be similar, but not necessarily an exact match, to those listed above.

CTDIvol ranges are provided for the pediatric categories listed in Table 1 below. The effective diameter is the diameter of a circle with the same area as the patient cross section, which does not commonly approximate a circle. It is calculated as √("AP x LAT") and used in the calculation of Size-Specific Dose Estimates (SSDE)[+]. This methodology estimates patient dose based on the CTDIvol and patient size and is therefore very pertinent to pediatric CT. The AP and LAT dimensions should be measured at the “xiphoid process, one slice below the image containing visible sternal bone”[*].

Table 1. Pediatric categories used to report CTDIvol and protocol parameters

Average Age	AP[1] (cm)	LAT[1] (cm)	Eff. Diameter[2] (cm)	Average Weight[1] (kg)
<1	5 - 9	7 - 13	6 - 11	2.5-12.2
1-5 y	10 - 12	14 - 16	12 - 14	8.1-23.8
5-10 y	13 - 15	17 - 22	15 - 18	14.7-45.6
10-15 y	16 - 18	23 - 27	19 - 22	24.9-78.3
>15 y	19 - 21	28 - 32	23 - 26	40.5-95.7

The provided values are all based on the 32 cm diameter CTDI phantom, which is the new international standard for all body CTDIvol measurements in the body region [International Electrotechnical Commission (IEC). Medical Electrical Equipment. Part 2-44: Particular requirements for the safety of x-ray equipment for computed tomography. IEC publication No. 60601-2-44: 2009+AMD1:2012 CSV
Consolidated version. Ed. 3. International Electrotechnical Commission (IEC) Central Office: Geneva, Switzerland, 2012.].

It is important to note which phantom CTDIvol is referencing, as it could result in a factor of 2 over- or under-dose estimate. The software on older units might report the CTDIvol for the 16 cm phantom. If this is the case, divide by approximately 2 for an estimate of what the CTDIvol would be for the 32 cm diameter CTDI phantom.

It is essential that users recognize that the CTDIvol values reported on the user console prior to acquiring CT localizer radiographs on a particular patient do not represent the CTDIvol that will be

delivered during that patient's scan. CT systems rely on the CT localizer radiograph to 1) estimate the patient's size, 2) determine the tube current settings for each tube angle and table position that will yield the requested level of image quality, and 3) calculate the average CTDIvol for the patient over the prescribed scan range. Until the CT localizer radiograph is acquired, the reported CTDIvol is not patient-specific, but is based on a generic patient size.

The CTDIvol value ranges in the table are approximate, and are intended only to provide reference ranges for the user to consider. The task group analyzed CTDIvol values provided by the vendors and representative hospitals. From this aggregate data, the arithmetic mean of the minimum CTDIvol values provided and the mean of the maximum CTDIvol values are presented as the ranges below. The lower part of the range corresponds to CTDIvol values typically found in dedicated pediatric hospitals, whereas the upper range would be more appropriate/suited for general community hospitals. Radiologist preference and training will also impact the choice of CTDIvol. These CTDIvol values are for a routine CT of a pediatric chest for the general indications given at the beginning of this document. Other indications or diagnostic tasks may have different image quality and dose requirements, and hence reasonable ranges of CTDIvol may differ according to those requirements.

Reference: Image Gently Pediatric CT Protocols and Instructions 2014

* P. L. Kleinman, K. J. Strauss, D. Zurakowski, K. S. Buckley, and G. A. Taylor. Patient Size Measured on CT Images as a Function of Age at a Tertiary Care Children's Hospital. *American Journal of Roentgenology.* 194(6): 1611-1619, 2010. DOI:10.2214/AJR.09.3771

Clinical Growth Charts Centers for Disease Control and Prevention, 2009. Web. Jan. 2016. http://www.cdc.gov/growthcharts/clinical_charts.htm 5th to 95th percentiles.

