



NATIONWIDE EVALUATION OF X-RAY TRENDS (NEXT)

TABULATION AND GRAPHICAL SUMMARY OF 2005-2006 SURVEY OF COMPUTED TOMOGRAPHY

November 2015

Published by
Conference of Radiation Control Program Directors, Inc.
www.crcpd.org

This page was intentionally left blank.

This publication was supported in part by grant number FDA-U-000005 through a cooperative agreement with the U.S. Food and Drug Administration (FDA). This document was prepared by FDA staff in association with a working group of the Conference of Radiation Control Program Directors, Inc. (CRCPD) and accepted by the CRCPD Board of Directors for publication. The information contained in this document is for guidance. The implementation and use of the information and recommendations contained in this document are at the discretion of the user. The implications from the use of this document are solely the responsibility of the user. The mention of commercial products, their sources, or their use in connection with material reported herein is not to be construed as either an actual or implied endorsement of such products by CRCPD or any federal agency supporting the work contained in this document. The contents contained herein, however, may not necessarily represent the views of the entire membership of the CRCPD or any federal agency supporting the work contained in this document.

NATIONWIDE EVALUATION OF X-RAY TRENDS (NEXT)

TABULATION AND GRAPHICAL SUMMARY OF 2005-2006 SURVEY OF COMPUTED TOMOGRAPHY

Prepared by David Spelic

Food and Drug Administration
Center for Devices and Radiological Health

in association with

Conference of Radiation Control Program Directors, Inc.
Healing Arts Council, H-4 Committee on
Nationwide Evaluation of X-ray Trends (NEXT)

and

American College of Radiology

H-4 Committee Members	Professional Liaisons	Federal Liaisons
Warren Freier, Chair (ND)	Priscilla Butler (ACR)	Stephanie Belella (FDA)
Aaron Gantt (SC)	Mahadevappa Mahesh (AAPM)	Richard Kaczmarek (FDA)
Bruce Matkovich (MI)	Jan Martensen (ACCR)	Mike Leal (FDA/ORA)
John Neal (NE)		Thomas Ohlhaber (FDA)
Mary Ann Spohrer (IL)		David Spelic (FDA)
		Stanley Stern (FDA)

November 2015

Published by
Office of Executive Director
Conference of Radiation Control Program Directors, Inc.
1030 Burlington Lane, Suite 4B
Frankfort, KY 40601
www.crcpd.org

This page intentionally left blank.

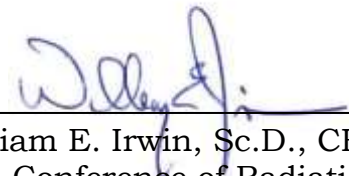
FOREWORD

The Conference of Radiation Control Program Directors, Inc. (CRCPD) is an organization made up of the radiation control programs in each of the 50 states, the District of Columbia, and Puerto Rico, and of individuals, regardless of employer affiliation, with an interest in radiation protection. The primary purpose and goal of CRCPD is to assist its members in their efforts to protect the public, radiation workers, and patients from unnecessary radiation exposure. CRCPD also provides a forum for centralized communication on radiation protection matters between the states and the federal government, and between the individual states.

One method of providing assistance to the states, as well as to other interested parties, is through technical and administrative publications. Most technical publications of CRCPD are written by various committees, task forces or special working groups. Most administrative publications are written by staff of the Office of Executive Director (OED).

CRCPD's mission is "to promote consistency in addressing and resolving radiation protection issues, to encourage high standards of quality in radiation protection programs, and to provide leadership in radiation safety and education."

This publication, *Nationwide Evaluation of X-ray Trends (NEXT) Tabulation and Graphical Summary of the 2005-2006 Survey of Computed Tomography*, is the release of data for informational use.

A handwritten signature in blue ink, appearing to read 'W. Irwin', is positioned above a horizontal line.

William E. Irwin, Sc.D., CHP
Chairperson, Conference of Radiation
Control Program Directors, Inc.

PREFACE

The Conference of Radiation Control Program Directors (CRCPD) collaborates with the U.S. Food and Drug Administration (FDA) in a unique federal-state partnership to characterize the radiation doses patients receive from diagnostic x-ray procedures, and to document the state of such practice. Each one to two years, the Nationwide Evaluation of X-ray Trends (NEXT) survey program selects a particular radiological examination for study and captures radiation exposure data from a nationally representative sample of clinical facilities in the United States. NEXT was initiated in 1972 at the request of state programs that were eager for a national picture of the state of practice. Since then, NEXT has documented trends associated with chest, abdomen, lumbosacral spine, dental, and pediatric chest radiography, fluoroscopy, and computed tomography. The CRCPD publishes statistical summaries of each survey, and they can be accessed at <http://www.crcpd.org/Pubs/NEXT.aspx>. Further information on NEXT is available at <http://www.fda.gov/radiation-emittingproducts/radiationsafety/nationwideevaluationofx-raytrendsnext/default.htm>.



Warren Freier, Chairperson
Committee on Nationwide Evaluation
Trends X-rays

ACKNOWLEDGMENTS

The following organizations provided support during the preparation of survey procedures or provided use of computed tomography (CT) equipment during the training of surveyors:

- Walter Reed National Military Medical Center;
- Shady Grove Adventist Hospital; and
- INOVA Fairfax Hospital.

We also thank Doctor Robert Zeman of the Department of Radiology at George Washington University Medical Center and Doctor David Goodenough of the Institute for Radiological Imaging Sciences, Inc., for their valuable presentations on clinical and technical aspects of CT imaging during surveyor training courses.

We also appreciate the financial support to NEXT surveyor training provided by the American College of Radiology. Finally we thank FDA staff members Camille Vidal and Stacy Cho for their assistance with data analysis.

TABLE OF CONTENTS

FOREWORD.....	iii
PREFACE.....	iv
ACKNOWLEDGMENTS.....	iv
TABLE OF CONTENTS.....	vi
ABSTRACT.....	viii
ACRONYMS AND ABBREVIATIONS	1
INTRODUCTION.....	2
2005-2006 NEXT SURVEY OF COMPUTED TOMOGRAPHY.....	3
SURVEY SAMPLE SELECTION	3
Table 1. 2005-2006 Survey Sample.....	4
Table 2. Participating States and Number of Site Visits.....	5
PROTOCOL.....	5
DOSIMETRY FOR CT EXAMS	5
Table 3. Types of Exams.....	6
NEXT CT ADULT-BODY ATTENUATION PHANTOM.....	7
SCAN PARAMETERS AND DOSIMETRIC QUANTITIES	8
Scan Parameters	8
Pitch factor (helical scanning) / axial beam overlap (axial scanning)	8
Clinical mA and mAs for AEC-configured CT exams.....	9
Clinical scan length.....	9
Table 4. Scan Length for Adult and Pediatric Exams.....	11
Dosimetric Quantities	11
CTDI free-in-air ($CTDI_{free-air}$)	11
Weighted CTDI ($CTDI_w$).....	112
Volume CTDI ($CTDI_{vol}$).....	113
Dose-length product (DLP).....	113
Effective dose (E)	113
Normalized effective dose values (mSv/100 mAs).....	113
Correction factors.....	113
Weighting factors	14
Adjustment Factor.....	14
Correction for scan length specified by the facility.....	14
Scanner-specific output correction	14
Pitch.....	15
CONSIDERATIONS ABOUT PARTICULAR EXAMS	15
Adult Head: Brain (Cerebrum) and Posterior Fossa.....	15
Pediatric Head and Body Exams	15
Tabulated Results for Surveyed Exams	16

SELECTED FINDINGS	16
INCREASING NUMBER OF CT UNITS AND CHANGES IN PREVALENT TYPES.....	16
Figure 1. Prevalence of types of CT units per surveyed site.	17
INCREASE IN ESTIMATED TOTAL CT SCANS CONDUCTED PER YEAR	17
Table 5. Estimated Number of CT Scans Conducted in the United States.....	188
INCREASE IN CT EQUIPMENT IN FACILITIES OTHER THAN HOSPITALS	18
DECREASE IN CT EQUIPMENT IN HOSPITALS	18
Table 6. Comparison of United States Statistics Between 2000 and 2005-2006 Surveys	188
AVAILABILITY OF AUTOMATIC EXPOSURE CONTROL.....	19
Figure 2. Automatic exposure control feature availability in the 2005-2006 survey	19
FACILITY TYPE AND ACCREDITATION	20
Figure 3. Types of facilities in the 2005-2006 survey.....	20
Figure 4. Practice speciality of facilities other than hospitals in the 2005-2006 survey.....	21
Figure 5. Number of CT scanners at surveyed facilities.	22
Table 7. Types and Average Numbers of CT Units in the 2005-2006 Survey.....	22
Figure 6. American College of Radiology accreditation status 2005-2006.	23
CT SCREENING EXAMS CONDUCTED AT SURVEYED FACILITIES	23
Figure 7. Per centage of facilities performing CT examinations as a screening procedure of asymptomatic patients.	24
Figure 8. Per centage of hospitals performing CT examinations as a screening procedure of asymptomatic patients.	24
Figure 9. Per centage of facilities other than hospitals performing CT examinations as screening procedures of asymptomatic patients.....	25
Figure 10. Average weekly workload for facilities that perform CT screening examinations.	25
AGE; FEATURES; QUALITY CONTROL AND ASSURANCE; AND MEDICAL PHYSICS SURVEYS	26
CT Scanner Age	26
Figure 11. Age of CT scanners 2005-2006 survey.	26
Figure 12. Age of CT scanners in hospitals 2005-2006 survey.	27
Figure 13. Age of CT scanners in facilities other than hospitals 2005-2006 survey.....	27
Features available on CT scanners.....	28
Figure 14. Maximum number of detector rows on CT scanners.	28
Figure 15. Fluoroscopy capability on CT scanners.	28
Quality control and quality assurance	29
Figure 16. Maintenance of CT units at hospitals.....	29
Figure 17. Maintenance of CT scanners at facilities other than hospitals.....	29
Medical Physics Surveys.....	30
Figure 18. Medical physics surveys of CT scanners at hospitals.	30
Figure 19. Medical physics surveys of CT scanners at facilities other than hospitals.....	30
CT EXAM WORKLOADS.....	31
Table 8. Number of Adult CT Exams Conducted Per Week on All CT Units at the Surveyed Facility.	32
Table 9. Number of Pediatric CT Exams Conducted Per Week on All CT Units at the Surveyed Facility.....	32
REFERENCES	33
APPENDIX: TABULATION OF RADIATION DOSES.....	33

ABSTRACT

Spelic, David, U.S. Federal Food and Drug Administration; Conference of Radiation Control Program Directors (CRCPD) H-4 Committee on Nationwide Evaluation of X-ray Trends. *Nationwide Evaluation of X-ray Trends (NEXT) Tabulation and Graphical Summary of 2005-2006 Survey of Computed Tomography*, CRCPD Publication #E-15-3, November 2015, 134 pp.

This document presents the 2005-2006 computed tomography survey data. The tables and graphs are a summary of the data collected as part of the Nationwide Evaluation of X-ray Trends program.

ACRONYMS AND ABBREVIATIONS

AAPM	American Association of Physicists in Medicine
ACCR	American College of Chiropractic Radiology
ACR	American College of Radiology
AEC	Automatic exposure control
AHA	American Hospital Association
CRCPD	Conference of Radiation Control Program Directors
CT	Computed tomography
CTDI	Computed tomography dose index
CTDI _{free-air}	CTDI free-in-air
CTDI _{vol}	Volume CTDI
CTDI _w	Weighted CTDI
DLP	Dose-length product
E	Effective dose
FDA	U.S. Food and Drug Administration
FDA/ORA	U.S. Food and Drug Administration Office of Regulatory Affairs
IMPACT	IMPACT CT patient dosimetry calculator spreadsheet
NEXT	Nationwide Evaluation of X-ray Trends
PMMA	Polymethyl methacrylate phantom

INTRODUCTION

The U.S. Food and Drug Administration (FDA) and the Conference of Radiation Control Program Directors (CRCPD) collaborate to periodically survey clinical facilities in the United States for data associated with the state of clinical practice of selected diagnostic x-ray imaging exams and modalities. This collaboration, the Nationwide Evaluation of X-ray Trends (NEXT), gathers data from a nationally representative sample of randomly selected and voluntarily participating clinical sites for measures of patient radiation dose, indicators of image quality, and related information about the practice of diagnostic radiology. FDA staff and members of the CRCPD Healing Arts Council H-4 Committee on Nationwide Evaluation of X-ray Trends organize all survey activities including the training of radiation control program personnel from participating states to conduct the data collection activities. CRCPD publishes statistical summaries of each survey, and surveys are repeated periodically to observe trends in the state of practice and clinical technologies. Survey protocols provide the comprehensive, step-by-step procedures used by surveyors to gather data associated with the particular survey activity. Protocols and statistical summaries of previous surveys are available for download from the CRCPD at www.crcpd.org.

