



School of Medicine  
and Public Health

UNIVERSITY OF WISCONSIN-MADISON

# Dose Check and Dose Benchmarking Manual

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Manufacturer:  
School of Medicine and Public Health  
University of Wisconsin-Madison  
610 Walnut Street  
Madison, WI 53726

Manufactured in USA

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## Introduction

The NEMA XR-25 standard requires operator notification of potential excess dose before a scan is started. GE Healthcare CT scanners are compliant via a feature named “Dose Check”. This feature allows the set-up of scanner output warnings at the scan series level on a protocol-by-protocol basis. The Dose Check feature also allows one to monitor how often warnings are triggered and analyze data from these occurrences.

Dose Check warning levels occur at two thresholds denoted as notification value (NV) and alert value (AV). The AV is higher than the NV and requires special user privileges to bypass. At the University of Wisconsin-Madison (UW), we have calculated NV for each series for each of our CT protocols. These are presented in this manual.

Editing scan parameters on the scanner console has the potential to change the maximum possible dose. The notification values in this report may not be valid if you customize the protocols that originally came from the UW. Additionally, depending on what version of UW protocols you have, the dose values may have changed. This document is meant to serve as a guide and should be used as a reference only. Please consult with your qualified medical physicist to assist you in setting your institution’s dose check values.

The previous version of this manual listed NV by scanner type. There were slight differences in NV among the scanner platforms. These differences existed because of different tube power, beam width, reconstruction options, tube rotation time, mA ranges, and scanner geometry options<sup>1</sup>. A scanner listed as having a higher NV value setting relative to another scanner does not mean that the scanner delivered more imaging dose. It does, however; mean that a higher dose could potentially be delivered if requested by the automatic exposure control. In this version of the manual, we simplified the Dose Check process by listing a single set of NV since the scanner-to-scanner differences shown in the previous manual were deemed too small to be clinically significant.

UW’s philosophy behind setting these values is to limit Dose Check alerts to cases in which: (1) the protocol has been modified at scan time resulting in a higher dose than was original prescribed for that protocol, and (2) in which a scan or series is repeated which would also result in a higher dose than expected. We do not desire the alert to be triggered each time an above-average patient is scanned. We use size-based protocols and tailor the dose in each size category to a specific size range of patients; this sizing is reflected in our NV values.

UW’s notification values were calculated by multiplying the maximum effective mAs possible during a given series by the  $CTDI_{vol}$  per 100 mAs factor provided in the GE technical reference manuals. Since the maximum mA, tube rotation time, and pitch are values controllable, we can therefore accurately predict what the maximum possible scanner output should be for any given protocol.

In response to recent Joint Commission guidelines (specifically PI.02.01.01 and PC.01.03.01), we have also compiled dose data in the form of  $CTDI_{vol}$ , DLP, and SSDE for our protocols. We list dose on a series-by-series level instead of an exam level so you can better compare what you see on your scanner to what we see here at the UW. In addition, we have compiled data on some of our most common single-phase exams similar to what is commonly reported in the literature.

To aide in comparing to external benchmarking data, we have also included dose data from a recent publication listing doses from 5 imaging centers in California<sup>2</sup> and data from the American College of Radiology Dose Index Registry (ACR DIR).

We hope that this manual can serve as a “one stop shop” to meet your dose compliance needs. For more information, please visit <https://www.radiology.wisc.edu/> or email Professor Szczykutowicz at [tszczykutowicz@uwhealth.org](mailto:tszczykutowicz@uwhealth.org)

<sup>1</sup>Szczykutowicz, Timothy P., Robert K. Bour, Nicholas Rubert, Gary Wendt, Myron Pozniak, and Frank N. Ranallo. "CT protocol management: simplifying the process by using a master protocol concept." *Journal of Applied Clinical Medical Physics* 16, no. 4 (2015).

<sup>2</sup>Smith-Bindman, Rebecca, et al. "Radiation doses in consecutive CT examinations from five University of California Medical Centers." *Radiology* 277.1 (2015): 134-141

## Setting the AV

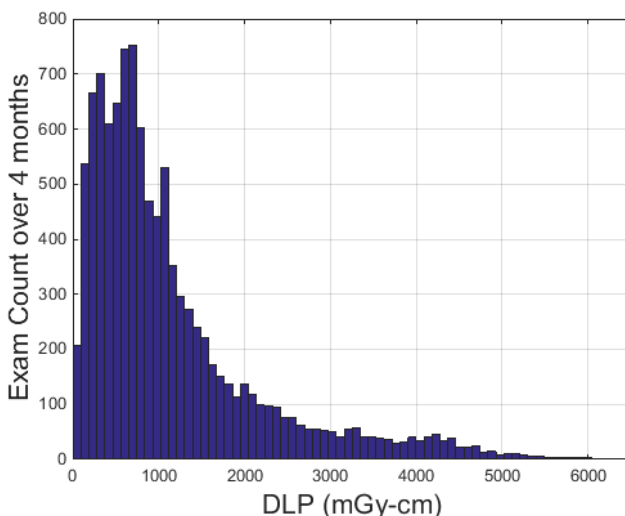
To set the AV, you must be a member of the Dose Check Administrator group. Please contact your site Dose Check Administrator. If your site does not have a Dose Check Administrator, consult your GE documentation manuals or contact your applications specialist to assist you in setting up appropriate permissions.

### Instructions for setting the AV:

1. From the scan monitor, click the **Protocol Management icon** located on the left bottom of the screen.
2. Click on the box labelled **Dose Check Management**.
3. In the AV checking section, select the box labelled **CTDI<sub>vol</sub>**.
4. Enter a value of 1000 mGy into the box below the CTDI<sub>vol</sub> box.
5. Click save. You have now set the AV.

An AV value of 1,000 mGy was chosen. Previously, we recommended using 5,000 mGy\*cm (a DLP-based AV), but this threshold can be triggered for clinically-appropriate reasons. A 1,000 mGy limit is more representative of a “never event” and therefore better suited for the AV threshold. This level of irradiation should never be necessary under usual clinical conditions. This warning level will catch multiple scans of the same body region or altered exam parameters yielding a much higher than originally programmed dose. Note, it is possible for a technologist to still administer a dose over this amount if they repeatedly “end exam” and start a new exam. In such a situation, the scanner cannot know the patient is the same. A robust third-party dose monitoring solution should be in place to identify and prevent this potential scenario.

If you wish to set your AV based on DLP, we recommend a value slightly over 5,000 mGy-cm. Below is a histogram of UW-Madison DLP data taken over a 4-month period. Only 4% of our exams exceeded 5,000 mGy-cm. These exams consisted mainly of stroke codes (multiphasic exams which include a perfusion series), trauma exams (require high dose to visualize subtle spinal fractures), and multiphasic routine heads (non-contrast, with contrast, and axial scans acquired with a gantry tilt).



## Setting the NV

To set the NV, you must be a member of the Standard User Group if the protocol change control (PCC) is turned on. Please consult your site's Dose Check Administrator to assist you with obtaining this level of permission if you are not a Standard User already.

### Instructions for setting the NV:

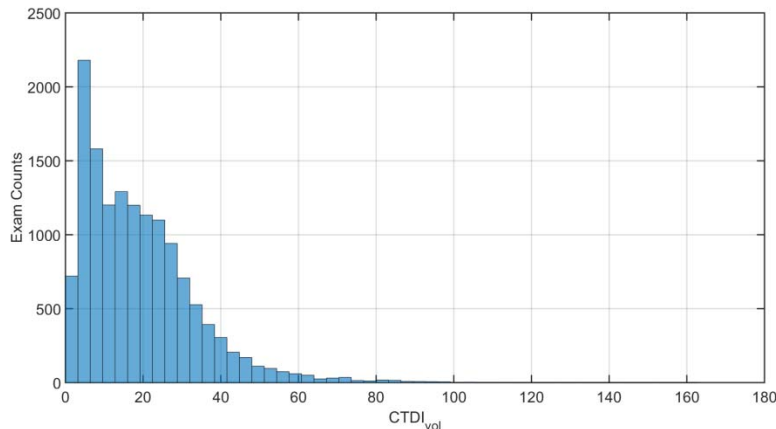
1. From the scan monitor, click the **Protocol Management icon** located on the left bottom of the screen.
2. Click on the box labelled **Dose Check Management**.
3. In the NV Checking section, de-select the box labelled **DLP** and select the box labelled **CTDI<sub>vol</sub>**.
4. Click save. You have now set the NV to use CTDI<sub>vol</sub> instead of DLP.

Now you must enter the proper CTDI<sub>vol</sub> NV for every protocol. Depending on the version of UW protocols you have, this may have already been done for you when you loaded the UW protocols onto your scanner.

### To edit the NV for a single protocol:

1. From the scan monitor, click the **Protocol Management icon** located on the left bottom of the screen.
2. Click on the box labelled **Protocol Management**.
3. Navigate to the protocol you wish to add a NV to and click edit.
4. Navigate to the specific series to which you wish to add a NV.
5. In the upper right hand corner of the screen, dose information will be displayed. Click on the box labelled **set up**.
6. Enter the proper CTDI<sub>vol</sub> values as listed in this document in the section titled "UW Table of NV".

Note, we do not have values listed for the smart prep series of any protocol. If you wish to enter a smartprep NV, we recommend setting it slightly higher than the displayed value on the scanner. At the top of the next page is a plot of all UW-Madison smartprep doses (in CTDI<sub>vol</sub>) from our scanners. You can see, the values rarely exceed 100 mGy. However, it is possible for some neck protocols using 140 kV, if the full 40 images of smartprep were acquired, to have smartprep CTDI<sub>vol</sub> values over 400 mGy.



If your dose monitoring alarm system is reporting smartprep series as high dose events, you need to consult a qualified medical physicist to review these cases. Usually, the dose from a properly-run smartprep series contributes only a small portion to a patient total dose.

Our tables of NV currently do not list values for timing bolus (cine scans of the same anatomical region). Our timing bolus scans use a manual technique, so the NV for them can simply be set to whatever the scanner displays while in protocol manager. The scanner will display an anticipated  $CTDI_{vol}$  for each irradiation event in the upper left hand corner next to the field where NV values are entered. You can simply enter this value for the NV of the timing bolus scans. This displayed value will be higher than what is actually used on patients as long as the peak is reached before the end of the timing bolus cine scan. If the timing bolus scan duration is increased, this NV would be tripped. This is appropriate as we have set default timing bolus durations that are clinically reasonable.

## UW Table of NV

The following pages include UW's NV values by protocol, series, and patient size. A description of how these were developed is listed below.

For most pediatric protocols, the sizes are reported according to the Broselow color groups: Pink, Red/Purple, Yellow/White, Blue/Orange, and Green/Black. For neuro protocols, which have adult, child, and infant variations, *child* refers to pediatric patients between 3 and 6 years old. *Infant* refers to pediatric patients between 0 and 3 years. Values denoted with an asterisk\* were taken from the AAPM working group on standardization of CT nomenclature and protocols and can be accessed at the link below. AAPM values were used for cine, cardiac, and perfusion exams.