+ Task Group Task Group 204. Size-specific dose estimates (SSDE) in pediatric and adult body CT examinations. Technical Report 204, American Association of Physicists in Medicine, 2011. https://www.aapm.org/pubs/reports/RPT_204.pdf

INDEX OF ROUTINE PEDIATRIC ABDOMEN and PELVIS PROTOCOLS (by manufacturer)

PEDIATRIC ABDOMEN and PELVIS ROUTINE (Selected GE scanners)

(Back to INDEX)

SCOUT: AP if automatic exposure control is used. PA if manual mA is used. Landmark at xyphoid process. Lateral scout optional, but recommended to ensure accurate vertical (AP) centering for AEC operation. If two Scouts are obtained, the second one must cover the entire intended scan range, as it is used to determine mA settings.

GE		Optima CT 520	Optima CT 540	EVO (ASIR)	EVO (ASIRV)
Scan Type		Helical	Helical	Helical	Helical
Rotation Time (s)	7-13 cm: 14-32 cm:	0.8 0.8	0.5 0.5	0.4 0.5	0.4 0.5
Beam Collimation (mm)	7-13 cm: 14-32 cm:	20 20	20 20	20 40	20 40
Pitch		1.375	1.375	1.375	1.375
Speed (mm/rot)		20 mm: 27.5 40 mm: N/A	20 mm: 27.5 40 mm: N/A	20 mm: 27.5 40 mm: 55	20 mm: 27.5 40 mm: 55
kV		120	120	120	120
Manual mA range	7-13 cm: 14-16 cm: 17-22 cm: 23-27 cm: 28-32 cm:	60-65 DR* 50 DR 50 DR 55 DR 65 DR	70-110 DR 70-75 DR 80-85 DR 90 DR 95 DR	70-125 85-95 85-105 120 140	60-110 75-80 70-100 100 120
Noise Index, NI (min mA – max mA)	7-13 cm: 14-16 cm: 17-22 cm: 23-27 cm: 28-32 cm:	9.6 (48-205) 10.6 (52-226) 11.3 (60-298) 13.0 (75-410) 13.5 (92-524)	9.6 (48-205) 10.6 (52-226) 11.3 (60-298) 13.0 (75-410) 13.5 (92-524)	9.6 (48-205) 10.6 (52-226) 11.3 (60-298) 13.0 (75-410) 13.5 (92-524)	9.6 (48-205) 10.6 (52-226) 11.3 (60-298) 13.0 (75-410) 13.5 (92-524)
SFOV	7-13 cm: 14-22 cm: 23-32 cm:	Small Large Large	Small Large Large	PedBody SmallBody LargeBody	PedBody SmallBody LargeBody

RECON 1

Series Description		Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Plane		Axial	Axial	Axial	Axial
Algorithm		Standard	Standard	Standard Plus	Standard Plus
Recon Mode		Full	Full	Full	Full
Thickness and Interval (mm)	7-13 cm:	3.75	3.75	3.75	3.75
	14-32 cm:	5	5	5	5
ASiR		40%	40%	30%	40% ASIRV

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

*DR = Dose Reduction Guidance available on select scanners
**To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

PEDIATRIC ABDOMEN and PELVIS ROUTINE (Selected GE scanners)

(Back to INDEX)

SCOUT: AP if automatic exposure control is used. PA if manual mA is used. Landmark at xyphoid process. Lateral scout optional, but recommended to ensure accurate vertical (AP) centering for AEC operation. If two Scouts are obtained, the second one must cover the entire intended scan range, as it is used to determine mA settings.