2005-2006 NEXT SURVEY OF COMPUTED TOMOGRAPHY

In 2005, a NEXT survey of computed tomography (CT) was initiated in response to the rapid growth of this imaging modality. The survey consisted of two components.

- Trained surveyors visited a random sample of clinical facilities and collected data including results of CT scanner measurements in order to characterize the practice of CT imaging. Surveyor measurements were done free-in-air on the axis of rotation for the evaluation of CTDI free-in-air ($CTDI_{free-air}$) and additionally, measurements were also done with a new phantom especially designed for this survey to characterize the automatic exposure control (AEC) features incorporated into newer CT scanners.
- These same clinical facilities completed a questionnaire covering additional information regarding their clinical, quality assurance, and quality control practices. With respect to clinical practice in particular, the questionnaire sought values of scanning parameters for a number of routinely conducted adult and pediatric CT exams.

Surveyors also requested these clinical sites to provide a copy of the most recent medical physics survey report conducted on the CT scanner under study during this survey. These reports were reviewed by FDA staff to extract or infer values for weighted CTDI ($CTDI_w$).

Two particular features that CT equipment manufacturers had begun to incorporate into scanners, namely, multi-slice imaging and AEC, were of particular interest, and accurately assessing their dose implications posed challenges during the development of survey procedures. Particularly the new AEC features on many CT scanners motivated FDA staff to design, build, and incorporate into the survey data collection activities a new NEXT phantom designed to drive this scanner feature to respond similarly to that of the body (chest, abdomen and pelvis sections) of an average-size adult patient.

SURVEY SAMPLE SELECTION

The clinical facility sample was selected from listings of clinical facilities that have registered CT equipment in participating states. From each state listing, a set of clinical facilities was randomly drawn. The total number of clinical sites drawn for each state was determined from the state's relative fraction of the total U.S. population at the time of survey (U.S. Census Bureau 2005). A total sample size of 358 clinical sites was identified for the 42 jurisdictions (41 states plus the District of Columbia) initially agreeing to participate in the survey.

Ultimately, however, nine of those states and the District of Columbia decided not to participate.

At the conclusion of the survey, the final dataset used for analysis consisted of the responses from a total of 264 clinical sites in 32 states. Note that although a total of 264 sites contributed to the statistics for this report, not every site provided useable data for each parameter. Therefore the value of N for the various statistical parameters will be equal to, or less than 264.

The first site visit occurred in August 2005, and the last in May 2007. Of the results included in the final data analyses, the number of sites surveyed in each year were:

- 44 (17% of sample) in 2005;
- 213 (80%) in 2006; and
- 7 (3%) in 2007.

Table 1. 2005-2006 Survey Sample.

32 states
264 clinical sites
336 site visits

Surveyors from the states shown in Table 2 conducted the indicated number of clinical site visits during this NEXT survey.

Table 2. Participating States and Number of Site Visits.

AL	1	NH	3
AR	5	NJ	12
AZ	8	NV	4
CA	37	NY	13
IA	5	OH	13
ID	3	OR	6
IL	14	PA	15
LA	4	RI	2
MA	3	SC	6
MD	7	SD	2
MI	12	TN	9
MO	8	TX	28
MS	5	VA	3
NC	10	WA	9
ND	2	WI	8
NE	3	WV	4

PROTOCOL

The protocol for the 2005-2006 Survey of Computed Tomography is available online at

http://www.crcpd.org/Pubs/NEXT_Protocols/NEXT-2005CT-Protocol.pdf

DOSIMETRY FOR CT EXAMS

The 2005-2006 NEXT CT survey captured clinical scanning parameters associated with the exams listed in Table 3 on the most frequently used CT scanner at each of the participating sites. For this survey an “infant” was defined as a patient of approximately one year old or younger, and a “child” was defined as a patient of age approximately five to six years.

In defining a pediatric patient as having an age less than 18 years, this would include INFANT and CHILD patient groups. Therefore Table 3 would include these patient groups. For the purposes of capturing workloads, pediatric patients are defined as < 18 yrs. For the particular exams, sites do not do PEDIATRIC exams, they do exams on patients based on age/size. Therefore it

was necessary to specify particular pediatric patients when capturing dosimetric data. The expression PEDIATRIC is to refer to all patients < 18 years.

Table 3. Types of Exams.

Adult Exams
Head: brain (cerebrum) and posterior fossa
Sinus
Chest
Abdomen
Abdomen and pelvis
Chest and abdomen and pelvis
Cervical, thoracic, and lumbar spine
Colon
Coronary angiography
Pediatric Exams
Head
Thoracic survey
Abdomen and pelvis

The Excel-based spreadsheet, *IMPACT CT Patient Dosimetry Calculator* (versions 1.0.3 and 1.0.4) were used for computing exam-specific values for:

- weighted CTDI ($CTDI_w$);
- volume CTDI ($CTDI_{vol}$);
- dose-length product (DLP);
- CTDI free-in air ($CTDI_{free-air}$); and
- effective dose (E).

The calculator was developed by the IMPACT group, based in St. George's Hospital, Tooting, London. It provides scanner and exam-specific dose quantities for user-input values of CT scanning conditions. The software runs on a Microsoft Excel platform and is available for download from the IMPACT website, www.impactscan.org. It requires a separate dataset NRPB SR 250 (Jones and Shrimpton 1991) to be purchased and installed on the end-user's computer. The dataset corresponds to reference, normalized organ-dose values derived from Monte Carlo computations modeling radiation transport in a mathematical adult hermaphrodite phantom for 23 models of CT scanners and

associated sets of scanning conditions. It is available for purchase at:
<http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/Publications/Radiation/NPRBArchive/NRPBSoftware>

NEXT CT ADULT-BODY ATTENUATION PHANTOM

An adult patient-equivalent x-ray attenuation phantom, averaged with respect to gender size, was designed specifically for this survey. The goal of this effort was to characterize how AEC, incorporated into newer CT equipment, influenced average-size adult patient dose. CT AEC sub-systems typically modulate the x-ray tube current and resulting tube current-gantry rotation time product (mAs) in response to the attenuation associated with patient habitus so as to maintain a constant level of image-pixel noise that can be preferentially pre-set by the operator. For the particular rotating fan-beam geometries of the CT equipment probed in this survey, a polymethyl methacrylate (PMMA) phantom was designed and constructed of three adjacent rectangular sections. Based on the modeling in the mathematical, anthropomorphic phantoms developed by Oak Ridge National Laboratory (Christy 1980; Eckerman, Christy and Ryman 1996) and extended by the Gesellschaft für Strahlen- und Umweltforschung (GSF) Munich, (Kramer, Zankl, Williams, and Drexler 1986) the NEXT CT phantom sections approximate the z-average, azimuthal dependence (associated with CT x-ray source rotation) of the attenuation of the chest, abdomen and pelvis cross-sections, respectively, of an average-size adult patient. A central z-axis hole bored into the phantom accommodated a CT pencil ionization chamber (of sensitive length 100 mm) that is typically used with standard CT dosimetry phantoms. Prototypes of the NEXT CT phantom were tested at two clinical sites.

Each surveyor was provided a NEXT CT adult-body attenuation phantom for capturing patient-representative values of mA, gantry rotation time, and mAs for CT scanners equipped with AEC technology. The scanner was configured for a typical abdomen and pelvis exam for an adult-size patient. Using a pencil chamber oriented along the gantry axis of rotation, the surveyors also measured air kerma and they recorded the pre-scanning and post-scanning values for mA and mAs per gantry rotation. These values for mA and mAs were then used to infer approximate corresponding values for mA and mAs for complete scan of the adult abdomen, abdomen and pelvis, adult chest, adult chest and abdomen and pelvis, and exams of the cervical, thoracic, and lumbar spine regions. A value for mAs was computed as a weighted average of the corresponding phantom-based mAs values for the surveyed exams which cover multiple body regions captured by the NEXT phantom:

- abdomen and pelvis;
- chest and abdomen and pelvis;

- thoracic spine; and
- lumbosacral spine.

The weighting factors are based on the body lengths derived from the reference phantom coordinate system published by Jones and Wall (1985).

Assumptions were made for those facilities that indicated they conduct adult and pediatric exams of the head, and pediatric body exams (thoracic survey and abdomen-pelvis) using the scanner's AEC feature. It was assumed that the scanning protocols (kV, mA, gantry rotation time, beam collimation, pitch, and approximate scan range) provided by the facility represented typical values for provided scan parameters. These were deemed adequate for the dosimetric calculations.

With the exception of exams of the pediatric and adult head (including exams of the sinuses), pediatric body, and adult cervical spine, dosimetric values were not computed for a particular facility's exam when the scanner's AEC feature was used clinically but survey data were not available to characterize the scanner. Sites that either performed clinical exams on a CT scanner that was not equipped with AEC, or did not use the AEC feature, provided their particular constant, pre-set values for scanning mA, mAs, or gantry rotation time.

Some surveyed facilities indicated that they employ the CT scanner's AEC feature for exams of the head (adult and pediatric) and adult sinus region. For those instances, it was assumed that the values provided for mAs (or values of mA and gantry rotation time for the computation of mAs) were approximately representative of those values that would result during clinical exams. These survey observations were included in the analyses.

SCAN PARAMETERS AND DOSIMETRIC QUANTITIES

For each clinical exam and for each surveyed scanner, estimates for the scan parameters and dosimetric quantities were derived as discussed in this section.

Scan Parameters

Pitch factor (helical scanning) / axial beam overlap (axial scanning)

A value for helical pitch factor (or axial beam overlap for axial scanning) hereafter simply referred to as pitch, was determined using the site-provided scan parameter values for acquisition slice thickness, number of slices

acquired per gantry rotation, and scanner table feed per gantry rotation. For the exams of the adult head and the adult abdomen and pelvis, sites were asked to directly provide values for pitch. If a value was not provided, then a value was computed using the provided scan parameters. If it was not possible to determine a value for pitch for a given exam, then those dose quantities requiring a value for pitch (eg. CTDI_{vol}) were not calculated. Pitch (or beam overlap for axial scanning) was calculated as:

$$\text{Pitch (axial beam overlap)} = \frac{\text{Table feed per gantry rotation (mm)}}{[\text{No. slices per gantry rotation}] \times [\text{slice thickness (mm)}]}$$

Clinical mA and mAs for AEC-configured CT exams

For adult body exams where the scanner's AEC feature was used, the clinical mA and mAs were estimated using data captured by the surveyors using the NEXT CT adult-body attenuation phantom. If a body exam region corresponded to only one of the sections of the phantom (e.g. the clinical abdomen exam), then the mA and mAs resulting from the scanning data for the phantom were used to compute subsequent dosimetric quantities. If a body exam consisted of a scanning length that crossed distinct regions (eg. abdomen and pelvis exam) then a weighted average was taken of the mA and mAs values captured with the NEXT body phantom. The weighting factors used for the mA and mAs values for the distinct phantom body regions (chest, abdomen, and pelvis) applicable for a particular exam are the relative reference body region scan lengths tabulated given in this report.

Clinical scan length

For each exam represented in the NEXT survey, clinical sites were asked to provide either a quantitative estimate for the typical length along the z-axis scanned clinically, or a description of the clinical scan range in terms of anatomical landmarks. The majority of surveyed sites provided brief descriptions. For those sites that did not provide a quantitative value for the scan length, the scan length was estimated from the values provided for table feed per gantry rotation, the total number of slices acquired during a single patient scan, and the number of slices acquired per gantry rotation. Specifically clinical scan length was approximated as:

$$\text{Clinical scan length (mm)} = \frac{[\text{Total no. of slices per phase}] \times [\text{table feed per rotation (mm)}]}{[\text{No. slices per gantry rotation}]}$$

The evaluation of dose-length product requires knowledge of the clinical scan length. For those survey entries for which a clinical scan range could not be derived from provided data, a reference scan length was used to compute dose-length product. For the adult exams covered in this report (with the exception of the adult colon exam) these reference scan lengths correspond to those based on the anthropomorphic mathematical adult model derived by Christy (Christy 1980). For the adult colon exam, an estimated scan range with scanning boundaries along z corresponding to just above the superior extent of the colon to the lowest extent of the pelvis was used. The reader is referred to the 2000 NEXT CT survey data summary for further documentation on these reference lengths (CRCPD 2007).