<http://www.aapm.org/pubs/CTProtocols/documents/NotificationLevelsStatement.pdf>.

Notification values are provided for every group of CT acquisitions, but not for scouts, Smart Preps, timing bolus scans, and recons. As with the protocol booklet, the series numbers in the dose check notification values table are incremented with every acquisition, including both scouts and CT acquisitions. For example, the Routine Abdomen/Pelvis protocol uses one scout (CT localizer radiograph) and one CT (helical/spiral) acquisition. The scout is labelled as Series 1 in our protocols, but there is no notification value listed for it since it contributes a very small dose to the overall exam. The CT acquisition is labeled Series 2 (S2). From the table shown in this manual for Routine Abdomen/Pelvis, you can see that the Small, Medium, and Large protocols have notification values of 20, 35, and 60 mGy respectively. These values are the ones to be entered for the NV in the Routine Abdomen/Pelvis protocol.

A more complex protocol is the Abd-Liver Hepatocellular Carcinoma (HCC) protocol. This protocol has a scout labeled Series 1, a Smart Prep labeled Series 2, two groups of CT acquisitions labeled Series 2, Group 1 (S2G1) and Series 2, Group 2 (S2G2), and a third CT acquisition labeled Series 3 (S3). The scout and Smart Prep do not have notification values. From the table, you can see that Series 2, Group 1 has Small, Medium, and Large notification values of 15, 25, and 50 mGy respectively. Series 2, Group 2 has Small, Medium, and Large notification values of 20, 35, and 60 mGy. The last series, Series 3, has Small, Medium, and Large notification values of 15, 25, and 50 mGy respectively. For this Abd-Liver - HCC protocol, you will enter 2 NVs (for Groups 1 and 2) on one screen of your protocol manager and the last series (S3) on the last series of the Abd-Liver - HCC protocol manager screen.

When we list multiple NVs for a single protocol, you will need to hit "next series" each time the series number increments. If the series number does not increment, but the group number does, all of these values are entered on the same series within protocol manager. Also be aware, the displayed value for NV shown on each page of the protocol manager displays the  $CTDI_{vol}$  that would be observed using the manual mA for that protocol. This is different from when a patient is actually being scanned. During the actual scan, the displayed  $CTDI_{vol}$  represents the output the scanner plans on using. The difference is due to the following: when automatic exposure control is on and you are in protocol manager, the scanner does not know the size of the patient is so it displays a  $CTDI_{vol}$  value using the selected manual mA value. When you are actually scanning a patient and have the scout images, the scanner knows the patient size and selects the mA it plans to use on that patient for calculating the displayed  $CTDI_{vol}$ .



Protocol Name	Acquisition	Patient Size	NV (mGy)
<b>Abd/Pelvis</b>	S2	Small	20
		Medium	35
		Large	60
<b>Abd/Pelvis - Flank Pain</b>	S2	Small	20
		Medium	35
		Large	60
	S3	Small	10
		Medium	20
		Large	30
<b>Abd/Pelvis - Peritoneogram</b>	S2	Small	20
		Medium	35
		Large	60
<b>Abd/Pelvis - Colonography</b>	S2	Small	15
		Medium	10
		Large	10
	S4	Small	15
		Medium	10
		Large	10
	S6	Small	15
		Medium	10
		Large	10
<b>Abd/Pelvis - Colonography W/IVC</b>	S2	Small	15
		Medium	10
		Large	10
	S4	Small	20
		Medium	35
		Large	60
	S6	Small	15
		Medium	10
		Large	10
<b>Abd/Pelvis Pre IVC filter removal</b>	S2	Small	20
		Medium	35
		Large	60
<b>Abd/Pelvis R/O hernia</b>	S2	Small	20
		Medium	35
		Large	60
<b>Abd/Pelvis-Kidney Tumor</b>	S2	Small	10
		Medium	20
		Large	35
	S3	Small	20
		Medium	35

		Large	60
	S4	Small	25
		Medium	45
		Large	85
<b>Abd/Pelvis - Urography</b>	S2	Small	15
		Medium	25
		Large	45
	S3	Small	25
		Medium	45
		Large	85
<b>Abd-Adrenal Gland - Adenoma</b>	S2	Small	25
		Medium	45
		Large	85
	S3	Small	20
		Medium	35
		Large	60
	S4	Small	20
		Medium	35
		Large	60
<b>Abd-Gastric Varices</b>	S2	Small	15
		Medium	25
		Large	45
	S3	Small	15
		Medium	25
		Large	45
<b>Abd-Liver - Biphasic</b>	S2G1	Small	15
		Medium	25
		Large	50
	S2G2	Small	20
		Medium	35
		Large	60
<b>Abd-Liver - Cholangiocarcinoma</b>	S2	Small	20
		Medium	40
		Large	70
	S3	Small	15
		Medium	25
		Large	50
<b>Abd-Liver - Donor Work-up</b>	S3G1	Small	25
		Medium	45
		Large	85
	S3G2	Small	10
		Medium	20

		Large	35
	S3G3	Small	15
		Medium	25
		Large	50
	S4	Small	25
		Medium	45
		Large	85
<b>Abd-Liver - Hepatocellular Carcinoma</b>	S2G1	Small	15
		Medium	25
		Large	50
	S2G2	Small	20
		Medium	35
		Large	60
	S3	Small	15
		Medium	25
		Large	50
<b>Abd-Liver - Transplant Recipient Workup</b>	S2	Small	10
		Medium	20
		Large	30
	S4G1	Small	25
		Medium	45
		Large	85
	S4G2	Small	10
		Medium	20
		Large	35
	S4G3	Small	10
		Medium	20
		Large	35
	S5	Small	15
		Medium	25
		Large	50
<b>Abd-Liver - Triphasic</b>	S2	Small	10
		Medium	20
		Large	30
	S4G1	Small	25
		Medium	45
		Large	85
	S4G2	Small	10
		Medium	20
		Large	35
	S4G3	Small	10
		Medium	20
		Large	35

<b>Abd-Pancreas - Neoplasm/Screening</b>	S2	Small	10
		Medium	20
		Large	35
	S3G1	Small	30
		Medium	60
		Large	100
	S3G2	Small	25
		Medium	45
		Large	85
<b>Abd-Small Bowel - Enterography</b>	S2	Small	25
		Medium	45
		Large	85
<b>Body Pelvis</b>	S2	Small	20
		Medium	35
		Large	60
<b>Chest/Abd/Pelvis w/o IV Contrast</b>	S2G1	Small	10
		Medium	20
		Large	45
	S2G2	Small	20
		Medium	35
		Large	60
<b>Chest/Abd/Pelvis with IV Contrast</b>	S2G1	Small	10
		Medium	20
		Large	45
	S2G2	Small	20
		Medium	35
		Large	60
<b>CTA Abd - Mesenteric Ischemia</b>	S2G1	Small	25
		Medium	45
		Large	85
	S2G2	Small	10
		Medium	20
		Large	35
<b>CTA Abd/Pelvis - Portosystemic Shunt Eval</b>	S2	Small	15
		Medium	25
		Large	45
<b>CTA Abd/Pelvis - TIPS Evaluation</b>	S2G1	Small	30
		Medium	60
		Large	100
	S2G2	Small	20
		Medium	35
		Large	60

<b>CTA Abd - Obscure GI Bleed</b>	S2	Small	10
		Medium	20
		Large	35
	S3	Small	35
		Medium	45
		Large	85
	S4	Small	10
		Medium	20
		Large	35
<b>CTA Abd-Pancreas - Neoplasm Pre-Op</b>	S2G1	Small	35
		Medium	45
		Large	85
	S2G2	Small	20
		Medium	40
		Large	70
<b>CTA Abd-Pancreas - Transplant</b>	S2	Small	10
		Medium	20
		Large	35
	S3G1	Small	25
		Medium	45
		Large	85
	S3G2	Small	25
		Medium	45
		Large	85
<b>CTA Abd - Renal Donor</b>	S2	Small	10
		Medium	20
		Large	35
	S3G1	Small	25
		Medium	45
		Large	85
	S4	Small	15
		Medium	25
		Large	50
<b>Cystogram (Non Trauma)</b>	S2	Small	20
		Medium	35
		Large	60
	S3	Small	20
		Medium	35
		Large	60
<b>Low Dose Renal Stone / Flank Pain</b>	S2	Small	10
		Medium	20
		Large	30
<b>Trauma - Chest</b>	S2	Small	30

		Medium	75
		Large	135
<b>Trauma - Abd/Pelvis</b>	S2	Small	30
		Medium	75
		Large	135
	S3	Small	20
		Medium	35
		Large	60
<b>Trauma - Chest/Abd/Pelvis</b>	S2G1	Small	30
		Medium	75
		Large	135
	S2G2	Small	30
		Medium	75
		Large	135
	S3	Small	20
		Medium	35
		Large	60
<b>Trauma - Cystogram</b>	S2	Small	30
		Medium	75
		Large	135
<b>Chest - CTA for PE</b>	S2	Small	10
		Medium	15
		Large	30
<b>Chest - Dynamic 3-D Airway</b>	S2	Small	10
		Medium	20
		Large	45
	S3	Small	5
		Medium	10
		Large	20
<b>Chest - Low Dose Follow-up</b>	S2	Small	5
		Medium	10
		Large	20
<b>Chest - Low Dose Screening</b>	S2	Small	5
		Medium	10
		Large	20
<b>Chest - Pectus</b>	S2	Small	5
		Medium	10
		Large	20
<b>Chest - Standard (Routine &amp; High-Resolution)</b>	S2	Small	10
		Medium	20
		Large	45
	S3	Small	15

		Medium	25
		Large	45
	S5	Small	15
		Medium	25
		Large	45
<b>Abdominal Wall Flap CTA</b>	S2	Small	55
		Medium	100
		Large	160
<b>Lower Extremity CTA</b>	S2	Small	10
		Medium	20
		Large	30
	S4G1	Small	10
		Medium	25
		Large	35
	S4G2	Small	10
		Medium	25
		Large	35
<b>Non-gated CTA (Chest/Abd/Pelvis)</b>	S2	Small	15
		Medium	25
		Large	45
	S3	Small	15
		Medium	30
		Large	55
	S4	Small	15
		Medium	25
		Large	45
<b>Post-endostent Non-con Volume Change (A/P only)</b>	S2	Small	15
		Medium	25
		Large	45
	S3	Small	15
		Medium	30
		Large	55
	S4	Small	15
		Medium	25
		Large	45
<b>Prospectively-Gated Coronary CTA</b>	S2	Small	150
		Medium	150
		Large	150
	S4	Small	50
		Medium	50
		Large	50
<b>Prospectively-Gated CTA Chest (Non-Coronary)</b>	S2	Small	15
		Medium	25