GE		Optima CT660	LightSpeed VCT	Discovery CT750 HD	Revolution CT
Scan Type		Helical	Helical	Helical	Axial
Rotation Time (s)	7-22 cm:	0.4	0.4	0.4	0.28
	23-27 cm:	0.5	0.4	0.4	0.35
	28-32 cm:	0.5	0.4	0.4	0.5
Beam Collimation (mm)	7-22 cm:	20	20	20	SC* 80
	23-27 cm:	40	40	40	SC 120
	28-32 cm:	40	40	40	SC 140
Pitch		1.375	1.375	1.375	N/A
Speed (mm/rot)		20 mm: 27.5 40 mm: 55	20 mm: 27.5 40 mm: 55	20 mm: 27.5 40 mm: 55	80 mm: N/A
kV		120	120	120	See below: kV, mA
Manual mA range	7-13 cm:	70-125	70-125	100-180	70 kV, 130-155 mA
	14-16 cm:	85-95	85-95	125-135	100 kV, 175-195 mA
	17-22 cm:	85-105	85-105	140-150	100 kV, 195-220 mA
	23-27 cm:	120	120	170	120 kV, 255 mA
	28-32 cm:	140	140	200	120 kV, 205 mA
Noise Index (NI)*	7-13 cm:	9.6 (48-205)	9.6 (48-205)	9.6 (48-205)	9.6 (48-205)
	14-16 cm:	10.6 (52-226)	10.6 (52-226)	10.6 (52-226)	10.6 (52-226)
	17-22 cm:	11.3 (60-298)	11.3 (60-298)	11.3 (60-298)	11.3 (60-298)
	23-27 cm:	13.0 (75-410)	13.0 (75-410)	13.0 (75-410)	13.0 (75-410)
	28-32 cm:	13.5 (92-524)	13.5 (92-524)	13.5 (92-524)	13.5 (92-524)
SFOV	7-13 cm:	PedBody	PedBody	PedBody	PedBody
	14-22 cm:	SmallBody	SmallBody	SmallBody	SmallBody
	23-32 cm:	LargeBody	LargeBody	LargeBody	MediumBody

RECON 1

Series Description		Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Plane		Axial	Axial	Axial	Axial
Algorithm		Standard	Standard	Standard Plus	Standard Plus
Recon Mode		Full	Full	Full	Full
Thickness and Interval (mm)	7-13 cm:	3.75	3.75	3.75	2.5
	14-32 cm:	5	5	5	2.5
ASiR		30%	30%	None	50% ASIRV

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

*SC = Smart Coverage

**To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected HITACHI scanners)

(Back to INDEX)

SCANOGRAM: PA and Lateral; scan from top of liver to either iliac crest or pubic symphysis.

HITACHI		CXR4	ECLOS 16
Scan Type		Volume	Volume
Rotation Time (s)		0.8	0.8
Detector Configuration		4 x 1.25 mm	16 x 1.25 mm
Pitch		1.75	1.1
Speed (mm/rot)		8.75	21.25
kVp		100	100
mA	7-13 cm:	125	25-100
	14-16 cm:	150	25-125
	17-22 cm:	175	50-150
	23-27 cm:	250	50-200
	28-32 cm:	300	55-225
Adaptive mA/IntelliEC		NA	SD 18.3
SFOV (mm)		50	50

RECON 1

Series Description	Soft Tissue	Soft Tissue
Type	Axial	Axial
Filter	4	32
Slice Thickness (mm)	2.5	2.5
Interval (mm)	2.5	2.5

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

*To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

Additional reconstructions may be needed based on the clinical indication.

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected HITACHI scanners)

(Back to INDEX)

SCANOGRAM: PA and Lateral; scan from top of liver to either iliac crest or pubic symphysis.

HITACHI		Supria 16	Supria 16^{IR}	Scenaria 64/128	Scenaria 64/128^{IR}
Scan Type		Volume	Volume	Volume	Volume
Rotation Time (s)		0.75	0.75	0.5	0.5
Detector Configuration		16 x 1.25 mm	16 x 1.25 mm	64 x 0.625 mm	64 x 0.625 mm
Pitch		1.1	1.1	1.1	1.1
Speed (mm/rot)		21.25	21.25	42.5	42.5
kVp		100	100	100	100
mA	7-13 cm:	30-125	15-70	35-150	20-85
	14-16 cm:	35-150	20-85	40-175	25-100
	17-22 cm:	45-175	25-100	55-225	30-130
	23-27 cm:	55-225	30-130	65-275	40-160
	28-32 cm:	70-275	40-160	100-375	50-215
Adaptive mA/IntelliEC		SD 15.3	SD 18.2	SD 19.5	SD 22.8
SFOV (mm)		50	50	50	50

RECON 1

Series Description	Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Type	Axial	Axial	Axial	Axial
Filter	32C	32 Level 3 IIP	32C	32 Level 3 IIP
Slice Thickness (mm)	2.5	2.5	2.5	2.5
Interval (mm)	2.5	2.5	2.5	2.5

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

*To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

Additional reconstructions may be needed based on the clinical indication.