For the pediatric exams covered in this report approximate scan ranges based on the ORNL phantoms (Christy and Eckerman 1987) were used.

Table 4. Scan Length for Adult and Pediatric Exams.

Scan Region - Adult Exams	Scan Length (mm)
Brain (cerebrum)	95
Posterior fossa	40
Sinus	65
Chest	240
Abdomen	195
Pelvis	200
Cervical spine	105
Thoracic spine	350
Lumbar spine	130
Heart (coronary angiography)	115
Colon	290
Scan Region - Pediatric Exams	Scan Length (mm)
Infant head [Brain (cerebrum) + posterior fossa]	90
Child head [Brain (cerebrum) + posterior fossa]	122
Infant chest	110
Child chest	160
Infant abdomen and pelvis	163
Child abdomen and pelvis	254

Dosimetric Quantities

For each exam and for each participating clinical site, dosimetric quantities were evaluated as discussed in this section.

CTDI free-in-air ($CTDI_{free-air}$)

For the most frequently used CT scanner in each of the facilities surveyed, surveyors measured scanner reference values of CTDI free-in-air on the axis of rotation. Measurements were made at every available kVp setting with a model MDH 1015 electrometer equipped with a 100-mm sensitive-length pencil ionization chamber typically used in CT dosimetry. For these measurements, the survey protocol specified technique factors for mA, gantry rotation time, and collimation. If a scanner could not be configured with one or more of the

specified parameters, the surveyor set a value as close as possible and documented the adjusted scan parameters.

Clinical $CTDI_{free-air}$ was then computed for each surveyed exam in several steps.

1. Input to the IMPACT dosimetry calculator used the same scanning parameters as those used in the NEXT surveyor measurements of scanner-reference $CTDI_{free-air}$. The IMPACT dosimetry calculator applied this input to its own survey database to compute a comparable value for $CTDI_{free-air}$.
2. The ratio of the NEXT survey scanner-reference $CTDI_{free-air}$ value to the IMPACT-generated $CTDI_{free-air}$ was then computed as a scanner-specific correction factor.
3. For each exam captured in the survey, the IMPACT dose calculator was then used to provide a clinically-representative value for $CTDI_{free-air}$ using the exam-specific scan parameters provided by the facility.
4. This IMPACT value for $CTDI_{free-air}$ was then multiplied by the scanner correction factor of step (2) in this paragraph to yield a scanner-representative value for clinical $CTDI_{free-air}$.
5. If a value for scanner reference $CTDI_{free-air}$ could not be determined from surveyor measurements, then the clinical-parameter values provided by the IMPACT dose calculator were adopted directly as final, exam-specific values for clinical $CTDI_{free-air}$.

Weighted CTDI ($CTDI_w$)

Surveyors were asked to collect from each participating site a copy of the most recent medical physics survey report for the surveyed CT scanner. These survey reports were reviewed to extract values for either $CTDI_w$ or to extract measured values that permitted the estimation of $CTDI_w$. Some reports provided values pertaining to measurements with both the standard 16-cm-diameter head phantom and the 32-cm-diameter body phantom. Other survey reports provided values for the head phantom only. For each report in which scanning conditions were sufficiently documented and values for the medical physics survey $CTDI_w$ were provided, a corresponding value for $CTDI_w$ was determined from the IMPACT dose calculator using the same scan parameters documented in the survey report. If values were provided for both the standard head and body phantoms, then corresponding values were derived using the IMPACT dose calculator. For each scanner surveyed and for each exam, the IMPACT CT dosimetry calculator was used to derive a value for the clinical $CTDI_w$ using the clinical scan parameters provided by the surveyed facility. Using the same method as described in this report for estimation of the final

value for the clinical $CTDI_{free-air}$, the IMPACT value for $CTDI_w$ was adjusted by a scanner-specific correction factor, computed as the ratio of the medical physics survey report for $CTDI_w$ to the corresponding value derived using the IMPACT calculator for the same scanning conditions documented in the survey report. If values were derived separately for the head and body phantoms, then the corresponding body region-specific correction factor was used. For example, for the adult chest exam, the IMPACT value for $CTDI_w$ was adjusted using the correction factor based on the standard body-phantom measured values in the survey report.

Volume CTDI ($CTDI_{vol}$)

For each exam and for each surveyed CT scanner, a final value for $CTDI_{vol}$ as the value for $CTDI_w$ divided by the corresponding value for pitch was computed.

Dose-length product (DLP)

A value for DLP was estimated for each exam and surveyed scanner using the estimated values for $CTDI_{vol}$ and estimated clinical scanning lengths.

Effective dose (E)

For each surveyed CT scanner and for each exam, effective dose (E) was estimated using the CT scanning techniques provided by the facility. These factors were estimated in the calculation of E.

Normalized effective dose values (mSv/100 mAs)

For each surveyed exam, the IMPACT CT dosimetry calculator was used to derive normalized effective dose values (mSv/100 mAs) corresponding to the clinical scan parameters provided by surveyed facilities, and then combined with the final value computed for clinical mAs for each exam.

Correction factors

Correction factors as described in this section were applied to the calculation of effective dose in order to account for site-specific scanning practices and scanner-specific characteristics at each surveyed facility.

Weighting factors

The IMPACT CT dose calculator offers values of effective dose based on two sets of weighting factors, namely, those based on International Commission on Radiological Protection (ICRP) Publication 60 and those referenced to ICRP Publication 103. All effective dose values in this report are based on the weighting coefficients from ICRP Publication 103 (ICRP 2007).

Adjustment factor

Adjustment factor for the fraction of exams conducted with two scans of the patient was computed as:

$$\frac{[\text{fraction of exams with contrast}] + [\text{fraction of exams without contrast}] + 2 \times [\text{fraction of exams conducted with a contrast phase and no-contrast phase}]}{2}$$

Each facility was asked to provide values for the fraction of exams that they conduct:

- only with a contrast phase;
- only without contrast; and
- those with two phases (one with contrast and one without contrast).

From these values an adjustment factor for E accounting for the fraction of times an exam is conducted with two scans of the patient was derived.

Correction for scan length specified by the facility

Where possible, the final value for E was adjusted with respect to the reference scan lengths tabulated using the scanner specific scan lengths either provided by the facility or derived from provided scan parameters. This correction factor was estimated as:

$$\text{Correction factor} = \frac{\text{Scanner-specific scan length for indicated exam (mm)}}{\text{Exam reference length (mm)}}$$

If a scanner-specific scan length could not be estimated from the provided data, no correction was done in the final estimation for E (i.e., a correction factor of 1.0 accounting for the scan length was assumed).

Scanner-specific output correction

The value for E was adjusted to account for the specific x-ray output of the surveyed scanner as described in this section.

- For each surveyed scanner a ratio was computed for the value of $\text{CTDI}_{\text{free-air}}$ derived from surveyor measurements to the corresponding

value output from the IMPACT dosimetry calculator for the same CT scanning conditions.

- This ratio was then used to adjust the value of E to account for the specific scanner output.
- If a value for $CTDI_{free-air}$ was not available for a particular survey, then a similar ratio was derived using values for $CTDI_w$ extracted from reviewed medical physics surveys compared to those computed using the IMPACT CT dosimetry calculator.
- If neither of these methods for characterizing the output of the surveyed scanner was available, then no correction factor was applied.

Pitch

A factor of $1/\text{pitch}$ was introduced into the calculation of E to account for the extent of x-ray beam overlap during scanning.

CONSIDERATIONS ABOUT PARTICULAR EXAMS

Adult Head: Brain (Cerebrum) and Posterior Fossa

Many facilities provided scan parameters separately for the brain and posterior fossa regions of the adult head. $CTDI_w$, $CTDI_{free-air}$, $CTDI_{vol}$, DLP, and E for these two regions were separately computed. These dosimetric quantities were combined to derive a single value for the adult head. To combine the final values of $CTDI_w$, $CTDI_{free-air}$, and $CTDI_{vol}$, a weighted average of the values for the two regions where the weighting factors are the reference scan lengths for each region, as tabulated in this report were computed. To derive single values for DLP and effective dose for the adult head, the separate values for the brain and posterior fossa regions were added. For the infant and child head exams, only a single set of scan parameters were captured for these exams; therefore only dosimetric quantities corresponding to the entire head (brain plus posterior fossa) were computed. Survey findings for the adult head exam tabulate scan technique factors separately for the brain and posterior fossa.

Pediatric Head and Body Exams

For CT exams of the pediatric head and body, some facilities indicated that they scan these patients, infants and young children, using the scanner's AEC feature. No phantom-based data were available to account for the response of this feature. Therefore it was assumed that the constant-value technique

factors provided by the facilities, which most provided even though they indicated the exam was conducted using AEC, were sufficiently representative of typical values (for mA and mAs) that would result clinically.

Dosimetric quantities for the four pediatric body exams (infant and child chest, and abdomen plus pelvis) were computed for $CTDI_w$, $CTDI_{free-air}$, $CTDI_{vol}$, DLP, and E using the IMPACT dosimetry calculator applying the clinically indicated scan settings based on both the standard 16-cm-diameter head and 32-cm-diameter body phantoms.

Tabulated Results for Surveyed Exams

For each surveyed exam, comprehensive statistics are provided in the appendix to this report for:

- scanning techniques;
- number of exams performed on the surveyed scanner each week; and
- dosimetric quantities described in this report.

For every exam the statistical tabulations are also reported separately between facilities identified as hospitals and sites other than hospitals. For adult body exams, findings are additionally separated by the use of AEC and manual technique selection. For exams of the adult and pediatric head and adult sinus, findings are also tabulated for helical and axial scanning.

SELECTED FINDINGS

Selected findings from this study along with comparative observations from the *NEXT Survey of Computed Tomography of 2000* (CRCPD 2007) are given in this section.

INCREASING NUMBER OF CT UNITS AND CHANGES IN PREVALENT TYPES

In the 2005-2006 survey, surveyed facilities had an average of 1.6 CT units, compared with 1.28 units found during the 2000 survey.

Of these 1.6 CT units per facility surveyed in the 2005-2006 study, the most prevalent type of CT system was the helical multi-slice (averaging 1.06 units

per site). Of the 1.28 units per facility in the 2000 study, the most prevalent type of CT system was helical single-slice (averaging 0.66 CT units per site).

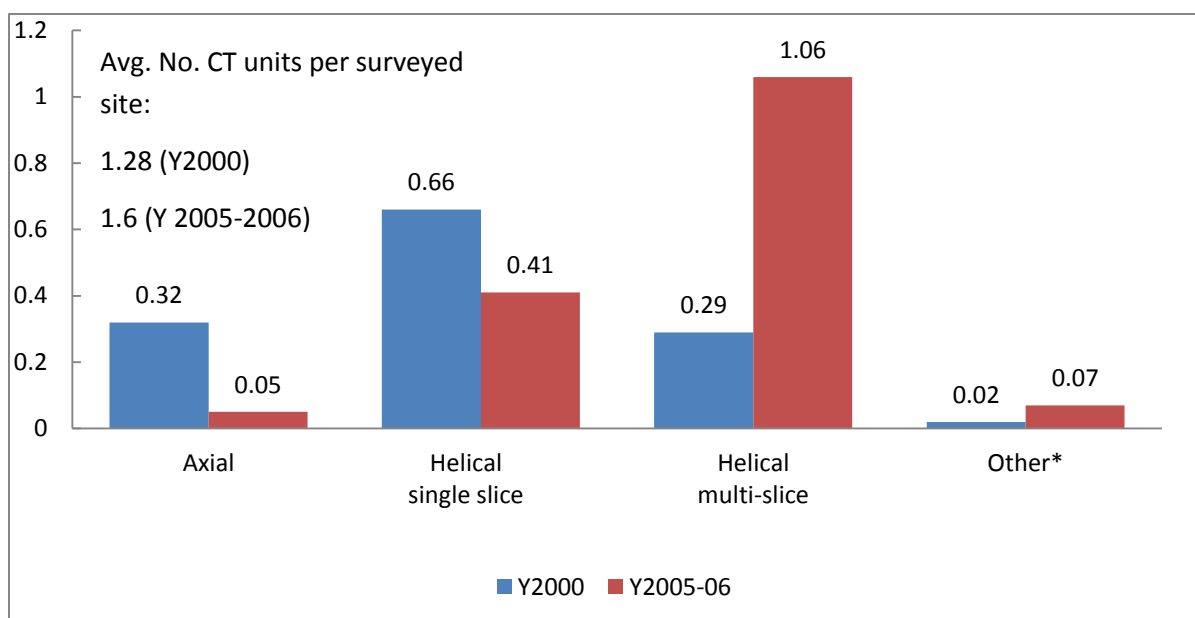


Figure 1. Prevalence of types of CT units per surveyed site.