		Large	45
	S3	Small	50
		Medium	50
		Large	50
<b>Prospectively-Gated CTA Chest Triple r/o</b>	S2	Small	15
		Medium	25
		Large	45
	S3	Small	50
		Medium	50
		Large	50
<b>Retrospectively-Gated Coronary CTA</b>	S2	Small	150
		Medium	150
		Large	150
	S4	Small	150
		Medium	150
		Large	150
<b>Retrospectively-Gated Chest + Non-Gated Abd/Pel CTA</b>	S2	Small	15
		Medium	25
		Large	45
	S3G1	Small	150
		Medium	150
		Large	150
	S3G2	Small	20
		Medium	30
		Large	55
	S4	Small	15
		Medium	25
		Large	45
<b>Retrospectively-Gated CTA Chest</b>	S2	Small	15
		Medium	25
		Large	45
	S3	Small	150
		Medium	150
		Large	150
	S4	Small	15
		Medium	25
		Large	45
<b>Subclavian CT Venogram</b>	S2	Small	15
		Medium	30
		Large	55
<b>TAVI CTA</b>	S2G1	Small	150
		Medium	150



		Large	150
	S2G2	Small	20
		Medium	30
		Large	55
<b>Upper Extremity CTA</b>	S2	Small	10
		Medium	20
		Large	30
	S4G1	Small	10
		Medium	25
		Large	35
	S4G1	Small	10
		Medium	25
		Large	35
<b>Ankle / Foot / Distal Tibia (Without Metal)</b>	S2	AnySize	60
<b>Ankle / Foot / Distal Tibia (With Metal)</b>	S2	AnySize	165
<b>Bony Pelvis / Hips / SI (Without Metal)</b>	S2	Small	25
		Medium	45
		Large	85
<b>Bony Pelvis / Hips / SI (With Metal)</b>	S2	Small	65
		Medium	95
		Large	135
<b>Bony Pelvis / Hips / SI (Without Metal) Larson</b>	S2	Small	25
		Medium	45
		Large	85
<b>Bony Pelvis /Hips/SI (With Metal) Larson</b>	S2	Small	65
		Medium	95
		Large	135
<b>Elbow (Without Metal)</b>	S2	AnySize	60
<b>Elbow (With Metal)</b>	S2	AnySize	165
<b>Femoral Anteversion</b>	S2G1	Small	10
		Medium	20
		Large	35
	S2G2	Small	5
		Medium	10
		Large	15
	S2G3	Small	5
		Medium	10
		Large	15
<b>Knee (Without Metal)</b>	S2	AnySize	60
<b>Knee (With Metal)</b>	S2	AnySize	165
<b>Mako Hip</b>	S2G1	AnySize	50
	S2G2	AnySize	30
<b>Mako Knee</b>	S2G1	AnySize	50

	S2G2	AnySize	30
	S2G3	AnySize	30
<b>Shoulder</b>	S2	Small	40
		Medium	60
		Large	85
	S3	Small	40
		Medium	60
		Large	85
<b>Wrist (Without Metal)</b>	S2	AnySize	25
<b>Wrist (With Metal)</b>	S2	AnySize	140
<b>3D CT: (Craniosynostosis, Congenital Facial Anomaly)</b>	S2	Adult	85
<b>3D CT: (Craniosynostosis, Congenital Facial Anomaly) (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
<b>Adult Brain: (Axial Mode)</b>	S2	Adult	85
	S3	Adult	70
<b>Adult Brain: Helical Scan with Angled Axial Reformations</b>	S2	Adult	85
	S3	Adult	70
<b>Adult Brain: Routine (Helical Mode)</b>	S2	Adult	85
	S3	Adult	70
<b>Cervical Spine: (Adult Routine) (No Metal)</b>	S2	Small	40
		Medium	85
		Large	155
	S3	Small	40
		Medium	85
		Large	155
<b>Cervical Spine: (Pediatric Routine)</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
	S3	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
<b>Cervical Spine: (Adult Routine) (With Metal)</b>	S2	Small	60

		Medium	105
		Large	170
	S3	Small	60
		Medium	105
		Large	170
<b>Facial Trauma: (Routine)</b>	S2	Adult	85
		Child	50
		Infant	30
	S3	Adult	70
		Child	35
		Infant	30
<b>Lumbar Spine: (Without Metal) (Adult Routine)</b>	S2	Small	30
		Medium	75
		Large	135
	S3	Small	30
		Medium	75
		Large	135
<b>Lumbar Spine: (Pediatric Routine)</b>	S2	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	15
		Green and black	35
	S3	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Lumbar Spine: (With Metal) (Adult Routine)</b>	S2	Small	60
		Medium	110
		Large	160
	S3	Small	60
		Medium	110
		Large	160
<b>Neck: (Add on Options)</b>	Op. 3	Adult	600*
<b>Neck: (Add on Options) Pediatric</b>	Op. 3	Child	300*
<b>Neck: (Parathyroid Adenoma)</b>	S2	Small	40
		Medium	85

		Large	155
	S3	Small	40
		Medium	85
		Large	155
	S4G1	Adult	40
		Child	25
		Infant	15
	S4G2	Adult	40
		Child	25
		Infant	15
<b>Neck: (Routine)</b>	S2	Small	40
		Medium	85
		Large	155
	S3	Adult	40
<b>Neck: (Routine)</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
	S3	Adult	40
		Child	25
		Infant	15
<b>Neck: (Salivary Gland)</b>	S2	Small	40
		Medium	85
		Large	155
	S3	Small	40
		Medium	85
		Large	155
	S4G1	Adult	40
	S4G2	Adult	40
<b>Neck: (Salivary Gland) Pediatric</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
	S3	Pink	5

		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
	S4G1	Child	25
		Infant	15
	S4G2	Child	25
		Infant	15
<b>Neck: (Vascular Mass)</b>	S2	Small	40
		Medium	85
		Large	155
	S3	Adult	600*
	S4	Small	40
		Medium	85
		Large	155
	S5	Adult	40
<b>Neck: (Vascular Mass)</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
	S3	Child	300*
	S4	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	20
		Green and black	50
	S5	Child	25
		Infant	15
<b>Orbit: (Dynamic Multipositional)</b>	S2	Adult	85
		Child	50
		Infant	30
	S3G1	Adult	85
		Child	50
		Infant	30

	S3G2	Adult	85
		Child	50
		Infant	30
	S3G3	Adult	85
		Child	50
		Infant	30
	S3G4	Adult	85
		Child	50
		Infant	30
<b>Orbit: (Routine)</b>	S2	Adult	85
	S3	Adult	70
<b>Orbit: (Routine) (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
	S3	Child	35
		Infant	30
<b>Orbit: (Vascular Mass or Carotid-Cavernous Fistula)</b>	S2	Adult	85
		Child	50
		Infant	30
	S3	Adult	600*
		Child	300*
	S4	Adult	70
		Child	35
		Infant	30
<b>Orbit: (With Valsalva)</b>	S2	Adult	70
		Child	35
		Infant	30
	S3	Adult	70
		Child	35
		Infant	30
<b>Pediatric Brain: (Axial Mode) (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
	S3	Child	35
		Infant	30
<b>Pediatric Brain: (Trauma) (&lt; 6 y/o) (with or without 3D CT)</b>	S2	Child	50
		Infant	30
	S3	Child	35
		Infant	30
<b>Pediatric Brain: Helical Scan with Angled Axial Reformations (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
	S3	Child	35
		Infant	30

<b>Pediatric Brain: Routine (Helical Mode) (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
	S3	Child	35
		Infant	30
<b>Pituitary Gland and Cavernous Sinus</b>	S2	Adult	85
		Child	50
		Infant	30
	S3	Adult	70
		Child	35
		Infant	30
	S4	Adult	70
		Child	35
		Infant	30
<b>Sinuses (Diagnostic)</b>	S2	Adult	45
		Child	25
		Infant	15
	S3	Adult	35
		Child	20
		Infant	15
<b>Sinuses (Follow-up Adult Sinus)</b>	S2	Adult	45
<b>Stealth - Stereotactic Head: (Whole Brain Treatment Planning)</b>	S2	Adult	110
<b>Stealth (Stereotactic) Spine</b>	S2	Adult	40
<b>Temporal Bone: (W/ Contrast Only or W/O &amp; W/ Contrast)</b>	S2	Adult	85
		Child	50
		Infant	30
	S3	Adult	70
		Child	35
		Infant	30
<b>Temporal Bone: (W/O Contrast)</b>	S2	Adult	85
<b>Temporal Bone: (W/O Contrast) (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
<b>Thoracic Spine: (Feet First) (Without Metal) (Adult Routine)</b>	S2	Small	30
		Medium	75
		Large	135
	S3	Small	30
		Medium	75
		Large	135
<b>Thoracic Spine: (Feet First) (With Metal) (Adult Routine)</b>	S2	Small	60
		Medium	110
		Large	160
	S3	Small	60

		Medium	110
		Large	160
<b>Thoracic Spine: (Pediatric Routine)</b>	S2	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	15
		Green and black	35
	S3	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Vascular Imaging: CT Venography</b>	S2	Adult	85
		Child	50
		Infant	30
	S3	Adult	125
		Child	65
		Infant	35
	S4	Adult	70
		Child	35
		Infant	30
<b>Vascular Imaging: CTA Head Only: (Stenosis, Aneurysm, Unknown Bleed)</b>	S2	Adult	85
	S3	Adult	70
	S4	Adult	600*
	S5	Adult	70
<b>Vascular Imaging: CTA Head Only: (Stenosis, Aneurysm, Unknown Bleed) (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
	S3	Child	35
		Infant	30
	S4	Child	300*
	S5	Child	35
		Infant	30
<b>Vascular Imaging: CTA Neck Only: (Cerebrovascular Disease)</b>	S2	Adult	125
<b>Vascular Imaging: CTA Neck Only: (Cerebrovascular Disease) (&lt; 6 y/o)</b>	S2	Child	65



		Infant	35
<b>Vascular Imaging: Stroke Deluxe – Total Cerebrovascular</b>	S2	Adult	85
	S3	Adult	125
	S4	Adult	600*
	S5	Adult	70
<b>Vascular Imaging: Stroke Deluxe – Total Cerebrovascular (&lt; 6 y/o)</b>	S2	Child	50
		Infant	30
	S3	Child	65
		Infant	35
	S4	Child	300*
	S5	Child	35
		Infant	30
<b>Chest - Pectus</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	5
		Green and black	15
<b>Chest with IV Contrast</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	20
<b>Chest without IV Contrast</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	20
<b>CTA Chest for PE</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10