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected NEUSOFT scanners)

(Back to INDEX)

SURVIEW: PA & LAT recommended**.** Scan from top of liver to either iliac crest or pubic symphysis, depending on clinical indications.

NV 16 surview: 7-13 cm lateral dimension:	40 mA, 90 kV
NV 16 surview: 27-32 cm lateral dimension:	40 mA, 120 kV
NV 64 surview: 7-28 cm lateral dimension	10 mA, 100 kV
NV 64 surview: 27-32 cm lateral dimension:	40 mA, 120 kV
NV 128 surview: 7-28 cm lateral dimension	10 mA, 100 kV
NV 128 surview: 27-32 cm lateral dimension:	40 mA, 120 kV

NEUSOFT		NeuViz 128	NeuViz64i/e	NeuViz 16
Scan Type		Helical	Helical	Helical
Rotation Time (s)		0.5	0.5	0.6
Detector Configuration		128 x 0.625 mm*	64 x 0.625 mm*	16 x 1.5 mm
kVp		80/100	100/120*	120
Speed (mm/rot)		48	24	24.2
Reference mAs	7-13 cm:	50	50	80
	14-16 cm:	100	100	110
	17-22 cm:	100*	100*	140
	23-27 cm:	100*	100*	140
	28-32 cm:	150*	150*	180
Pitch		1.2	1.2	1.0069
SNR		1	1	N/A
FOV (mm)		180-350	180-350	180-350
Resolution		High/STD	STD	STD
Dose Modulation		O-DOSE	ClearView	Dose Right

RECON 1

Series Description	Soft Tissue	Soft Tissue	Soft Tissue
Type	Axial	Axial	Axial
Filter	F20	F20	SB
Thickness (mm)	3	3	3
Increment (mm)	3	3	3
ClearView	20%	20%	N/A

*120 kVp corresponds to the higher reference mAs values for the larger patients and also to thicker reconstructed slices. A z-axis “flying focal spot” is utilized, in which two unique projections are acquired at the same z-axis table position. When this technique is used, we identify it with **. The CTDIvol on the console accurately accounts for use of this feature.

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom***
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

***To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

The disclaimer found on page 1 is an integral part of this document.

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected PHILIPS scanners)

(Back to INDEX)

SURVIEW: PA, scan from diaphragm to pubic symphysis.

PHILIPS		Brilliance 16 slice	Brilliance 64 ch with iPatient	Ingenuity CT with iPatient	Brilliance iCT SP with iPatient	Brilliance iCT with iPatient
Scan Type*		Abdomen/Pelvis	Abdomen/Pelvis	Abdomen/Pelvis	Abdomen/Pelvis	Abdomen/Pelvis
Rotation Time (s)		0.5	0.5	0.4	0.4	0.4
Detector Configuration		16 x 1.5 mm	64 x 0.625 mm	64 x 0.625 mm	64 x 0.625 mm	128 x 0.625 mm
kV		120	100	100	100	100
Manual mAs/slice	7-13 cm:	120	125	125	125	125
	14-16 cm:	170	175	175	175	175
	17-22 cm:	170	175	175	175	175
	23-27 cm:	200	225	225	225	225
	28-32 cm:	250	300	300	300	300
AEC approach*		DRI NA	DRI=25	DRI=25	DRI=25	DRI=25
Pitch		0.93	0.6	0.8	0.9	0.9
FOV (mm)		180-360	180-360	180-360	180-360	180-360
RECON 1						
Series Description		Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Type		Axial	Axial	Axial	Axial	Axial
Filter		C	C	C	C	C
Thickness (mm)		3	3	3	3	3
Increment (mm)		1.5	1.5	1.5	1.5	1.5

*TCM and manual approaches provided. CTDI-vol (mGy) values reflect the range of doses for both approaches and the different scanners.

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

**To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected SIEMENS scanners)

(Back to INDEX)

TOPOGRAM: AP, 100 kV, 512 or 768 mm. Scan from above diaphragm to below ischium. If two Topograms are obtained, both will be used to determine mA settings.