INCREASE IN ESTIMATED TOTAL CT SCANS CONDUCTED PER YEAR

Using figures from the 2000 study, an estimated total of 45.1 million CT scans were conducted in the U.S. This estimate increased to 81.6 million exams based on figures from the 2005-2006 study. See Tables 5 and 6.

Table 5. Estimated Number of CT Scans Conducted in the United States.
2005-2006 Survey

	Hospitals	Sites other than hospitals
Number of sites with at least one CT unit	4707	3253
Average facility no. of exams per week	261 (adult) 15 (pediatric)	59 (adult) 2.7(pediatric)
Total annual U.S. CT exam workload (millions)	63.9 (adult) 5.5 (pediatric)	11.7 (adult) 0.5 (pediatric)
Estimated total U.S. number of CT exams (millions)	81.6	

INCREASE IN CT EQUIPMENT IN FACILITIES OTHER THAN HOSPITALS

Between the surveys of 2000 and 2005-2006, the number of facilities other than hospitals that have CT equipment increased by 67% (from 1950 to 3253 sites). See Table 6.

DECREASE IN CT EQUIPMENT IN HOSPITALS

During the same time period the number of hospital sites with CT equipment decreased by 9% (from 5130 sites to 4707 sites).

Table 6. Comparison of United States Statistics
Between 2000 and 2005-2006 Surveys

	Hospitals		Facilities other than hospitals	
Survey year:	2000	2005-06	2000	2005-06
Number of sites with at least one CT unit	5130	4707	1950	3253

Average facility no. of exams per week	149 (all)	261 (adult) 15 (pediatric)	53 (all)	59 (adult) 2.7 (pediatric)
Annual U.S. CT exam workload by facility type (millions)	39.8 (all)	63.9 (adult) 5.5 (pediatric)	5.4 (all)	11.7 (adult) 0.5 (pediatric)
Estimated total U.S. number of CT exams (millions)	45.1 (2000 survey) compared to 81.6 (Y2005-2006 survey)			

AVAILABILITY OF AUTOMATIC EXPOSURE CONTROL

Finally, one of the most significant technological developments in CT scanning is the inclusion of means for AEC, sometimes referred to as tube current modulation. In this technology, the tube current (and thereby mAs) is modulated during CT scanning in response to the level of attenuation in the scanning x-ray beam plane/detector field. This can provide a means to better optimize patient dose. In the CT survey of 2000, this CT equipment feature was not captured because too few facilities had CT scanners so equipped. During the 2005-2006 survey this scanner feature was captured, showing that of the CT scanners surveyed, 71 percent were equipped with a means for automatic exposure control.

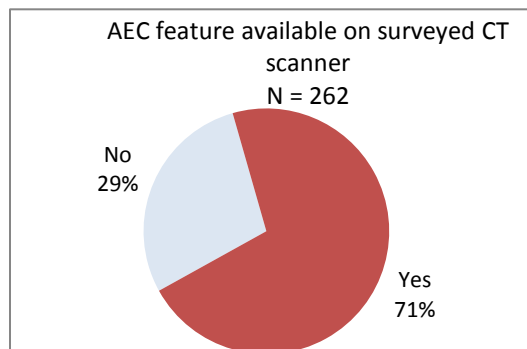


Figure 2. Automatic exposure control feature availability in the 2005-2006 survey.

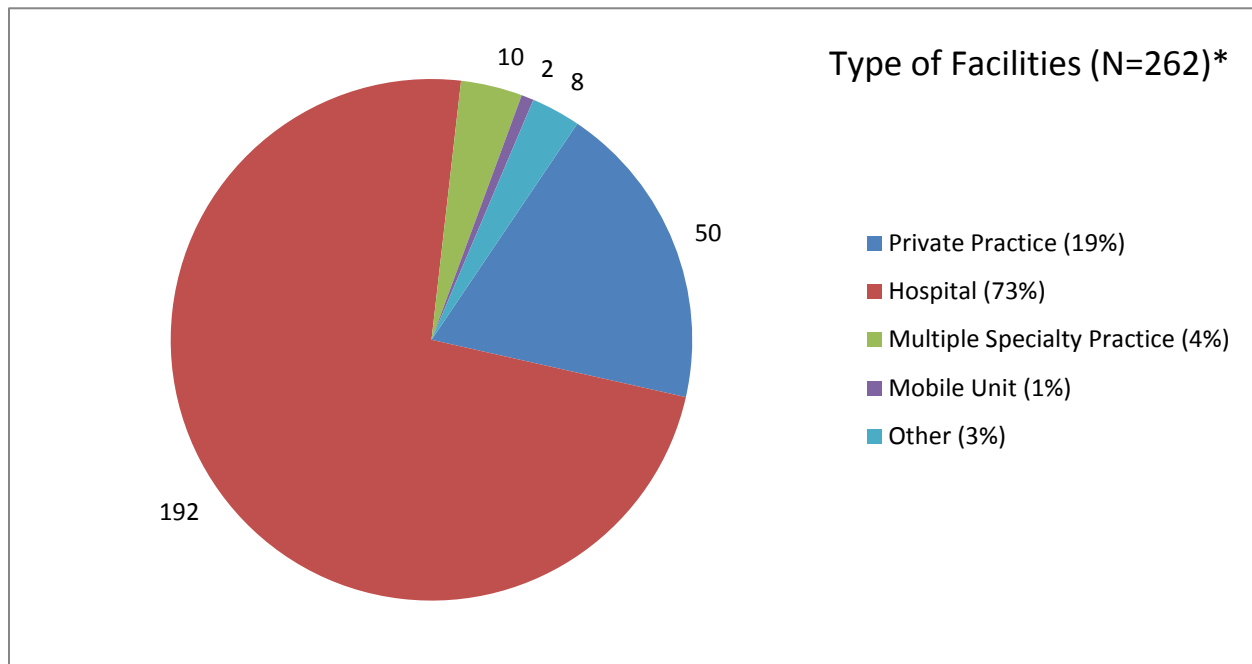
Note: Not every site provided a value for every survey element. The type of CT unit could be determined from only 255 of the 264 responses. 262 of the 264 responses provided indication regarding whether the surveyed CT unit provided AEC technology.

FACILITY TYPE AND ACCREDITATION

The study classified 262 facilities into types that included:

- private practice;
- hospitals;
- multiple specialty practice;
- mobile units; and
- other.

Facilities other than hospitals were classified based on practice specialty. CT units were categorized based on scanner type and the average number of CT scanners per facility was determined. American College of Radiology (ACR) accreditation status of 238 facilities was collected. Figures and tables in this section report the findings of these examinations.



*Two surveyed facilities did not provide a classification identifier.

Figure 3. Types of facilities in the 2005-2006 survey

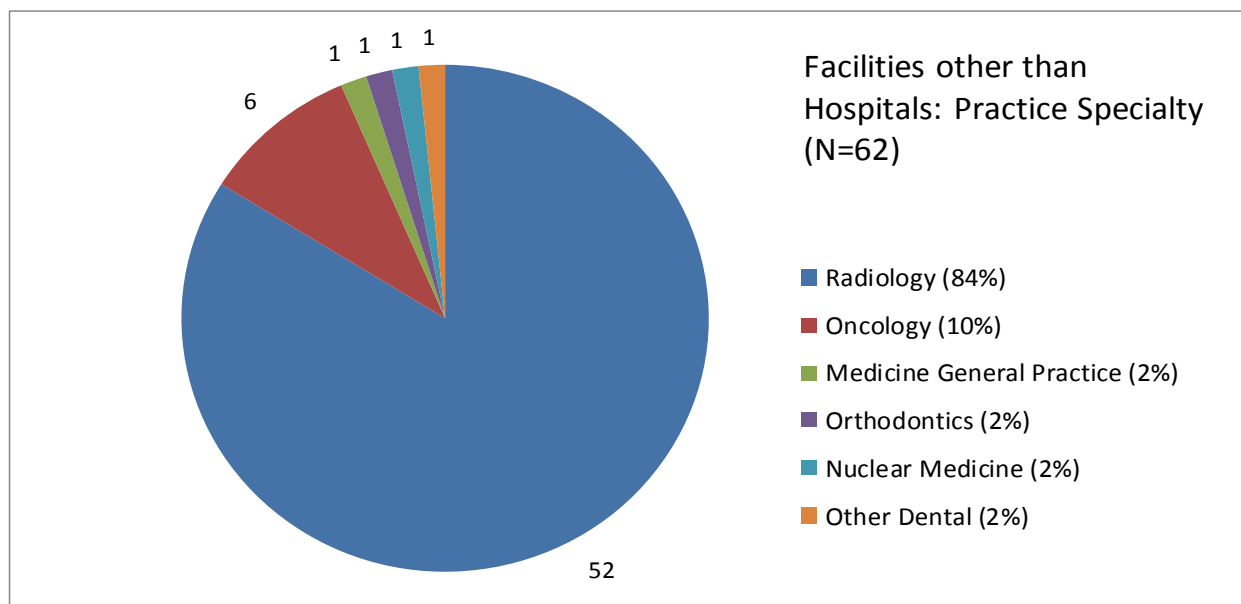


Figure 4. Practice speciality of facilities other than hospitals in the 2005-2006 survey.

Note: The value of 62 in Figure 4 reflects the number of sites that provided information regarding the specific data element: Practice Specialty. This should not be confused with the total of non-hospital sites that contributed data to the survey.

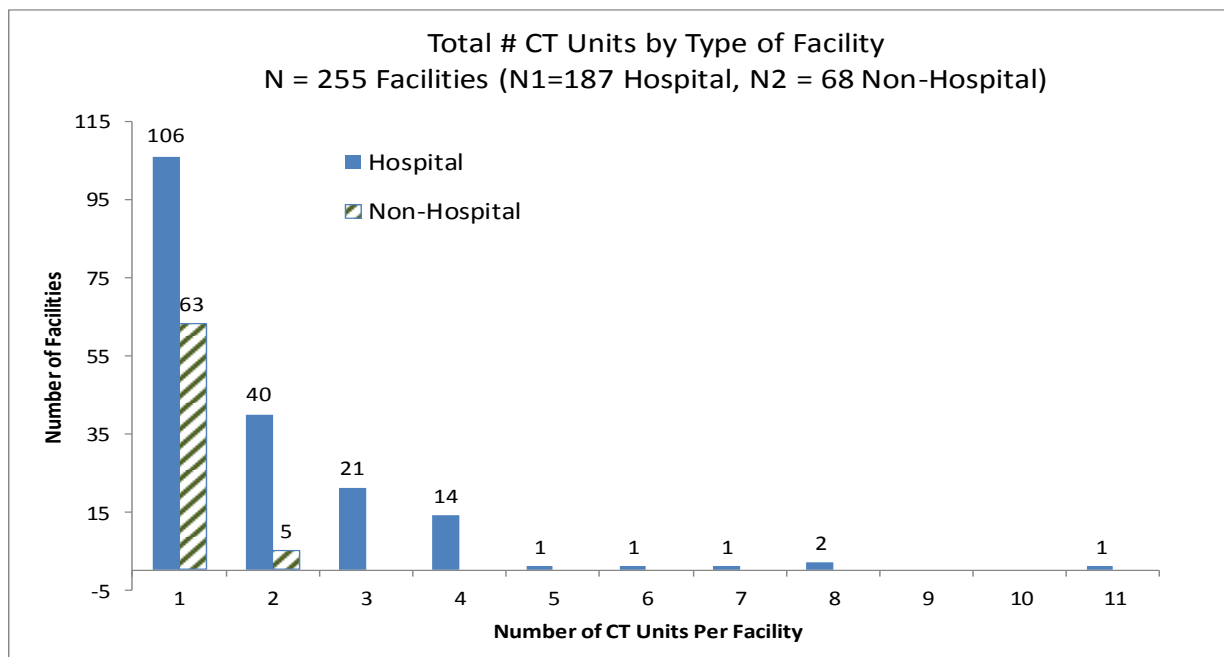


Figure 5. Number of CT scanners at surveyed facilities.

Table 7. Types and Average Numbers of CT Units in the 2005-2006 Survey.