		Green and black	20
<b>Renal Stone / Flank Pain</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>Routine Abdomen/Pelvis</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>Routine Chest/Abdomen/Pelvis</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>Trauma Abdomen/Pelvis</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	40
	S3	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>Trauma Chest/Abdomen/Pelvis</b>	S2G1	Pink	5

		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	40
	S2G2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	40
	S3	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>Triphasic Liver</b>	S3G1	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	40
	S3G2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
	S3G3	Pink	5
		Red and purple	5
		Yellow and white	5

		Blue and orange	10
		Green and black	25
<b>Acute Appendicitis: Abdomen/Pelvis</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Chest - Pectus</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	20
<b>Chest with IV Contrast</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>Chest without IV Contrast</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25
<b>CTA Chest for PE</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	5
		Blue and orange	10
		Green and black	25

<b>Renal Stone / Flank Pain - High Image Quality</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Routine Abdomen/Pelvis - High Image Quality</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Routine Chest/Abdomen/ Pelvis - High Image Quality</b>	S2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Trauma Abdomen/Pelvis - High Image Quality</b>	S2	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	20
		Green and black	55
	S3	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Trauma Chest/Abdomen/Pelvis High Image Quality</b>	S2G1	Pink	5
		Red and purple	10
		Yellow and white	10

		Blue and orange	20
		Green and black	55
	S2G2	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	20
		Green and black	55
	S3	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
<b>Triphasic Liver - High Image Quality</b>	S3G1	Pink	5
		Red and purple	10
		Yellow and white	10
		Blue and orange	20
		Green and black	55
	S3G2	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35
	S3G3	Pink	5
		Red and purple	5
		Yellow and white	10
		Blue and orange	15
		Green and black	35

## **UW Dose Data by Protocol & Series**

The following UW dose data was compiled from an Optima CT660 platform. Please note the following as you review this information:

1. The data below represent those studies for which more than 10 patients were scanned. Some pediatric and less frequently used adult protocols are not included in this table.
2. This data is more detailed than is commonly published. A more typical dose break down by indication and body region is listed after this table. That table includes pediatric dose levels.
3. The series names listed in this table will change on future versions of the UW protocol package. Future series level names will be vendor neutral and more similar among the different indications to enhance hanging protocol utilization by radiologists.
4. All head doses are reported using the 16 cm phantom. Cervical spine doses are reported using both the 16 and 32 cm phantoms. The pediatric body doses are reported using a 32 cm phantom.

Protocol Names in <b>BOLD</b> followed by series level names corresponding to those protocols  # of exams included in statistics provided after name	Series Level Statistics												Total Study Statistics			
	CTDI				SSDE				DLP				DLP			
	25pctCTDI	Mean CTDI	Median CTDI	75pctCTDI	25pctSSDE	Mean SSDE	Median SSDE	75pct SSDE	25pctDLP	Mean DLP	Median DLP	75pctDLP	25%	Mean	Median	75%
<b>01.01 ADULT BRAIN: ROUTINE (HELICAL MODE)</b> 606	31	34	33	37	32	35	34	37	594	683	666	744	615	776	681	779
HEAD W IVC 38	21	23	23	25	23	24	24	25	418	469	462	516	887	1053	1060	1278
HEAD W/O IVC 598	31	35	34	37	32	36	35	37	610	697	671	751	616	778	684	780
<b>01.02 ADULT BRAIN: HELICAL SCAN WITH ANGLED AXIAL REFORMATIONS</b> 277	38	47	45	56	38	45	43	51	749	955	899	1161	760	1086	929	1262
HEAD W/O IVC 277	38	47	45	56	38	45	43	51	749	955	899	1161	760	1086	929	1262
<b>01.03 ADULT BRAIN: (AXIAL MODE)</b> 250	27	35	28	50	26	35	29	47	518	661	519	975	518	875	576	1021
HEAD W/O IVC 250	27	35	28	50	26	35	29	47	518	661	519	975	518	875	576	1021
<b>01.06 CTA STROKE DELUXE</b> 44	24	95	30	36	27	111	38	63	507	891	738	1192	2366	3243	3649	3960
CTA STROKE DELUXE 42	26	27	29	30	57	57	61	63	1010	1054	1121	1191	2354	3233	3649	3962
HEAD W IVC 41	21	23	22	24	23	24	24	25	419	452	441	487	2372	3218	3648	3873
HEAD W/O 41	32	35	34	36	35	37	36	38	624	698	678	731	2404	3318	3650	3963
PERFUSION 27	399	399	399	399	427	436	435	451	1597	1597	1597	1597	3649	3787	3783	4035
<b>01.07 CTA HEAD ONLY</b> 54	22	27	26	32	23	28	27	33	444	560	530	632	1374	1789	1562	2004
CTA HEAD 53	22	26	24	27	23	26	25	28	456	561	491	567	1373	1771	1528	1980
HEAD W IVC 41	21	22	22	24	22	23	23	25	393	439	438	471	1416	1670	1528	1749
HEAD W/O 48	31	34	33	36	33	35	34	36	591	661	656	705	1425	1879	1607	2039
<b>01.10 STEALTH-STEREOTACTIC HEAD</b> 17	53	53	53	53	49	51	52	53	1006	1019	1006	1059	1006	1705	1059	2117
STEALTH 17	53	53	53	53	49	51	52	53	1006	1019	1006	1059	1006	1705	1059	2117
<b>01.13 CTA STROKE DELUXE W/PERFUSION SHUTTLE</b> 166	27	77	32	54	30	84	41	67	585	1020	827	1352	3549	3805	4116	4299
CTA STROKE DELUXE 150	27	27	29	31	53	56	59	63	1005	1052	1129	1214	3782	3960	4146	4311
HEAD W IVC 152	26	28	27	28	26	28	27	28	504	557	533	573	3714	3974	4135	4310
HEAD W/O 149	32	36	35	38	33	36	35	38	620	725	685	770	3650	3827	4135	4310
PERFUSION 143	224	224	224	224	218	225	227	227	1795	1795	1795	1795	3890	4105	4161	4316
<b>02.01 ORBIT (ROUTINE)</b> 12	39	40	40	41	39	40	40	42	389	434	409	490	406	508	454	543
ORBIT W/O IVC 12	39	40	40	41	39	40	40	42	389	434	409	490	406	508	454	543
<b>02.05 FACIAL TRAUMA (ROUTINE)</b> 82	37	48	46	58	38	45	46	52	752	976	950	1188	760	1095	958	1277
FACIAL TRAUMA 82	37	48	46	58	38	45	46	52	752	976	950	1188	760	1095	958	1277
<b>02.07 SINUSES (DIAGNOSTIC)</b> 229	18	20	20	22	18	20	20	22	289	349	323	385	291	352	323	385



SINUS W/O	229	18	20	20	22	18	20	20	22	289	349	323	385	291	352	323	385
<b>02.10 TEMPORAL BONE (W/O CONTRAST)</b>	30	23	35	35	41	23	35	36	41	204	346	314	409	204	395	314	409
T BONE W/O IVC	30	23	35	35	41	23	35	36	41	204	346	314	409	204	395	314	409
<b>03.01 NECK (ROUTINE)</b>	67	32	36	32	39	31	54	34	87	136	684	136	1356	1540	1761	1712	1940
ANGLED AXIALS	48	32	32	32	32	30	31	31	33	136	136	136	136	1663	1844	1746	2034
NECK W /IVC	66	39	43	39	45	81	88	89	94	1320	1489	1415	1601	1539	1735	1711	1912
<b>03.02 NECK (ROUTINE) (MEDIUM ADULT)</b>	99	39	50	59	59	60	66	63	70	251	608	251	1007	1377	1563	1565	1799
ANGLED AXIALS	76	59	59	59	59	57	60	62	64	251	251	251	251	1476	1678	1659	1930
NECK W /IVC	97	28	36	35	42	66	76	74	89	921	1167	1108	1428	1377	1563	1560	1817
<b>03.02 NECK (ROUTINE) (MEDIUM ADULT)</b>	125	38	50	59	59	55	61	59	67	251	587	251	970	1276	1515	1524	1790
ANGLED AXIALS	91	59	60	59	60	52	57	57	60	251	253	251	251	1413	1665	1627	1850
NECK W /IVC	120	28	35	33	42	59	69	68	77	891	1097	1089	1316	1283	1495	1512	1782
<b>03.03 NECK (ROUTINE) (LARGE ADULT)</b>	13	59	62	60	62	57	79	60	121	251	831	251	1887	2459	2693	2655	2752
ANGLED AXIALS	13	59	60	59	61	56	57	57	60	251	251	251	251	2459	2693	2655	2752
NECK W /IVC	12	62	65	64	69	124	126	128	133	1931	2088	2116	2255	2449	2696	2618	2757
<b>03.03 NECK (ROUTINE) LARGE ADULT</b>	13	59	60	59	61	55	68	57	80	251	854	251	1727	2207	2734	2661	2693
ANGLED AXIALS	11	59	60	59	61	55	55	56	57	251	251	251	251	2314	2520	2661	2686
NECK W /IVC	12	56	61	60	65	80	94	94	105	1727	1959	1950	2181	2200	2740	2571	2708
<b>03.07 CERVICAL SPINE (16 cm phantom)</b>	30	91	111	98	115	95	109	102	110	2069	2626	2464	2952	2461	3038	2874	3473
C-SPINE W/O IVC	30	91	111	98	115	95	109	102	110	2069	2626	2464	2952	2461	3038	2874	3473
<b>03.11 CTA NECK</b>	22	30	33	34	36	61	66	68	74	925	1023	1011	1162	939	1238	1023	1185
CTA NECK	22	30	33	34	36	61	66	68	74	925	1023	1011	1162	939	1238	1023	1185
<b>03.13 CTA STROKE DELUXE W/ PERFUSION SHUTTLE</b>	25	28	77	32	51	32	84	47	67	612	1045	879	1333	3726	3792	4043	4391
CTA STROKE DELUXE	21	28	29	29	31	55	59	58	62	1060	1158	1143	1267	3828	3990	4140	4391
HEAD W IVC	23	26	29	27	31	27	29	27	30	503	564	525	605	3815	4057	4140	4406
HEAD W/O	21	33	38	36	42	34	37	36	41	620	744	712	851	3726	3666	4043	4288
PERFUSION	20	224	224	224	224	224	225	227	236	1795	1795	1795	1795	3992	4258	4211	4430
<b>03.17 CERVICAL SPINE MEDIUM ADULT - NO METAL</b>	145	27	33	31	39	58	66	64	73	569	733	688	857	664	1099	943	1377
C-SPINE W/O IVC	145	27	33	31	39	58	66	64	73	569	733	688	857	664	1099	943	1377
<b>03.17 CERVICAL SPINE MEDIUM ADULT - NO METAL</b>	11	27	36	30	40	61	69	66	68	605	693	675	858	634	804	734	888
C-SPINE W/O IVC	11	27	36	30	40	61	69	66	68	605	693	675	858	634	804	734	888
<b>03.18 CERVICAL SPINE LARGE ADULT - NO METAL</b>	19	57	61	62	67	100	106	104	109	1215	1349	1373	1473	1424	1749	1603	2059
C-SPINE W/O IVC	19	57	61	62	67	100	106	104	109	1215	1349	1373	1473	1424	1749	1603	2059