SIEMENS	Emotion 16/ Scope Power	Perspective 64/ Perspective 128	Sensation 64	Definition DS ‡
Scan type	Spiral	Spiral	Spiral	Spiral
Rotation Time (s)	0.6	0.6	0.5	0.5
Detector Configuration	16 x 1.2 mm	32 x 1.2 mm 64 x 0.6 mm	24 x 1.2 mm	24 x 1.2 mm
Pitch	1.5	1.4	1.4	1.4
kV	110	110	120	100
Quality ref. mAs^{CD}	196	196	85	279
CARE kV	-	-	-	ON
CARE Dose4D	ON	ON	ON	ON
RECON 1				
Series Description	Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Type	Axial	Axial	Axial	Axial
Filter	B41s (I41s)^{IR}	B41s (I41s)^{IR}	B30f	B30f (I30f)^{IR}
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom*
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

† For Sensation 64 only, the reference patient is defined as a typical child, 5 years, appr. 20 kg or 45 lbs. Based on that value, CARE Dose 4D adapts the tube current (or the mean (eff.) mAs value) to the individual patient size or body region. For all other scanners listed the reference patient for adult and child is 70 kg to 80 kg or 155 to 180 lbs
*To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2
‡ Dual Source capable scanners to be used in single source mode – Default dual source abdomen/pelvis protocols are available on the scanner (assuming default strength settings)
^{IR} Kernel for Iterative Reconstruction

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected SIEMENS scanners)

(Back to INDEX)

TOPOGRAM: AP, 100 kV, 512 or 768 mm. Scan from above diaphragm to below ischium. If two Topograms are obtained, both will be used to determine mA settings.

SIEMENS	Definition AS+/ Edge (128-slice)	Definition Flash Dual source (128-slice) ‡	Drive Dual source (128-slice)‡	Somatom Force Dual source (192-slice)‡
Scan type	Spiral	Spiral	Spiral	Spiral
Rotation time (s)	0.5	0.5	0.5	0.5
Detector Configuration	32 x 1.2 mm	32 x 1.2 mm	32 x 1.2 mm	96 x 0.6 mm
Pitch	1.4	1.4	1.4	1.4
kV	100	100	100	100
Quality ref. mAs[CD]	208	297	208	207
CARE Dose4D	ON	ON	ON	ON
CARE kV	ON	ON	ON	ON
RECON 1				
Series Description	Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Type	Axial	Axial	Axial	Axial
Filter	B30f (I30f)[IR]	B30f (I30f)[IR]	I30f[IR]	Br40[IR]
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0
Interval (mm)	3.0	3.0	3.0	3.0

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom*
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

† For Sensation 64 only, the reference patient is defined as a typical child, 5 years, appr. 20 kg or 45 lbs. Based on that value, CARE Dose 4D adapts the tube current (or the mean (eff.) mAs value) to the individual patient size or body region. For all other scanners listed the reference patient for adult and child is 70 kg to 80 kg or 155 to 180 lbs
*To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2
‡ Dual Source capable scanners to be used in single source mode – Default dual source abdomen/pelvis protocols are available on the scanner
[IR] Kernel for Iterative Reconstruction are available

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected TOSHIBA scanners)

(Back to INDEX)

SCANOGRAM: Above diaphragm through ischium
7-13 cm lateral dimension: 30 AP mA, 30 Lat mA, 80 kV, 250 mm range
14-16 cm lateral dimension: 30 AP mA, 30 Lat mA, 100 kV, 250 mm range
17-22 cm lateral dimension 30 AP mA, 50 Lat mA, 100 kV, 400 mm range
23-27 cm lateral dimension: 50 AP mA, 50 Lat mA, 120 kV, 500 mm range
28-32 cm lateral dimension: 50 AP mA, 80 Lat mA, 120 kV, 500 mm range