Average number of CT scanners per facility	All scanner types	Non-helical units	Helical single-slice units	Helical multi-slice units	EBCT units	PET-CT combination units
Hospitals	1.9	0.1	0.5	1.2	0	0.1
Facilities other than hospitals	1.1	0.0	0.3	0.7	0	0.1

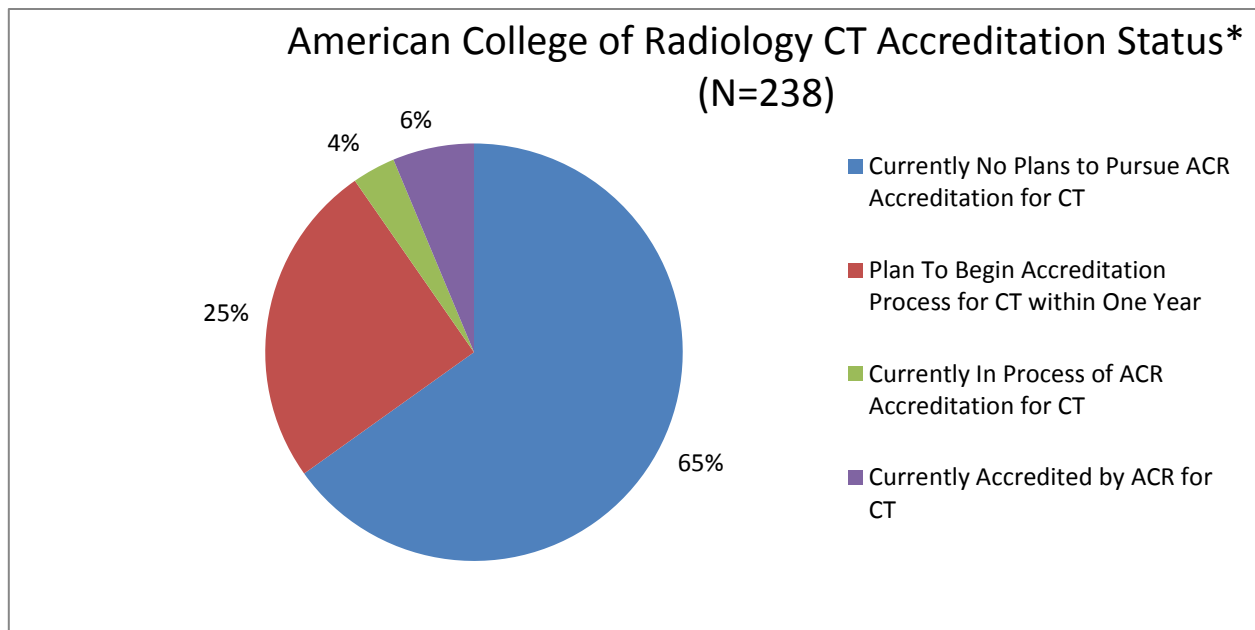


Figure 6. American College of Radiology accreditation status 2005-2006.

*At the time of survey preparation the ACR CT accreditation program was the only known U.S. based accreditation program. The Intersocietal Accreditation Commission initiated a CT accreditation program soon after this survey was completed.

CT SCREENING EXAMS CONDUCTED AT SURVEYED FACILITIES

Data were collected regarding the practice of using CT to screen asymptomatic patients at hospital and facilities other than hospitals. The average weekly workload for facilities that perform CT screening exams is reported for these exams:

- whole body;
- lung;
- virtual colonoscopy; and
- cardiac studies.

Figures in this section show the findings pertaining to conduct of screening exams.

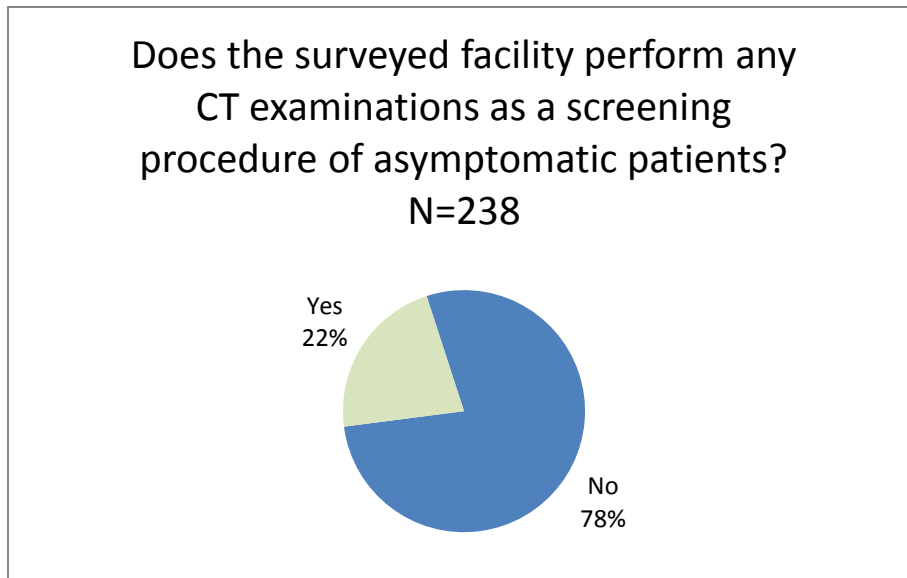


Figure 7. Percentage of facilities performing CT examinations as a screening procedure of asymptomatic patients.

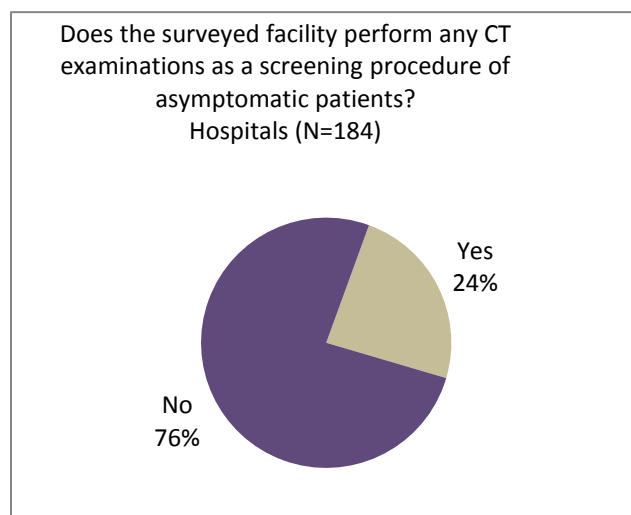


Figure 8. Percentage of hospitals performing CT examinations as a screening procedure of asymptomatic patients.

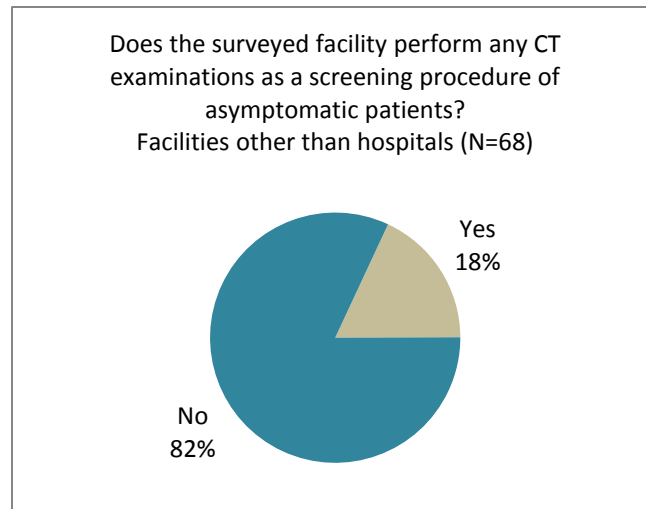


Figure 9. Percentage of facilities other than hospitals performing CT examinations as a screening procedure of asymptomatic patients.

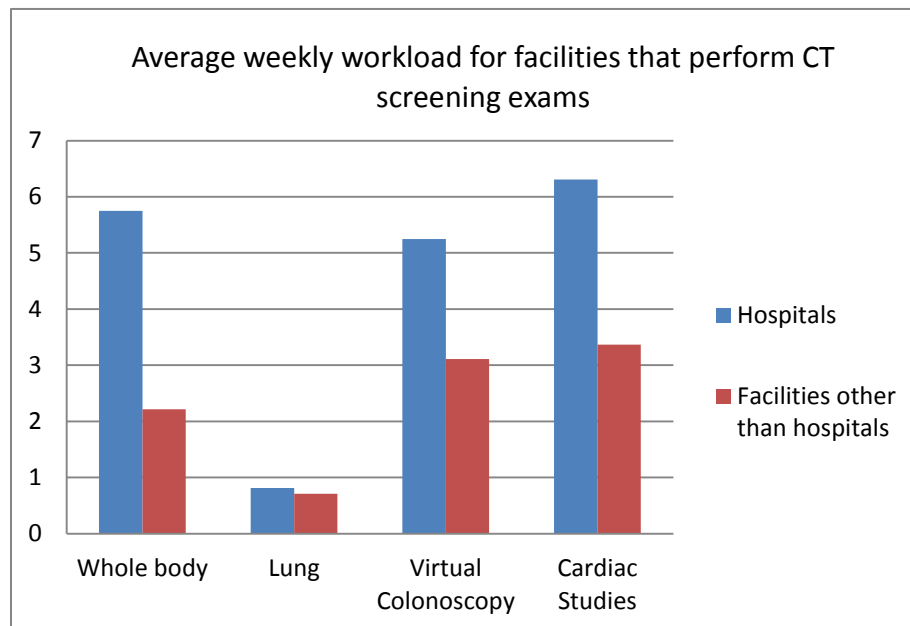


Figure 10. Average weekly workload for facilities that perform CT screening examinations.

AGE; FEATURES; QUALITY CONTROL AND ASSURANCE; AND MEDICAL PHYSICS SURVEYS

The age of surveyed CT scanners was recorded for hospitals and facilities other than hospitals. Maximum number of detector rows of surveyed CT scanners was recorded. Availability of two features were determined:

- AEC feature
- fluoroscopy capability

Frequency of maintenance and Medical Physics Surveys were recorded. Findings are presented in figures in this section. AEC feature statistics were presented previously in this report as Figure 2.

CT Scanner Age

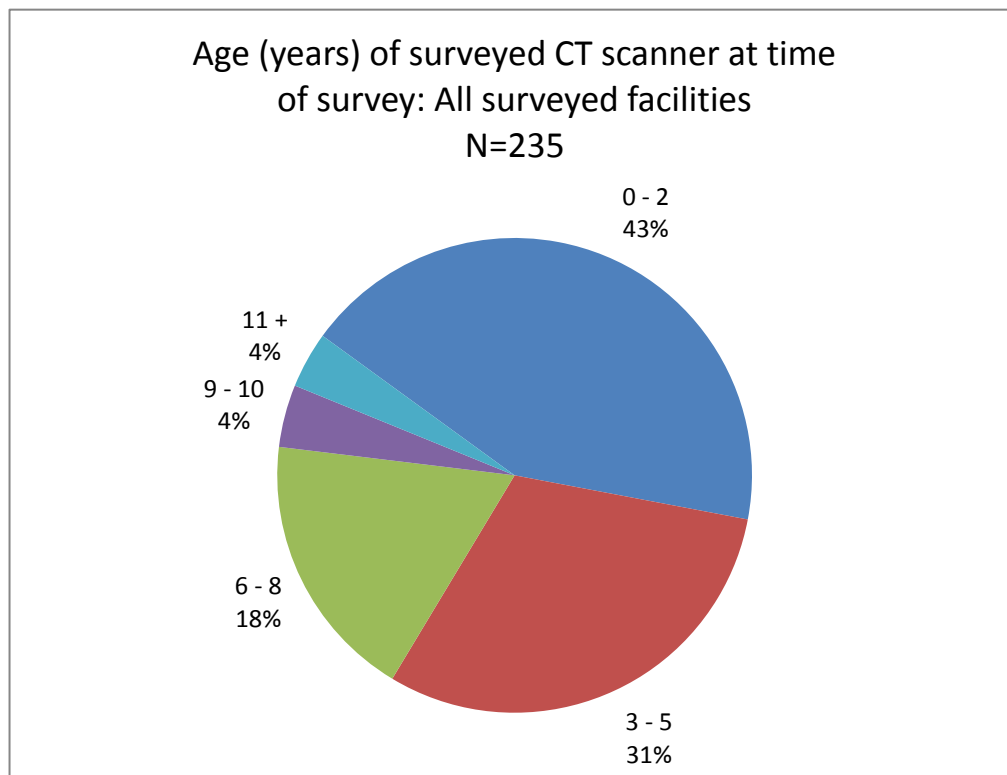


Figure 11. Age of CT scanners 2005-2006 survey.