<b>04.01 SHOULDER (WITH OR WITHOUT METAL) MEDIUM ADULT</b>	10	11	23	14	33	16	30	20	42	260	529	307	780	260	548	399	781
UPP. EXT. W/O IVC	10	11	23	14	33	16	30	20	42	260	529	307	780	260	548	399	781
<b>04.06 ELBOW WITHOUT METAL</b>	11	21	25	33	33	68	71	71	74	279	339	440	449	494	561	557	654
ELBOW	11	21	25	33	33	68	71	71	74	279	339	440	449	494	561	557	654
<b>04.08 WRIST WITHOUT METAL</b>	28	23	29	23	25	58	60	60	63	352	508	381	490	348	470	361	430
WRIST	28	23	29	23	25	58	60	60	63	352	508	381	490	348	470	361	430
<b>05.01 CHEST-STANDARD (ROUTINE AND HIGH-RESOLUTION) SMALL ADULT</b>	50	4	8	9	11	6	10	11	13	156	301	310	420	165	363	340	421
CHEST	50	4	8	9	11	6	10	11	13	156	301	310	420	165	363	340	421
<b>05.02 CHEST-STANDARD (ROUTINE AND HIGH-RESOLUTION) MEDIUM ADULT</b>	680	3	6	6	9	5	8	7	10	124	233	210	323	153	292	245	369
CHEST	680	4	7	6	9	5	8	8	10	140	253	227	338	153	292	245	369
EXPIRATION HI RES	52	0	3	1	1	1	4	1	2	8	19	16	26	147	266	242	330
<b>05.03 CHEST-STANDARD (ROUTINE AND HIGH-RESOLUTION) LARGE ADULT</b>	158	11	18	17	24	12	17	17	22	381	617	589	893	494	834	739	973
CHEST	157	12	19	18	24	13	18	18	22	443	675	640	904	496	839	740	973
EXPIRATION HI RES	14	1	10	2	3	1	10	2	3	23	43	31	61	370	657	606	837
<b>05.04 CHEST/ABD/PELVIS WITH IV CONTRAST SMALL ADULT</b>	23	3	5	4	7	4	8	7	11	91	218	178	305	305	421	379	512
C/A/P	23	3	5	4	7	4	8	7	11	91	218	178	305	305	421	379	512
<b>05.05 CHEST/ABD/PELVIS WITH IV CONTRAST MEDIUM ADULT</b>	610	5	9	7	11	6	11	10	14	165	373	294	497	455	785	680	1044
C/A/P	610	5	9	7	11	6	11	10	14	165	373	294	497	455	785	680	1044
<b>05.06 CHEST/ABD/PELVIS WITH IV CONTRAST LARGE ADULT</b>	195	13	19	17	25	14	19	17	24	481	857	740	1157	1243	1764	1617	2174

C/A/P	195	13	19	17	25	14	19	17	24	481	857	740	1157	1243	1764	1617	2174
<b>05.08 CHEST/ABD/PELVIS W/O IV CONTRAST MEDIUM ADULT</b>	18	5	10	8	15	7	12	10	17	169	398	259	650	495	839	894	1096
C/A/P	18	5	10	8	15	7	12	10	17	169	398	259	650	495	839	894	1096
<b>05.09 CHEST/ABD/PELVIS W/O IV CONTRAST LARGE ADULT</b>	11	13	21	20	27	13	20	19	25	340	808	663	1064	1290	1763	1812	2300
C/A/P	11	13	21	20	27	13	20	19	25	340	808	663	1064	1290	1763	1812	2300
<b>05.11 CHEST-LOW DOSE FOLLOW-UP MEDIUM ADULT</b>	142	1	2	2	3	2	3	3	3	45	84	74	109	46	90	77	116
CHEST	142	1	2	2	3	2	3	3	3	45	84	74	109	46	90	77	116
<b>05.12 CHEST-LOW DOSE FOLLOW-UP LARGE ADULT</b>	31	3	5	4	6	4	5	5	7	128	194	160	246	137	201	162	247
CHEST	31	3	5	4	6	4	5	5	7	128	194	160	246	137	201	162	247
<b>05.14 CHEST-LOW DOSE SCREENING MEDIUM ADULT</b>	43	2	2	2	3	2	3	3	4	49	93	87	131	73	99	94	133
CHEST	43	2	2	2	3	2	3	3	4	49	93	87	131	73	99	94	133
<b>05.17 CHEST-CTA FOR PE MEDIUM ADULT</b>	231	3	6	6	7	4	7	7	8	123	202	193	271	135	243	207	293
STANDARD	231	3	6	6	7	4	7	7	8	123	202	193	271	135	243	207	293
<b>05.18 CHEST-CTA FOR PE LARGE ADULT</b>	95	9	14	13	17	9	13	13	16	310	466	442	598	324	540	479	643
STANDARD	95	9	14	13	17	9	13	13	16	310	466	442	598	324	540	479	643
<b>05.20 CHEST-CTA FOR PE WITH ABD/PELVIS MEDIUM ADULT</b>	15	5	7	6	7	6	8	8	9	239	285	263	311	423	587	517	678
PE-A/P-PHASIC	15	5	7	6	7	6	8	8	9	239	285	263	311	423	587	517	678
<b>05.26 TRAUMA-CHEST/ABD/PELVIS MEDIUM ADULT</b>	66	13	22	20	30	17	25	24	33	547	988	883	1444	1185	2044	1942	2581
C/A/P	66	13	22	20	30	17	25	24	33	547	988	883	1444	1185	2044	1942	2581
<b>05.27 TRAUMA-CHEST/ABD/PELVIS LARGE ADULT</b>	22	31	41	43	50	29	38	40	47	1072	1809	1701	2602	3243	4211	4448	4983
C/A/P	22	31	41	43	50	29	38	40	47	1072	1809	1701	2602	3243	4211	4448	4983
<b>05.29 NON-GATED CTA (CHEST/ABD/PELVIS) MEDIUM ADULT</b>	173	7	11	10	13	9	13	12	16	338	571	524	758	659	1232	1180	1641

<b>1.25 CTA AX</b>	169	7	11	10	14	9	13	12	16	348	566	524	747	664	1244	1195	1646
<b>1.25 DELAYED AX</b>	49	5	8	7	9	7	9	9	11	270	393	364	486	964	1535	1372	1927
<b>1.25 NON-CON AX</b>	143	8	12	11	15	10	14	13	17	398	639	612	867	829	1342	1254	1721
<b>05.30 NON-GATED CTA (CHEST/ABD/PELVIS) LARGE ADULT</b>	48	17	23	21	29	18	21	20	26	911	1341	1258	1721	1703	2993	2807	4237
<b>1.25 CTA AX</b>	43	16	24	21	29	17	22	21	27	931	1407	1288	1836	2070	3168	3173	4408
<b>1.25 DELAYED AX</b>	19	18	22	21	24	18	20	19	21	910	1201	1195	1405	3005	4098	4216	4989
<b>1.25 NON-CON AX</b>	42	15	22	21	29	16	21	20	26	911	1338	1374	1734	1808	3156	2959	4462
<b>05.47 PROSPECTIVELY GATED CTA CHEST (NON-CORONARY) MEDIUM ADULT</b>	42	7	11	13	15	8	13	15	16	238	345	365	456	500	619	607	728
<b>1.25 NON-CON AX</b>	25	4	7	6	8	5	8	7	9	136	229	219	285	548	650	643	725
<b>PROSPECTIVE GATED CHEST</b>	42	13	14	13	15	15	16	16	17	365	419	410	457	496	618	607	728
<b>05.48 PROSPECTIVELY GATED CTA CHEST (NON-CORONARY) LARGE ADULT</b>	10	26	27	26	26	25	28	26	30	758	832	827	896	847	1067	1094	1232
<b>PROSPECTIVE GATED CHEST</b>	10	26	27	26	26	25	28	26	30	758	832	827	896	847	1067	1094	1232
<b>06.01 ABD/PELVIS SMALL ADULT</b>	50	6	8	8	10	10	12	12	15	288	378	372	451	295	385	378	456
<b>A/P</b>	50	6	8	8	10	10	12	12	15	288	378	372	451	295	385	378	456
<b>06.02 ABD/PELVIS MEDIUM ADULT</b>	1085	6	10	9	13	9	12	11	15	293	503	451	662	313	537	473	690
<b>A/P</b>	1075	6	10	9	13	9	12	11	15	295	506	454	664	316	540	476	694
<b>ABD</b>	10	5	8	6	10	8	10	8	13	159	241	179	300	165	291	187	305
<b>06.03 ABD/PELVIS LARGE ADULT</b>	358	14	22	21	30	14	20	19	26	734	1194	1067	1661	797	1338	1198	1784
<b>A/P</b>	358	14	22	21	30	14	20	19	26	734	1194	1067	1661	797	1338	1198	1784
<b>06.11 ABD/PELVIS-FLANK PAIN MEDIUM ADULT</b>	100	7	11	10	14	10	13	12	16	283	486	412	606	304	505	430	637
<b>FLANK PAIN</b>	100	7	11	10	14	10	13	12	16	283	486	412	606	304	505	430	637
<b>06.12 ABD/PELVIS-FLANK PAIN LARGE ADULT</b>	34	17	24	22	31	18	22	21	26	782	1069	965	1374	804	1168	1067	1398
<b>FLANK PAIN</b>	34	17	24	22	31	18	22	21	26	782	1069	965	1374	804	1168	1067	1398
<b>06.14 LOW DOSE RENAL STONE/FLANK PAIN MEDIUM ADULT</b>	25	4	5	4	5	5	6	6	7	142	205	172	244	153	222	194	253
<b>LOW DOSE FLANK PAIN</b>	25	4	5	4	5	5	6	6	7	142	205	172	244	153	222	194	253