TOSHIBA		Aq RXL	Aq 32	Aq 64
Scan Type		Helical	Helical	Helical
Rotation Time (s)		0.5	0.5	0.5
Detector Configuration		16 x 0.5 mm	32 x 0.5 mm	64 x 0.5 mm
Pitch		Standard (0.938)	Standard (0.844)	Standard (0.828)
Speed (mm/rot)		7.5	13.5	26.4
SURE Exposure approach	7-13 cm:	80 kV	5 SD	30-150 mA
	14-16 cm:	80 kV	5 SD	30-150 mA
	17-22 cm:	100 kV	7.5 SD	40-200 mA
	23-27 cm:	100 kV	10 SD	50-300 mA
	28-32 cm:	120 kV	12.5 SD	60-400 mA
AIDR 3D		AIDR 3D	AIDR 3D	AIDR 3D
Scan FOV		S (240 mm) or M (320 mm)	S (240 mm) or M (320 mm)	S (240 mm) or M (320 mm)

RECON 1

Series Description	Soft Tissue	Soft Tissue	Soft Tissue
Type	Axial	Axial	Axial
SURE IQ*	Ped Body	Ped Body	Ped Body
Thickness (mm)	3	3	3
Interval (mm)	3	3	3

ADDITIONAL RECONSTRUCTIONS MAY BE NEEDED BASED ON THE CLINICAL INDICATION.

*The SURE IQ setting determines the reconstruction FC as well as other post-processing and reconstruction options, such as AIDR. The SURE IQ settings listed here refer to the manufacturer default settings.

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

**To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2

PEDIATRIC ABDOMEN and PELVIS ROUTINE (selected TOSHIBA scanners)

(Back to INDEX)

SCANOGRAM: Above diaphragm through ischium
7-13 cm lateral dimension: 30 AP mA, 30 Lat mA, 80 kV, 250 mm range
14-16 cm lateral dimension: 30 AP mA, 30 Lat mA, 100 kV, 250 mm range
17-22 cm lateral dimension 30 AP mA, 50 Lat mA, 100 kV, 400 mm range
23-27 cm lateral dimension: 50 AP mA, 50 Lat mA, 120 kV, 500 mm range
28-32 cm lateral dimension: 50 AP mA, 80 Lat mA, 120 kV, 500 mm range

TOSHIBA		Aq PRIME	Aq ONE Premium	Aq ONE	Aq ONE Vision
Scan Type		Helical	Helical	Volume / Helical	Volume / Helical
Rotation Time (s)		0.5	0.5	0.35	0.275
Detector Configuration		80 x 0.5 mm	80 x 0.5 mm	320 x 0.5 mm / 80 x 0.5 mm	320 x 0.5 mm / 80 x 0.5 mm
Pitch		Standard (0.813)	Standard (0.813)	None / 0.813	None / 0.813
Speed (mm/rot)		32.5	32.5	None / 32.5	None / 32.5
SURE Exposure approach	7-13 cm:	80 kV 5 SD 30-150 mA			
	14-16 cm:	80 kV 5 SD 30-150 mA			
	17-22 cm:	100 kV 7.5 SD 40-200 mA			
	23-27 cm:	100 kV 10 SD 50-300 mA			
	28-32 cm:	120 kV 12.5 SD 60-400 mA			
AIDR 3D		AIDR 3D	AIDR 3D	AIDR 3D	AIDR 3D
Scan FOV		S (240 mm) or M (320 mm)	S (240 mm) or M (320 mm)	S (240 mm) or M (320 mm)	S (240 mm) or M (320 mm)

RECON 1

Series Description	Soft Tissue	Soft Tissue	Soft Tissue	Soft Tissue
Type	Axial	Axial	Axial	Axial
SURE IQ*	Ped Body	Ped Body	Ped Body	Ped Body
Thickness (mm)	3	3	3	3
Interval (mm)	3	3	3	3

ADDITIONAL RECONSTRUCTIONS MAY BE NEEDED BASED ON THE CLINICAL INDICATION.

*The SURE IQ setting determines the reconstruction FC as well as other post-processing and reconstruction options, such as AIDR. The SURE IQ settings listed here refer to the manufacturer default settings.

Lateral dimensions (cm)	Approx. Weight (kg)	Approx. Weight (lbs)	CTDI-vol (mGy) 32 cm CTDI phantom**
7-13	6	13	2.5-3.5
14-16	12	27	3.5-4.6
17-22	18	40	4.2-5.9
23-27	32	71	4.9-6.7
28-32	54	119	6.6-11.2

**To convert this CTDIvol to an estimate for the 16 cm phantom, multiply by 2