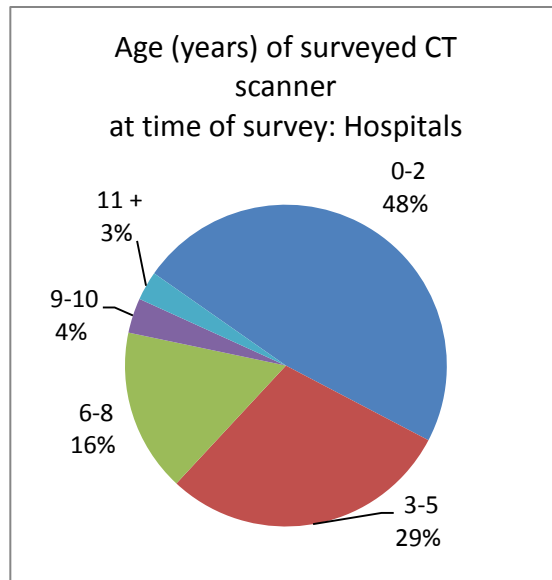


Figure 12. Age of CT scanners in hospitals 2005-2006 survey.

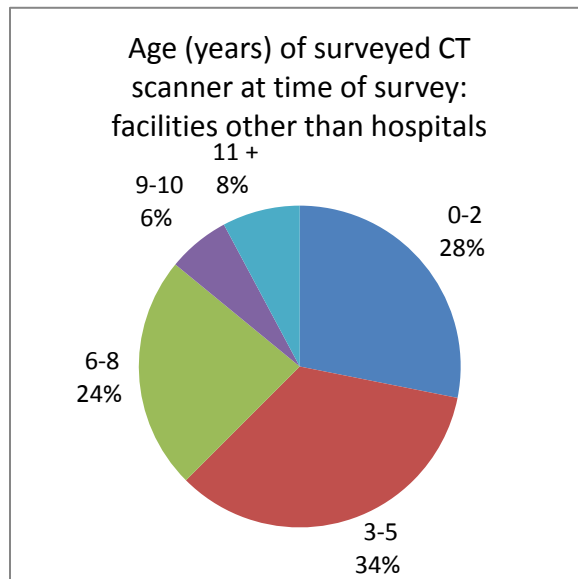


Figure 13. Age of CT scanners in facilities other than hospitals 2005-2006 survey.

Features available on CT scanners

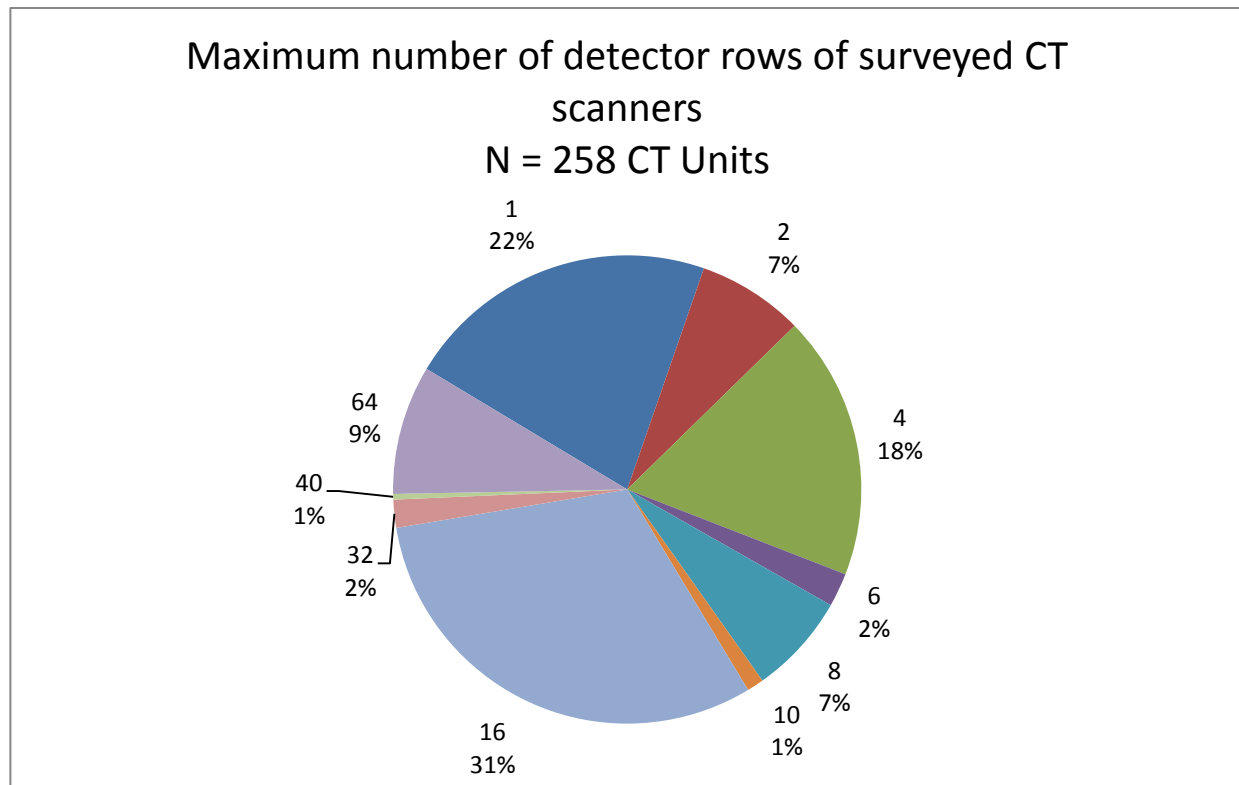


Figure 14. Maximum number of detector rows on CT scanners.

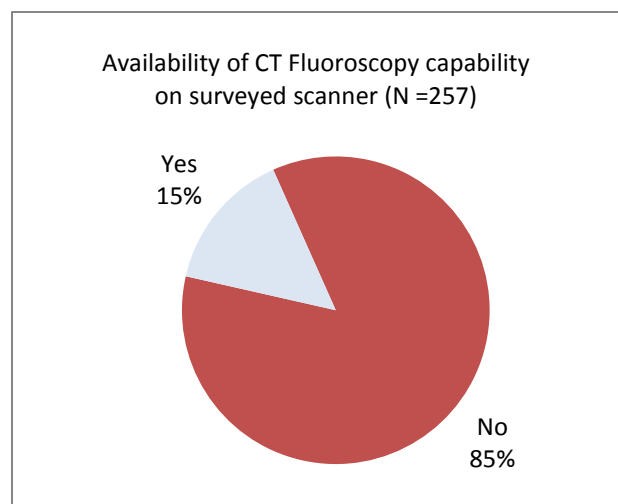


Figure 15. Fluoroscopy capability on CT scanners.

Quality control and quality assurance

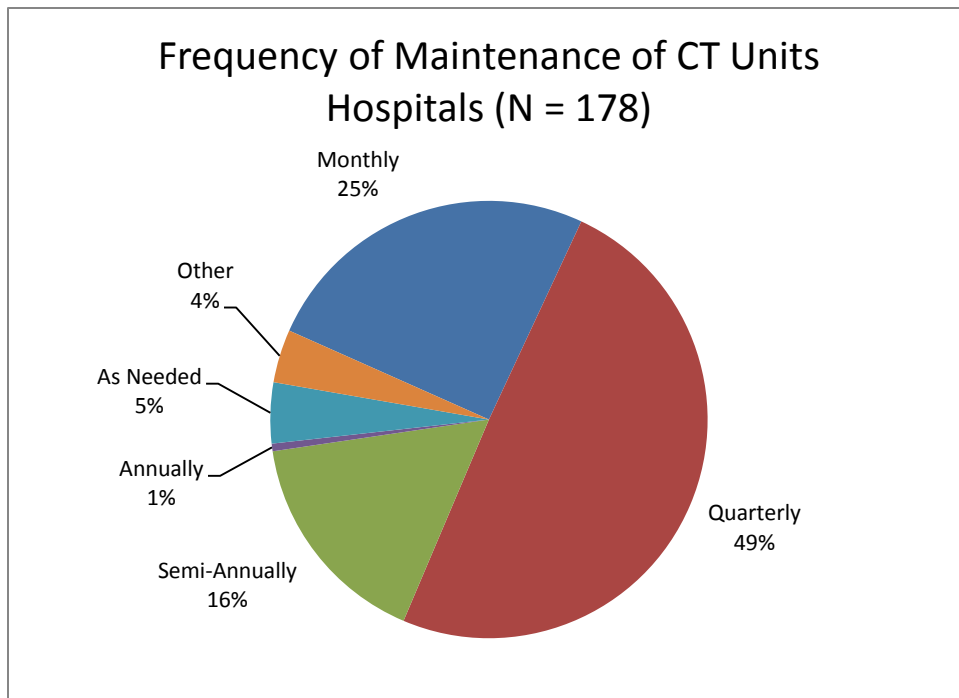


Figure 16. Maintenance of CT units at hospitals.

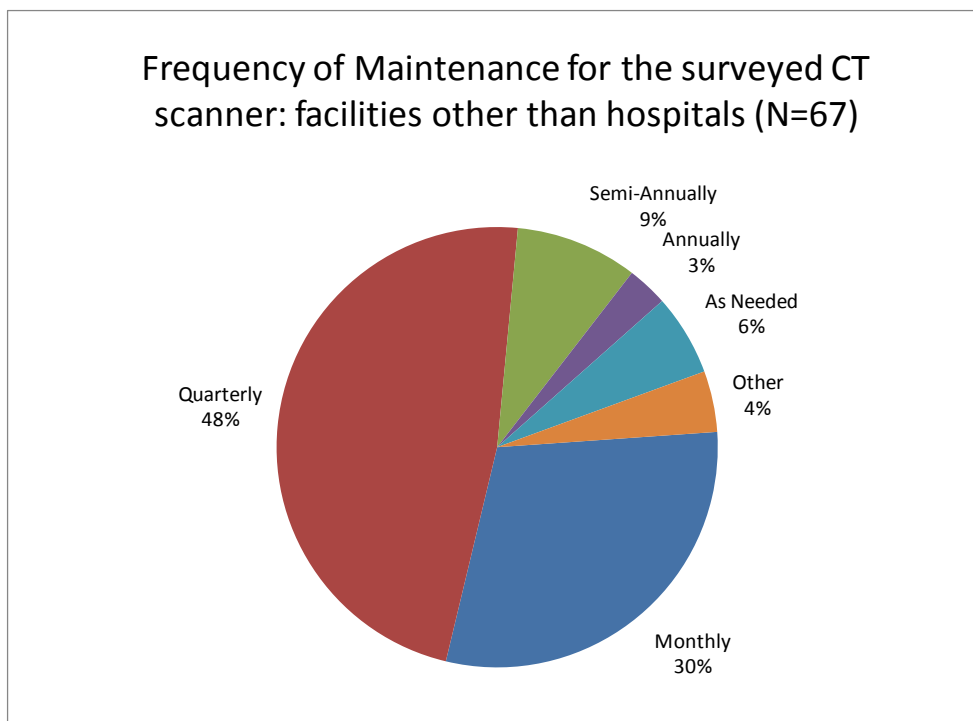


Figure 17. Maintenance of CT scanners at facilities other than hospitals.

Medical Physics Surveys

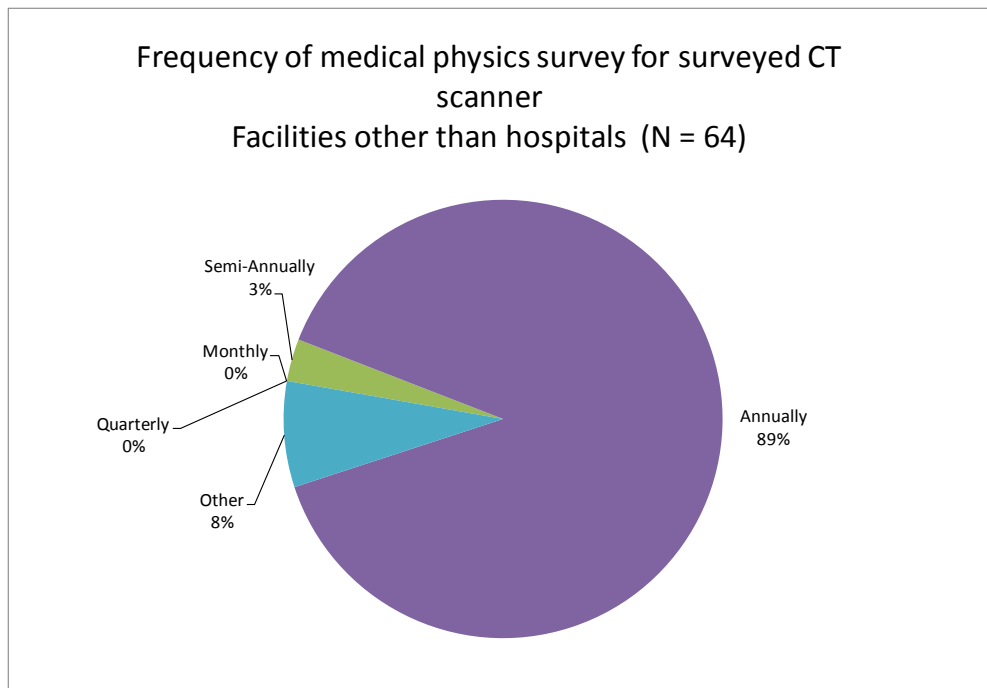


Figure 18. Medical physics surveys of CT scanners at hospitals.