<b>06.17 ABD/PELVIS-COLONOGRAPHY MEDIUM ADULT</b>	154	2	3	3	4	3	4	4	5	100	174	155	230	226	372	329	459
5X3	154	2	4	4	5	3	5	5	6	125	205	194	264	226	372	329	459
DECUB COLONOGRAPHY	56	2	3	3	4	3	4	4	5	94	158	135	218	243	438	391	581
PRONE COLONOGRAPHY	111	2	3	2	3	2	4	3	4	76	140	121	182	212	361	315	425
<b>06.18 ABD/PELVIS-COLONOGRAPHY LARGE ADULT</b>	28	5	7	8	10	6	8	8	9	275	411	416	545	660	920	895	1113
5X3	28	6	8	9	10	7	8	9	9	374	446	466	572	660	920	895	1113
DECUB COLONOGRAPHY	13	3	7	6	10	4	7	7	10	187	387	345	542	640	958	949	1173
PRONE COLONOGRAPHY	15	5	6	6	8	6	7	8	9	280	363	340	471	684	847	870	1034
<b>06.23 ABD/PELVIS-UROGRAPHY MEDIUM ADULT</b>	157	7	12	10	15	9	15	13	18	269	509	427	662	665	1060	966	1378
PARENCHYMAL WITHOUT	155	10	15	14	20	14	19	18	24	411	662	583	856	667	1064	966	1382
	155	5	8	7	11	7	10	9	12	218	352	311	452	663	1064	970	1382
<b>06.24 ABD/PELVIS-UROGRAPHY LARGE ADULT</b>	38	15	24	21	32	15	23	20	31	631	1018	851	1415	1430	2168	2135	2548
PARENCHYMAL WITHOUT	38	22	31	31	39	23	31	31	37	906	1327	1388	1700	1430	2168	2135	2548
	37	11	16	16	19	12	15	15	18	468	684	691	844	1501	2209	2153	2550
<b>06.26 ABD-LIVER-BIPHASIC MEDIUM ADULT</b>	97	5	8	7	10	7	10	10	13	152	406	305	571	528	820	730	990
BIPHASIC	97	5	8	7	10	7	10	10	13	152	406	305	571	528	820	730	990
<b>06.27 ABD-LIVER-BIPHASIC LARGE ADULT</b>	39	12	18	17	24	12	18	16	22	383	928	677	1275	1281	1897	1681	2466
BIPHASIC	39	12	18	17	24	12	18	16	22	383	928	677	1275	1281	1897	1681	2466
<b>06.32 ABD-ADRENAL GLAND: ADENOMA MEDIUM ADULT</b>	14	5	8	7	11	8	12	11	15	111	180	121	166	127	336	186	320
WITHOUT	14	5	8	7	11	8	12	11	15	111	180	121	166	127	336	186	320
<b>06.41 ABD-PANCREAS - NEOPLASM/ SCREENING MEDIUM ADULT</b>	15	5	10	9	13	6	13	11	17	103	333	256	398	638	1021	839	1135
PANC-PHASIC WITHOUT	15	7	13	11	15	11	17	15	18	279	456	351	621	638	1021	839	1135
	15	2	4	4	5	4	6	5	6	56	102	89	121	638	1021	839	1135
<b>06.44 CTA ABD-PANCREAS -</b>	18	5	9	7	12	9	12	11	16	137	398	305	503	427	798	605	1172

<b>NEOPLASM PRE-OP MEDIUM ADULT</b>																	
PANC-PHASIC	18	5	9	7	12	9	12	11	16	137	398	305	503	427	798	605	1172
<b>06.50 ABD/PELVIS- KIDNEY TUMOR MEDIUM ADULT</b>	12	8	14	13	17	10	16	14	18	177	434	340	599	740	1527	1253	1978
DELAY	12	13	20	15	27	17	23	18	28	209	505	486	668	740	1527	1253	1978
VASCULAR	11	8	13	13	18	11	15	14	19	391	656	564	798	726	1330	1142	1650
WITHOUT	12	5	9	9	13	7	10	10	14	109	195	174	248	740	1527	1253	1978
<b>06.53 CTA ABD-RENAL DONOR MEDIUM ADULT</b>	39	5	9	7	12	6	11	9	14	101	281	204	360	544	871	776	1240
PARENCHYMAL PHASE	39	4	7	7	9	6	8	8	11	135	224	192	311	544	871	776	1240
VASCULAR PHASE	39	10	16	15	20	14	19	18	23	334	509	450	717	544	871	776	1240
WITHOUT	39	3	6	5	7	4	7	7	9	55	124	101	173	544	871	776	1240
<b>06.54 CTA ABD-RENAL DONOR LARGE ADULT</b>	10	8	15	12	18	9	15	12	19	229	446	334	627	1064	1384	1284	1604
PARENCHYMAL PHASE	10	9	11	11	13	9	11	12	13	284	351	322	415	1064	1384	1284	1604
VASCULAR PHASE	10	19	25	26	28	21	24	25	28	662	811	748	951	1064	1384	1284	1604
WITHOUT	10	6	9	7	11	7	9	8	11	135	201	203	249	1064	1384	1284	1604
<b>06.56 ABD-SMALL BOWEL ENTEROGRAPHY MEDIUM ADULT</b>	19	11	15	13	17	15	19	18	23	542	754	667	894	542	754	667	894
PARENCHYMAL PHASE	19	11	15	13	17	15	19	18	23	542	754	667	894	542	754	667	894
<b>06.62 CTA ABD- MESENTERIC ISCHEMIA MEDIUM ADULT</b>	11	4	9	8	14	6	10	9	14	206	451	377	752	598	1233	1029	1740
PARENCHYMAL PHASE	11	4	9	8	14	6	10	9	14	206	451	377	752	598	1233	1029	1740
<b>06.83 ABD-LIVER-HCC MEDIUM ADULT</b>	33	5	8	8	10	7	10	10	12	145	299	216	342	536	922	744	1205
3 MIN DELAY	33	5	7	6	9	6	9	8	11	127	201	183	241	527	895	715	1205
BIPHASIC	32	5	9	8	13	7	11	10	15	158	349	248	424	533	930	786	1213
<b>06.84 ABD-LIVER-HCC LARGE ADULT</b>	31	12	19	17	23	13	19	17	22	341	682	568	862	1314	2029	1853	2403
3 MIN DELAY	30	11	17	14	21	12	16	15	19	326	486	419	601	1308	2042	1855	2422
BIPHASIC	31	13	21	19	26	13	20	18	24	436	777	610	1078	1314	2029	1853	2403
<b>07.02 LUMBAR SPINE (FEET FIRST) MEDIUM ADULT</b>	68	15	29	28	38	22	35	35	45	434	843	766	1204	524	979	930	1386
L-SPINE W/O IVC	68	15	29	28	38	22	35	35	45	434	843	766	1204	524	979	930	1386
<b>07.03 LUMBAR SPINE (FEET FIRST) LARGE ADULT</b>	23	29	50	45	72	28	48	49	66	919	1523	1446	2013	919	2178	1508	2480
L-SPINE W/O IVC	23	29	50	45	72	28	48	49	66	919	1523	1446	2013	919	2178	1508	2480

<b>07.05 THORACIC SPINE (FEET FIRST) MEDIUM ADULT</b>	14	16	18	18	22	20	24	23	29	548	665	644	861	698	1009	858	1383
T-SPINE W/O IVC	14	16	18	18	22	20	24	23	29	548	665	644	861	698	1009	858	1383
<b>07.08 THORACIC SPINE (HEAD FIRST) MEDIUM ADULT</b>	20	17	25	21	34	20	28	26	36	593	991	845	1304	788	1222	1122	1750
T-SPINE W/O IVC	20	17	25	21	34	20	28	26	36	593	991	845	1304	788	1222	1122	1750
<b>07.17 LUMBAR SPINE (WITH METAL) MEDIUM ADULT</b>	19	23	42	36	65	31	56	47	75	662	1098	1087	1457	662	1147	1087	1457
L-SPINE W/O IVC	19	23	42	36	65	31	56	47	75	662	1098	1087	1457	662	1147	1087	1457
<b>08.01 BONY PELVIS/HIPS/SI MEDIUM ADULT (NO METAL)</b>	16	8	16	11	20	12	20	17	26	233	476	496	604	236	586	502	622
BONEY PELVIS	16	8	16	11	20	12	20	17	26	233	476	496	604	236	586	502	622
<b>08.14 BODY PELVIS MEDIUM ADULT</b>	18	7	12	12	15	9	14	14	17	175	340	307	534	260	397	347	564
PELVIS	18	7	12	12	15	9	14	14	17	175	340	307	534	260	397	347	564
<b>09.01 ANKLE/FOOT/DISTAL TIBIA (NO METAL)</b>	31	33	34	33	35	74	79	80	86	674	801	741	835	674	801	741	835
LOW EXT. W/O IVC	31	33	34	33	35	74	79	80	86	674	801	741	835	674	801	741	835
<b>09.03 KNEE (NO METAL)</b>	13	33	33	33	33	63	71	74	82	730	823	852	905	779	887	881	908
KNEE W/O IVC	13	33	33	33	33	63	71	74	82	730	823	852	905	779	887	881	908
<b>11.01 PEDIATRIC BRAIN: ROUTINE (HELICAL MODE) 3-6 YR</b>	11	20	27	25	30	22	27	27	31	404	517	488	573	404	517	488	573
HEAD W/O IVC	11	20	27	25	30	22	27	27	31	404	517	488	573	404	517	488	573
<b>11.02 PEDIATRIC BRAIN: ROUTINE (HELICAL MODE) 0-3 YR</b>	17	20	21	21	22	21	22	22	23	297	355	364	417	297	375	372	431
HEAD W/O IVC	17	20	21	21	22	21	22	22	23	297	355	364	417	297	375	372	431
<b>11.04 PEDIATRIC BRAIN: HELICAL SCAN W/ANGLED AXIAL REF 0-3 YR</b>	12	22	22	22	23	22	23	23	24	343	394	365	411	355	424	375	443
HEAD W/O IVC	12	22	22	22	23	22	23	23	24	343	394	365	411	355	424	375	443
<b>15.09 CHEST WITHOUT IV CONTRAST 13-18 YRS</b>	10	3	5	3	6	4	6	5	8	74	146	103	161	74	146	103	161
CHEST W/O	10	3	5	3	6	4	6	5	8	74	146	103	161	74	146	103	161
<b>Grand Total</b>	<b>7529</b>	<b>7</b>	<b>24</b>	<b>15</b>	<b>31</b>	<b>9</b>	<b>27</b>	<b>16</b>	<b>32</b>	<b>251</b>	<b>595</b>	<b>487</b>	<b>791</b>	<b>359</b>	<b>907</b>	<b>642</b>	<b>1121</b>

## **UW Dose Data by Body Region & Indication**

The following UW dose data was compiled by body region and indication.



Protocol Names in <b>BOLD</b> followed by series level names corresponding to those protocols	# of exams included in statistics provided after name	Series Level Statistics												Total Study Statistics			
		CTDI				SSDE				DLP				DLP			
		25pctCTDI	Mean CTDI	Median CTDI	75pctCTDI	25pctSSDE	Mean SSDE	Median SSDE	75pct SSDE	25pctDLP	Mean DLP	Median DLP	75pctDLP	25%	Mean	Median	75%
<b>Ab/Pelv</b>	<b>1468</b>	<b>7.04</b>	<b>13.02</b>	<b>10.52</b>	<b>16.10</b>	<b>9.50</b>	<b>14.30</b>	<b>12.87</b>	<b>17.61</b>	<b>17</b>	<b>339</b>	<b>673</b>	<b>531</b>	<b>367</b>	<b>729</b>	<b>567</b>	<b>890</b>
Small	51	6.04	8.06	7.91	9.77	9.77	12.37	12.21	14.48	163	288	381	372	295	388	381	458
Medium	1068	6.20	10.07	9.04	13.12	8.63	12.30	11.61	15.47	17	299	509	456	318	544	479	704
Large	349	14.25	22.50	21.07	31.06	14.56	20.63	19.65	26.50	30	734	1202	1104	809	1345	1259	1779
<b>C/A/P</b>	<b>855</b>	<b>5.35</b>	<b>11.14</b>	<b>9.06</b>	<b>14.89</b>	<b>7.37</b>	<b>12.58</b>	<b>11.11</b>	<b>16.54</b>	<b>27</b>	<b>192</b>	<b>485</b>	<b>362</b>	<b>505</b>	<b>1012</b>	<b>859</b>	<b>1336</b>
Small	23	2.50	5.00	3.88	6.91	3.72	7.72	6.69	10.92	61	91	218	178	305	421	379	512
Medium	626	4.66	8.66	7.40	11.47	6.45	10.57	9.58	14.00	27	166	375	295	458	788	686	1059
Large	206	13.06	19.39	17.44	25.08	13.76	19.30	17.64	23.85	46	472	855	737	1241	1761	1617	2175
<b>Chest</b>	<b>892</b>	<b>3.70</b>	<b>8.57</b>	<b>6.77</b>	<b>10.99</b>	<b>5.11</b>	<b>9.61</b>	<b>8.45</b>	<b>12.52</b>	<b>1</b>	<b>130</b>	<b>305</b>	<b>248</b>	<b>171</b>	<b>389</b>	<b>286</b>	<b>470</b>
Small	52	3.52	7.55	8.08	11.31	5.34	9.63	10.43	13.51	1	126	274	274	152	351	320	419
Medium	682	3.42	6.40	5.65	8.60	4.65	7.78	7.34	10.32	1	122	233	210	153	289	244	368
Large	158	11.08	17.96	16.42	23.66	12.22	17.23	16.78	21.88	7	382	617	589	494	834	739	973
<b>C-spine</b>	<b>182</b>	<b>27.21</b>	<b>36.02</b>	<b>32.55</b>	<b>40.36</b>	<b>59.27</b>	<b>69.72</b>	<b>64.88</b>	<b>79.20</b>	<b>316</b>	<b>578</b>	<b>790</b>	<b>715</b>	<b>665</b>	<b>1134</b>	<b>992</b>	<b>1465</b>
Small	5	16.17	17.83	17.39	17.60	32.02	35.27	33.21	38.73	316	319	359	346	346	578	390	426
Medium	156	27.13	33.35	30.69	38.70	58.52	65.94	63.83	72.81	356	573	729	688	657	1074	906	1343
Large	21	55.05	60.32	61.93	66.30	98.76	106.19	104.16	109.31	981	1223	1349	1373	1418	1712	1556	2048
<b>Head</b>	<b>1097</b>	<b>30.36</b>	<b>38.06</b>	<b>35.00</b>	<b>44.24</b>	<b>31.70</b>	<b>37.58</b>	<b>35.66</b>	<b>42.15</b>	<b>58</b>	<b>576</b>	<b>749</b>	<b>696</b>	<b>601</b>	<b>864</b>	<b>717</b>	<b>965</b>
(blank)	1097	30.36	38.06	35.00	44.24	31.70	37.58	35.66	42.15	58	576	749	696	601	864	717	965
<b>L-spine</b>	<b>95</b>	<b>16.68</b>	<b>32.92</b>	<b>31.42</b>	<b>43.83</b>	<b>22.70</b>	<b>36.99</b>	<b>36.41</b>	<b>48.06</b>	<b>129</b>	<b>452</b>	<b>971</b>	<b>910</b>	<b>550</b>	<b>1190</b>	<b>1085</b>	<b>1536</b>
Small	3	14.62	22.70	20.01	29.44	18.89	26.84	22.01	32.38	129	335	535	540	618	1383	1106	2009
Medium	70	15.41	28.38	27.93	38.39	21.72	34.38	34.35	44.53	174	429	832	758	521	972	930	1362
Large	22	27.83	48.98	44.96	70.62	27.94	46.78	48.58	64.09	429	892	1480	1437	892	1856	1468	2450
<b>Lung Ca</b>	<b>226</b>	<b>1.34</b>	<b>2.79</b>	<b>2.29</b>	<b>3.49</b>	<b>1.88</b>	<b>3.24</b>	<b>2.93</b>	<b>4.17</b>	<b>5</b>	<b>48</b>	<b>106</b>	<b>87</b>	<b>51</b>	<b>117</b>	<b>91</b>	<b>144</b>
Small	3	1.21	1.69	1.22	1.94	1.89	2.57	1.98	2.95	48	49	58	50	49	58	50	63
Medium	185	1.21	2.24	2.05	2.94	1.69	2.76	2.62	3.56	5	46	86	77	47	92	81	117
Large	38	3.48	5.55	4.44	6.48	4.01	5.65	4.85	6.69	36	130	211	177	141	241	180	263
<b>PE</b>	<b>333</b>	<b>4.22</b>	<b>7.89</b>	<b>6.50</b>	<b>9.69</b>	<b>5.27</b>	<b>8.40</b>	<b>7.55</b>	<b>10.21</b>	<b>46</b>	<b>146</b>	<b>277</b>	<b>231</b>	<b>163</b>	<b>326</b>	<b>249</b>	<b>386</b>
Small	7	3.45	4.38	4.67	4.92	5.08	6.53	7.15	7.27	71	127	147	151	134	154	159	167
Medium	231	3.43	5.68	5.50	7.46	4.42	6.65	6.73	8.49	46	123	202	193	135	243	207	293
Large	95	9.09	13.50	12.85	17.13	9.24	12.81	12.95	15.82	57	310	466	442	324	540	479	643

Continued on next page

Protocol Names in <b>BOLD</b> followed by series level names corresponding to those protocols  # of exams included in statistics provided after name	Series Level Statistics												Total Study Statistics			
	CTDI				SSDE				DLP				DLP			
	25pctCTDI	Mean CTDI	Median CTDI	75pctCTDI	25pctSSDE	Mean SSDE	Median SSDE	75pct SSDE	25pctDLP	Mean DLP	Median DLP	75pctDLP	25%	Mean	Median	75%
<b>Peds</b>																
<b>Abd/Pelv</b> <b>15</b>	<b>1.29</b>	<b>3.00</b>	<b>1.56</b>	<b>2.34</b>	<b>2.64</b>	<b>4.46</b>	<b>3.17</b>	<b>4.24</b>	<b>24</b>	<b>37</b>	<b>93</b>	<b>52</b>	<b>38</b>	<b>94</b>	<b>52</b>	<b>89</b>
Newborn 2	1.09	1.13	1.13	1.17	2.57	2.64	2.64	2.71	24	25	26	26	25	26	26	27
6mo-2.5yrs 1	1.38	1.38	1.38	1.38	3.17	3.17	3.17	3.17	37	37	37	37	37	37	37	37
3yrs-7yrs 3	1.97	2.13	2.38	2.42	3.64	3.89	4.07	4.22	51	64	72	77	67	74	83	85
8yrs-12yrs 6	1.20	1.54	1.41	1.78	2.33	2.87	2.70	3.05	25	39	51	49	41	52	49	54
13yrs-18yrs 3	2.44	8.56	2.72	11.77	4.45	9.84	4.65	12.63	95	104	260	113	109	263	113	343
<b>Peds</b>																
<b>Head</b> <b>43</b>	<b>20.71</b>	<b>24.36</b>	<b>22.11</b>	<b>25.07</b>	<b>21.73</b>	<b>25.07</b>	<b>23.29</b>	<b>25.57</b>	<b>175</b>	<b>358</b>	<b>442</b>	<b>400</b>	<b>360</b>	<b>455</b>	<b>410</b>	<b>536</b>
0-3 27	20.53	21.44	21.70	22.66	21.53	22.31	22.48	23.98	175	338	371	364	338	385	372	424
3-6 16	21.77	29.64	28.13	37.16	24.18	29.89	29.50	34.76	325	410	572	546	410	572	546	701
<b>Renal</b>																
<b>Colic</b> <b>174</b>	<b>6.37</b>	<b>12.80</b>	<b>10.11</b>	<b>17.06</b>	<b>8.66</b>	<b>13.82</b>	<b>12.16</b>	<b>18.32</b>	<b>22</b>	<b>259</b>	<b>559</b>	<b>439</b>	<b>281</b>	<b>596</b>	<b>455</b>	<b>798</b>
Small 7	6.29	9.67	8.92	10.54	10.54	14.08	14.18	16.46	125	251	416	380	251	416	380	462
Medium 125	5.17	9.77	8.53	11.89	7.34	11.56	10.81	14.47	22	210	428	357	236	449	389	554
Large 42	14.66	21.86	19.40	27.82	13.53	20.17	19.57	23.55	63	589	952	851	621	1063	926	1369

## University of California Dose Data

External Benchmarking data: University of California dose data compiled from “Smith-Bindman, Rebecca, et al. "Radiation doses in consecutive CT examinations from five University of California Medical Centers." *Radiology* 277.1 (2015): 134-141.”