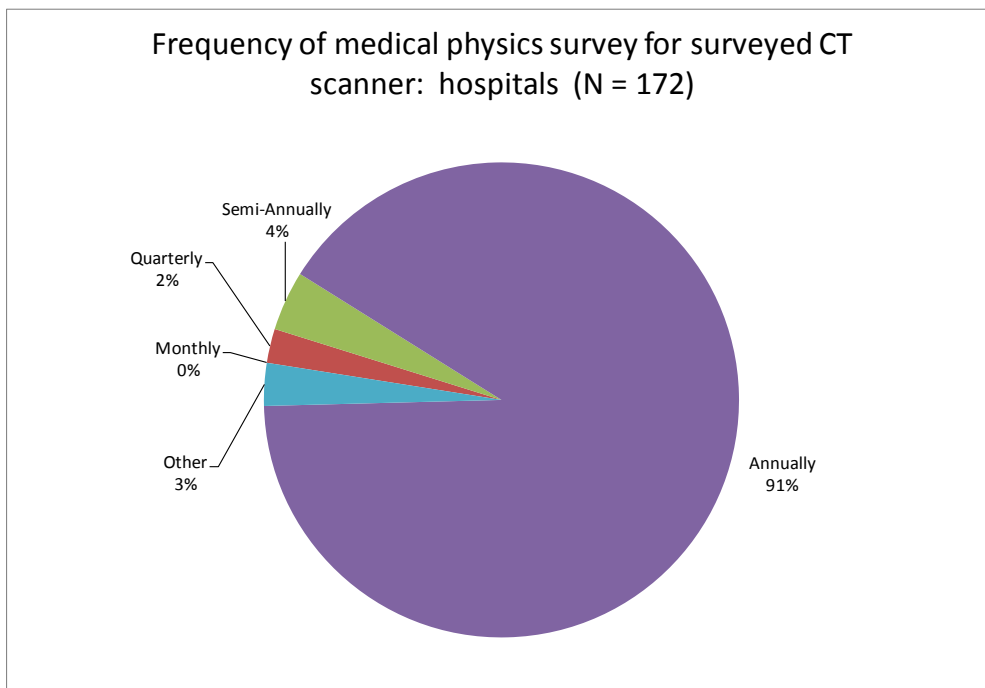


Figure 19. Medical physics surveys of CT scanners at facilities other than hospitals.

CT EXAM WORKLOADS

Exam workloads for clinical facilities that were surveyed and total U.S. annual CT exam workloads are provided in this section of the report. Each surveyed facility was asked to provide a good estimate for the total number of CT examinations and procedures performed on adult and pediatric patients on all CT scanners in clinical use at the facility at the time of survey. A pediatric patient was defined as a person under the age of 18 years. Resulting weekly workload statistics are provided for all facilities, and separately for four categories of facilities identified in the survey:

- hospitals;
- private practice facilities (e.g. stand-alone radiology practices);
- multi-specialty facilities; and
- sites that were categorized as providing mobile imaging services or other, non-specified types of clinical services.

Estimates also are provided for the total number of adult and pediatric CT exams performed annually in the U.S. In deriving these estimates, a count of the number of clinical sites having CT equipment in each state that participated in the survey was made. Each participating state was asked to provide a listing of registered clinical sites in the state that have at least one CT scanner. Listings of registered clinical sites from state radiation control programs that were unable to participate in the data collection phase of the survey were sought. Many of the collected facility listings included duplicate records, and non-clinical site listings (e.g., veterinary or industrial sites). Some states could provide a listing of only *all* clinical sites having any type of x-ray based imaging capability, (i.e., not specific to CT). Therefore, most listings needed significant processing in order to perform a CT facility count and estimate of the number of exams accurately. Most listings also provided little or no information regarding the type or number of CT scanners at each facility; although 17 states provided listings that included entries for the number of CT scanners registered with the state radiation control program at each site.

To estimate the number of hospitals that have CT equipment, a count was made of the number of hospital facilities so indicated in the American Hospital Association (AHA) registry for 2006 (AHA 2006). This guidebook provided a parameter indicating whether the clinical site had capability of performing CT exams. Although this indicator of CT capability also could mean that a hospital might rely on an outpatient/off-site CT provider, it was deemed reasonable to assume that in most cases this AHA parameter indicates that the hospital has CT equipment on-site. This hospital indicator was used along with a count for

the total number of U.S. hospitals as provided by the AHA guidebook to infer a total count for the number of U.S. hospitals that have CT equipment. To estimate the total number of U.S. non-hospital clinical sites that have CT equipment, a count was made for a selected number of states using the provided facility listings. For these selected states, counts of the number of hospitals and facilities other than hospitals were determined. From these counts of the number of hospitals and non-hospital sites, a ratio of these values for each state and for the entire sample set was determined. This ratio was then applied to the estimate for the number of hospitals in the U.S. that have CT equipment to derive a corresponding value for facilities other than hospitals.

Finally, these estimates for the number of U.S. hospital and non-hospital sites with CT equipment were combined with their respective average total facility workloads to determine a total U.S. count for the number of CT examinations performed annually in the U.S. at the time of survey. See Tables 8 and 9 in this section and Table 5 previously presented in this report.

Table 8. Number of Adult CT Exams Conducted Per Week on All CT Units at the Surveyed Facility.

Facility type	N	Mean	SDEV	25 th	50 th	75 th	Min	Max
Hospitals	177	261	284	70	180	350	5	1645
Private Practice	46	56	37	30	50	75	3	200
Multi-Specialty Practice	10	92	22	80	87	110	60	125
Mobile / Other	10	47	24	30	36	69	18	88
All facilities	246	207	259	50	108	250	3	1645

Table 9. Number of Pediatric CT Exams Conducted Per Week on All CT Units at the Surveyed Facility.

Facility type	N	Mean	SDEV	25 th	50 th	75 th	Min	Max
Hospitals	177	15	25	2	6	16	0	215
Private Practice	46	3	4	0	1	3	1	5
Multi-Specialty Practice	10	1	4	0	2	4	0	2
Mobile / Other	10	1	1	0	1	1	0	4
All facilities	236	12	22	1	4	10	0	215

REFERENCES

AHA Guide 2006. Chicago: Health Forum, an American Hospital Association affiliate, 2005.

Cristy, M. 1980. *Mathematical Phantoms Representing Children of Various Ages for Use in Estimates of Internal Dose*, NUREG/CR-1159, ORNL/NUREG/TM-367, Washington, DC: Oak Ridge National Laboratory for the U.S. Nuclear Regulatory Commission.

Cristy, M., Eckerman, K.F. 1987. *Specific Absorbed Fractions of Energy at Various Ages from Internal Photon Sources*. ORNL/TM-8381/V1. Oak Ridge, Tennessee: Oak Ridge National Laboratory.

CRCPD. 2007. *Nationwide Evaluation of X-Ray Trends (NEXT) Tabulation and Graphical Summary of 2000 Survey of Computed Tomography*, CRCPD Publication E-07-2. Frankfort, Kentucky: Conference of Radiation Control Program Directors, Inc., http://www.crcpd.org/Pubs/NEXT_docs/NEXT2000-CT.pdf.

Eckerman, K. F., M. Cristy and J. C. Ryman. 1996. *The ORNL Mathematical Phantom Series*, ORNL, Oak Ridge, Tennessee: Oak Ridge National Laboratory. <http://homer.ornl.gov/vlab/VLabPhan.html>.

ICRP. 2007. *The 2007 Recommendations of the International Commission on Radiation Protection*, ICRP Publication 103. Ann. ICRP 37 (2-4). Vienna, Austria: International Commission on Radiation Protection.

Jones, D.G. and B.F. Wall. 1985. *Organ Doses from Medical X-ray Examinations Calculated Using Monte Carlo Techniques*, NRPB-R186. U.K.: National Radiological Protection Board.

Jones, D.G., and P.C. Shrimpton. 1991. Survey of CT practice in the UK. Part 3: Normalised organ doses calculated using Monte Carlo techniques. NRPB-R250, Chilton: National Radiological Protection Board.

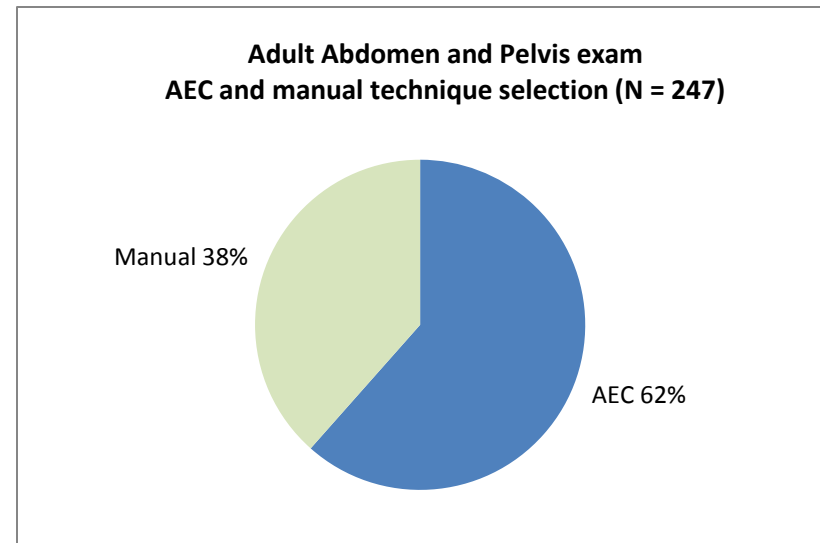
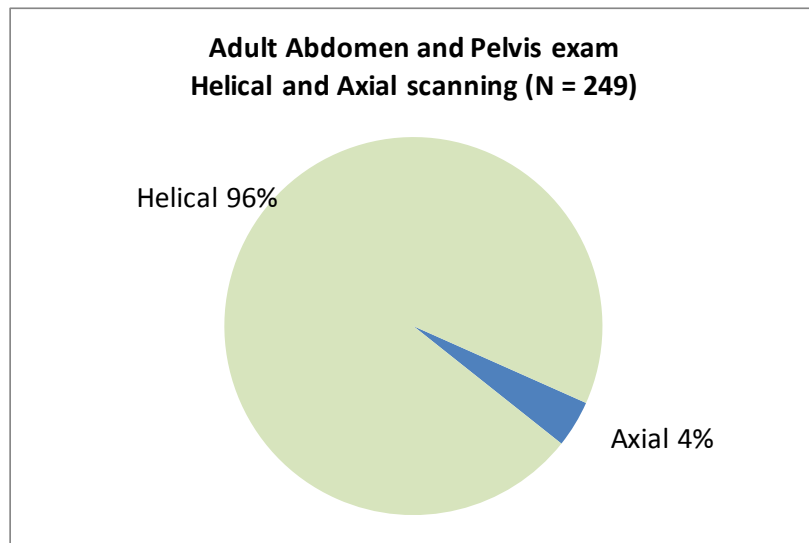
Kramer, R. , M. Zankl, G. Williams, and G. Drexler. 1986. *The Calculation of Dose from External Photon Exposures Using Reference Human Phantoms and Monte Carlo Methods. Part 1: The Male (Adam) and Female (Eva) Adult Mathematical Phantoms*, GSF-Bericht S-885 (Gesellschaft für Strahlen- und Umweltforschung, München.

U.S. Census Bureau. 2005. Projection for U.S. Population, 2005; www.census.gov.