Area of Examination Type	No. of Exams	Series Level Statistics											
		CTDI <sub>vol</sub> (mGy)			SSDE (mGy)			DLP (mGy cm)			Effective Dose		
		25th	50th	75th	25th	50th	75th	25th	50th	75th	25th	50th	75th
<b>Head</b>													
Singlephase	25245							640	880	1120	1	2	3
Multiphase	7418							1150	1550	2130	3	4	8
<b>All</b>	32663	37	50	62				690	960	1300	2	2	3
<b>Chest</b>													
Singlephase	16413							260	420	610	5	9	13
Multiphase	10444							570	880	1430	12	18	29
<b>All*</b>	26857	7	12	17	9	14	20	320	550	830	6	11	18
<b>Abdomen</b>													
Singlephase	22755							360	580	860	6	10	16
Multiphase	40412							850	1220	1790	15	22	32
<b>All*</b>	63167	8	12	17	11	15	19	600	960	1460	11	17	26
<b>Chest and Abdomen</b>													
Singlephase	10944							820	1260	1800	16	25	36
Multiphase	1654							1070	1560	2160	21	31	43
<b>All*</b>	26998	10	13	17	12	16	20	970	1450	2020	19	29	40
<b>Sinus</b>													
Singlephase	3536							260	380	530	1	1	1
Multiphase	414							740	1210	1670	2	4	7
<b>All</b>	3950	16	25	29				280	400	610	1	1	2
<b>Neck</b>													
Singlephase	2505							370	490	650	4	5	7
Multiphase	967							330	560	1150	5	7	14
<b>All</b>	3472	12	16	22				360	510	690	4	6	8

## ACR DIR Adult Data

External Benchmarking data: Compiled from ACR DIR percentile report available online at <http://www.acr.org/Quality-Safety/National-Radiology-Data-Registry/Dose-Index-Registry>

### National Level Percentiles Jul-Dec 2015 - Adult

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT ABDOMEN		11	16	22		460	705	1018		11	15	20
CT ABDOMEN PELVIS		9	14	20		429	647	949		11	15	20
CT ABDOMEN PELVIS KIDNEY WO IVCON		9	13	19		390	602	908		9	13	16

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT ABDOMEN PELVIS KIDNEY WO THEN W IVCON		11	14	21		512	738	1069		10	13	18
CT ABDOMEN PELVIS UROGRAPHY WO THEN W IVCON		9	13	19		420	625	905		10	13	18
CT ABDOMEN PELVIS W IVCON		8	12	18		389	602	920		9	13	18
CT ABDOMEN PELVIS WO IVCON		8	13	19		401	618	945		9	13	18

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT ABDOMEN PELVIS WO THEN W IVCON		9	13	19		411	631	924		10	14	19
CT ABDOMEN W IVCON		8	11	18		291	445	654		10	14	18
CT ABDOMEN WO IVCON		9	14	20		313	519	787		10	14	18
CT ABDOMEN WO THEN W IVCON		9	14	21		276	452	676		10	15	20
CT C SPINE W IVCON		14	18	24		247	396	520		NA	NA	NA
CT C SPINE WO IVCON		15	21	30		300	439	661		NA	NA	NA
CT CHEST		7	11	17		220	374	582		7	11	16

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT CHEST ABDOMEN PELVIS W IVCON		9	14	20		503	768	1140		10	14	20
CT CHEST ABDOMEN PELVIS WO IVCON		8	13	19		512	813	1190		8	12	18
CT CHEST ANGIO		8	13	20		257	462	704		8	14	19
CT CHEST ANGIO W IVCON		9	14	20		284	472	685		10	14	19
CT CHEST ANGIO WO THEN W IVCON		10	15	22		341	544	856		11	17	26

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT CHEST HEART WO IVCON		5	6	9		77	104	138		5	8	10
CT CHEST LOW DOSE WO IVCON		2	3	4		59	90	149		2	3	4
CT CHEST LUNG BIOPSY GUIDANCE		8	16	55		277	518	1038		9	19	118
CT CHEST PULMONARY ARTERIES ANGIO W IVCON		8	12	16		241	361	536		7	11	16



<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT CHEST PULMONARY ARTERIES W IVCON		8	12	18		241	392	573		8	12	18
CT CHEST W IVCON		7	11	16		248	407	649		8	11	16
CT CHEST WO IVCON		6	9	14		193	314	495		6	9	13
CT FACE MAXILLOFACIAL WO IVCON		13	23	41		243	452	763		NA	NA	NA
CT HEAD		45	53	62		643	840	975		NA	NA	NA
CT HEAD BRAIN WO IVCON		42	50	58		649	813	988		NA	NA	NA

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT HEAD BRAIN WO THEN W IVCON		43	52	61		642	828	1027		NA	NA	NA
CT HEAD FACIAL BONES		21	37	51		387	629	912		NA	NA	NA
CT HEAD MAXILLOFACIAL WO IVCON		16	27	45		300	508	829		NA	NA	NA
CT HEAD NECK ANGIO		29	46	54		878	1173	1595		NA	NA	NA
CT HEAD PARANASAL SINUSES WO IVCON		11	17	27		153	253	435		NA	NA	NA
CT L SPINE WO IVCON		16	24	35		447	685	1007		21	30	41
CT LE WO IVCON		7	12	19		186	336	642		NA	NA	NA

<i>RPID Shortname</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
CT NECK ANGIO W IVCON		13	18	26		386	587	825		NA	NA	NA
CT NECK W IVCON		11	15	20		294	427	588		NA	NA	NA
CT PELVIS WO IVCON		10	16	24		297	483	746		11	17	24
CT T SPINE WO IVCON		14	21	31		511	790	1190		17	24	34

## ACR DIR Pediatric Data

External Benchmarking data: Compiled from ACR DIR percentile report available online at <http://www.acr.org/Quality-Safety/National-Radiology-Data-Registry/Dose-Index-Registry>

### National Level Percentiles Jul-Dec 2015 - Pediatric

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT ABDOMEN PELVIS</b>	0-2		2	3	4		59	84	103		4	6	7
<b>CT ABDOMEN PELVIS</b>	3-6		2	3	4		72	101	137		4	6	7
<b>CT ABDOMEN PELVIS</b>	7-10		3	4	6		107	156	209		5	7	12
<b>CT ABDOMEN PELVIS</b>	11-14		5	7	11		184	280	460		7	10	13
<b>CT ABDOMEN PELVIS</b>	15-18		6	10	15		282	457	705		9	12	17

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT ABDOMEN PELVIS W IVCON</b>	0-2		2	2	3		46	67	89		3	4	5
<b>CT ABDOMEN PELVIS W IVCON</b>	3-6		2	3	4		61	87	133		3	4	6
<b>CT ABDOMEN PELVIS W IVCON</b>	7-10		3	4	5		98	150	223		4	5	8
<b>CT ABDOMEN PELVIS W IVCON</b>	11-14		4	6	8		186	266	392		6	8	10
<b>CT ABDOMEN PELVIS W IVCON</b>	15-18		5	8	12		250	368	572		7	10	13

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT ABDOMEN PELVIS WO IVCON</b>	0-2		2	2	9		50	70	288		3	4	6
<b>CT ABDOMEN PELVIS WO IVCON</b>	3-6		2	3	4		65	91	149		3	4	6
<b>CT ABDOMEN PELVIS WO IVCON</b>	7-10		3	4	6		90	149	222		4	5	8
<b>CT ABDOMEN PELVIS WO IVCON</b>	11-14		4	6	9		162	256	398		5	8	11
<b>CT ABDOMEN PELVIS WO IVCON</b>	15-18		6	8	12		259	379	586		7	10	14
<b>CT C SPINE WO IVCON</b>	0-2		2	5	12		35	88	197		NA	NA	NA

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT C SPINE WO IVCON</b>	3-6		3	5	12		41	90	194		NA	NA	NA
<b>CT C SPINE WO IVCON</b>	7-10		4	8	15		68	144	259		NA	NA	NA
<b>CT C SPINE WO IVCON</b>	11-14		7	14	23		145	276	465		NA	NA	NA
<b>CT C SPINE WO IVCON</b>	15-18		12	18	27		259	387	596		NA	NA	NA
<b>CT CHEST ABDOMEN PELVIS W IVCON</b>	0-2		2	2	3		53	72	94		3	4	4
<b>CT CHEST ABDOMEN PELVIS W IVCON</b>	3-6		2	2	3		65	84	112		3	3	4

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT CHEST ABDOMEN PELVIS W IVCON</b>	7-10		2	3	5		92	129	214		3	4	6
<b>CT CHEST ABDOMEN PELVIS W IVCON</b>	11-14		4	6	8		188	302	464		5	7	10
<b>CT CHEST ABDOMEN PELVIS W IVCON</b>	15-18		6	8	14		336	527	827		7	10	14
<b>CT CHEST W IVCON</b>	0-2		1	2	2		19	30	57		2	2	3
<b>CT CHEST W IVCON</b>	3-6		1	2	2		27	40	75		2	3	4
<b>CT CHEST W IVCON</b>	7-10		2	2	3		40	68	119		2	3	5



<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT CHEST W IVCON</b>	11-14		3	4	6		80	128	221		3	5	7
<b>CT CHEST W IVCON</b>	15-18		4	7	11		149	263	479		5	7	11
<b>CT CHEST WO IVCON</b>	0-2		1	1	3		19	30	55		2	2	4
<b>CT CHEST WO IVCON</b>	3-6		1	2	3		25	34	56		2	3	4
<b>CT CHEST WO IVCON</b>	7-10		1	2	3		33	56	90		2	3	4
<b>CT CHEST WO IVCON</b>	11-14		2	3	5		66	105	169		3	4	6
<b>CT CHEST WO IVCON</b>	15-18		3	5	7		106	163	259		4	5	8
<b>CT HEAD</b>	0-2		16	21	56		218	280	443		NA	NA	NA
<b>CT HEAD</b>	3-6		17	25	32		220	282	431		NA	NA	NA
<b>CT HEAD</b>	7-10		12	30	55		190	274	450		NA	NA	NA

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT HEAD</b>	11-14		29	32	49		280	522	860		NA	NA	NA
<b>CT HEAD</b>	15-18		32	52	63		414	785	988		NA	NA	NA
<b>CT HEAD BRAIN WO IVCON</b>	0-2		16	21	29		227	330	462		NA	NA	NA
<b>CT HEAD BRAIN WO IVCON</b>	3-6		17	23	30		242	361	484		NA	NA	NA
<b>CT HEAD BRAIN WO IVCON</b>	7-10		20	27	37		308	448	604		NA	NA	NA
<b>CT HEAD BRAIN WO IVCON</b>	11-14		26	35	47		417	576	783		NA	NA	NA
<b>CT HEAD BRAIN WO IVCON</b>	15-18		32	45	55		528	713	919		NA	NA	NA
<b>CT HEAD PARANASAL SINUSES WO IVCON</b>	0-2		3	5	12		37	64	121		NA	NA	NA

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT HEAD PARANASAL SINUSES WO IVCON</b>	3-6		4	7	12		50	79	142		NA	NA	NA
<b>CT HEAD PARANASAL SINUSES WO IVCON</b>	7-10		4	8	13		67	98	189		NA	NA	NA
<b>CT HEAD PARANASAL SINUSES WO IVCON</b>	11-14		5	9	17		84	136	230		NA	NA	NA
<b>CT HEAD PARANASAL SINUSES WO IVCON</b>	15-18		8	13	23		113	198	352		NA	NA	NA
<b>CT NECK W IVCON</b>	0-2		2	3	5		34	61	100		NA	NA	NA
<b>CT NECK W IVCON</b>	3-6		2	4	6		44	73	115		NA	NA	NA
<b>CT NECK W IVCON</b>	7-10		3	5	8		66	110	177		NA	NA	NA

<i>ShortNameReport</i>	<i>Age Group</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>		<i>P25</i>	<i>P50</i>	<i>P75</i>
<b>CT NECK W IVCON</b>	11-14		5	8	12		127	192	320		NA	NA	NA
<b>CT NECK W IVCON</b>	15-18		7	11	16		197	318	462		NA	NA	NA