APPENDIX: TABULATION OF RADIATION DOSES

APPENDIX: TABULATION OF RADIATION DOSES.....	33
Table 10.1 Adult Abdomen and Pelvis Exam.....	34
Table 10.2 Adult Head Exam.	40
Table 10.3 Adult Sinus Exam.	55
Table 10.4 Adult Chest Exam.....	61
Table 10.5 Adult Abdomen Exam.....	67
Table 10.6 Adult Chest and Abdomen and Pelvis Exam.....	73
Table 10.7 Adult Cervical Spine Exam.	79
Table 10.8 Adult Thoracic Spine Exam.	83
Table 10.9 Adult Lumbar Spine Exam.	89
Table 10.10 Adult Colon Exam.	95
Table 10.11 Adult Coronary Angiography Exam.	101
Table 10.12 Infant Head Exam.	107
Table 10.13 Child Head Exam.....	113
Table 10.14 Infant Abdomen and Pelvis Exam.....	119
Table 10.15 Child Abdomen and Pelvis Exam.	123
Table 10.16 Infant Thoracic Survey Exam.	127
Table 10.17 Thoracic Survey Exam.....	131

Table 10.1 Adult Abdomen and Pelvis Exam.



Percent of sites Helical scanning	Hospitals	Facilities other than hospitals
Helical	96	95
Axial	4	5

Percent of sites AEC / manual	Hospitals	Facilities other than hospitals
AEC	66	51
Manual	34	49

Adult Abdomen and Pelvis Exam: All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	224	37	44	1	8	22	60	225
No. Scout views per exam	237	1.2	0.4	1	1	1	1	3
f_{nc}	216	25	19	0	10	20	35	100
F_c	216	48	32	0	15	55	75	100
F_{c+nc}	216	27	32	0	2	10	50	100
kVp	250	122	5	110	120	120	120	140
mA	182	282	134	40	200	255	350	823
Time (s) per rotation	245	0.8	0.4	0.33	0.5	0.8	1.0	3.6
mA s per rotation	215	240	129	67	160	214	280	1037
Slices per rotation	244	10.5	13.4	1	2	4	16	64
Slice width (mm)	225	3.9	2.8	0.5	1.25	3.75	5	10
Table feed (mm/rot)	227	18	11	4	10	15	25	100
Pitch	182	1.2	0.3	0.5	0.9	1.2	1.4	2.0
Scan length (mm)	84	450	124	261	372	440	500	840
CTDI _{free air} (mGy)	134	60.5	40.6	18.3	35.4	51.2	72.7	298
CTDI _w (mGy)	181	21.5	12.4	6.0	13.0	19.0	25.0	93.0
CTDI _{vol} (mGy)	177	20.5	12.0	4.6	12.4	18.2	25.1	99.3
DLP (mGy-cm)	93	911	620	131	525	842	1095	4692
E (mSv)	161	15.9	9.1	3.1	9.5	14.8	19.2	56.9

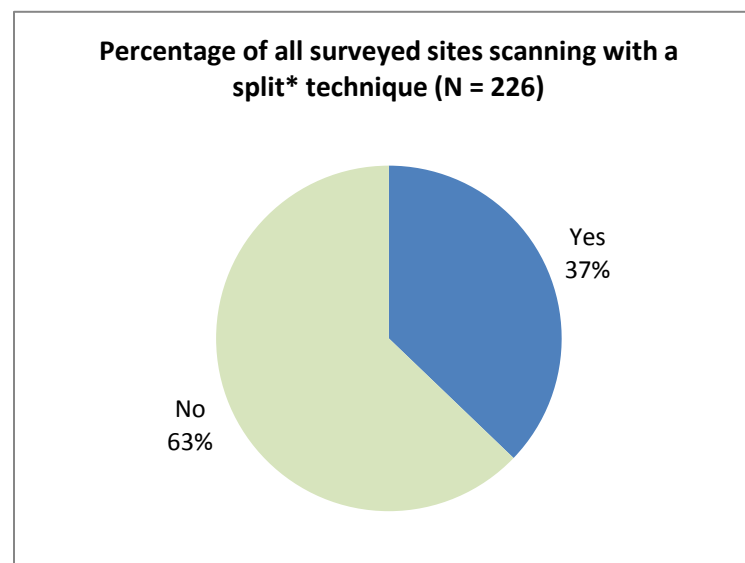
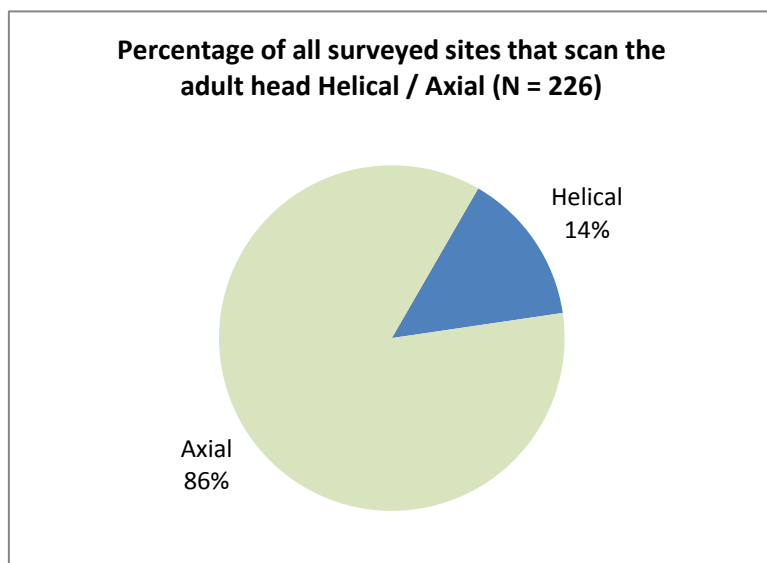
Adult Abdomen and Pelvis Exam, hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	160	48	36	0	20	35	63	397
No. Scout views per exam	167	1.5	0.5	1	1	1	2	3
f_{nc}	154	27	19	0	15	23	40	100
F_c	154	49	30	0	24	55	75	98
F_{c+nc}	154	24	32	0	1	9	40	100
kVp	183	122	5	120	120	120	120	140
mA	127	287	126	40	200	263	374	750
Time (s) per rotation	180	0.8	0.3	0.33	0.5	0.8	0.8	3.6
mAs per rotation	158	241	125	72	160	218	287	972
Slices per rotation	178	11	13	1	2	8	16	64
Slice width (mm)	162	3.6	2.7	0.5	1.3	2.5	5.0	10.0
Table feed (mm/rot)	164	18.7	11.2	4.5	10.5	15.0	27.0	100.0
Pitch	167	1.1	0.3	0.6	0.9	1.0	1.4	2.0
Scan length (mm)	84	450	124	261	372	440	500	840
CTDI _{free air} (mGy)	134	60	41	18	35	51	73	298
CTDI _w (mGy)	135	21	12	6	13	19	24	93
CTDI _{vol} (mGy)	132	21	12	5	13	18	26	99
DLP (mGy-cm)	72	943	665	132	531	857	1103	4652
E (mSv)	116	15.8	8.6	3.1	9.7	14.7	18.9	50.9

Adult Abdomen and Pelvis Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	62	21	38	.1	8	15	24	300
No. Scout views per exam	36	1.4	0.5	1	1	1	2	3
f_{nc}	61	21	19	0	5	20	30	100
F_c	61	45	36	0	5	50	80	100
F_{c+nc}	61	34	34	0	5	20	60	100
kVp	66	122	5	110	120	120	120	140
mA	54	267	155	80	162	223	328	823
Time (s) per rotation	65	0.9	0.5	0.4	0.6	0.8	1.0	3.0
mAs per rotation	56	233	139	67	160	210	279	1037
Slices per rotation	65	8	14	1	1	4	6	64
Slice width (mm)	60	4.6	2.9	0.5	2	5	5	10
Table feed (mm/rot)	55	15.4	10.3	4.0	10.0	12.0	15.0	55.0
Pitch	59	1.2	0.3	0.5	1.0	1.1	1.5	1.8
Scan length (mm)	32	422	84	220	399	425	465	580
CTDI _{free air} (mGy)	46	63	46	20	36	52	74	311
CTDI _w (mGy)	45	21	13	7	13	19	26	89
CTDI _{vol} (mGy)	44	19	11	5	11	17	24	65
DLP (mGy-cm)	21	802	422	231	462	699	1027	1716
E (mSv)	44	16.1	10.5	3.5	8.5	14.5	20.4	56.9

Adult Abdomen and Pelvis Exam, AEC scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	129	49	55	0	20	30	60	397
No. Scout views per exam	137	1.6	0.5	1	1	2	2	3
f_{nc}	130	24	15	0	15	20	32	80
F_c	130	51	30	0	26	57	75	98
F_{c+nc}	130	25	32	0	2	10	38	100
kVp	153	121	4	120	120	120	120	140
mA	100	315	152	40	200	294	403	823
Time (s) per rotation	152	0.7	0.2	0.3	0.5	0.8	0.8	1.5
mAs per rotation	132	254	143	67	162	224	300	1037
Slices per rotation	150	14	15	1	4	16	16	64
Slice width (mm)	134	2.9	2.3	0.5	1.3	1.5	5	10
Table feed (mm/rot)	134	20.5	10.1	5.0	12.7	18.0	27.5	55.0
Pitch	141	1.1	0.3	0.6	0.9	1.2	1.4	1.8
Scan length (mm)	64	436	106	220	362	420	500	800
CTDI _{free air} (mGy)	110	61	46	20	33	50	73	311
CTDI _w (mGy)	110	22	14	7	12	18	29	93
CTDI _{vol} (mGy)	108	21	13	5	13	18	25	99
DLP (mGy-cm)	52	886	675	232	498	788	1031	4652
E (mSv)	98	15.6	9.4	3.5	9.3	13.8	18.1	56.9

Adult Abdomen and Pelvis Exam, manually selected technique								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	84	27	26	0.1	10	18	40	125
No. Scout views per exam	87	1.3	0.5	1	1	1	2	3
f_{nc}	85	27	23	0	10	22	40	100
F_c	85	43	34	0	10	45	75	100
F_{c+nc}	85	30	34	0	1	10	50	100
kVp	95	123	7	110	120	120	120	140
mA	82	241	97	72	181	250	300	628
Time (s) per rotation	94	1.0	0.5	0.4	0.78	0.8	1.0	3.6
mAs per rotation	83	217	101	75	160	200	250	800
Slices per rotation	93	5	8	1	1	2	4	64
Slice width (mm)	89	5.3	2.9	0.5	3	5	8	10
Table feed (mm/rot)	86	13.8	11.3	4.0	10.0	11.3	15.0	100.0
Pitch	86	1.1	0.3	0.5	0.9	1.0	1.3	2.0
Scan length (mm)	52	451	125	244	399	440	500	840
CTDI _{free air} (mGy)	71	61	35	18	41	54	74	270
CTDI _w (mGy)	71	21	9	6	15	20	24	66
CTDI _{vol} (mGy)	69	20	10	5	12	20	25	52
DLP (mGy-cm)	41	944	548	132	596	853	1208	2624
E (mSv)	63	16.5	9	3	11	16	21	43

Table 10.2 Adult Head Exam.



Percent of sites Helical scanning	Hospitals	Facilities other than hospitals
Helical	14	18
Axial	86	82

Percent of sites split protocol	Hospitals	Facilities other than hospitals
No	66	54
Yes	34	46

*Split technique refers to the scanning of the two broad regions of the head- the posterior fossa and the brain- using different scan parameters.

Adult Head Exam: Brain and Posterior Fossa, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	224	40	44	1	8	22	60	225
No. Scout views per exam	236	1.2	0.4	1	1	1	1	3
f _{nc}	225	76	25	0	70	85	95	100
F _c	225	4	12	0	0	0	3	95
F _{c+nc}	225	20	24	0	3	10	25	100
kVp								
mA								
Time (s) per rotation	NOTE: Technique factors are only tabulated for the separate scan regions – brain and posterior fossa							
mAs per rotation								
Slices per rotation								
Slice width (mm)								
Table feed (mm/rot)								
Pitch								
Scan length (mm)	259	136	10	90	135	135	135	200
CTDI _{free air} (mGy)	193	98	45	17	72	88	115	334
CTDI _w (mGy)	194	67	30	12	49	63	80	215
CTDI _{vol} (mGy)	182	66	32	12	48	63	78	215
DLP (mGy-cm)	181	896	434	186	639	849	1080	2908
E (mSv)	169	2.5	1.2	0.5	1.8	2.3	3.0	7.6

Adult Head Exam: Posterior Fossa region, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	249	127	9	120	120	120	140	140
mA	208	237	97	50	170	200	300	600
Time (s) per rotation	244	1.5	0.6	0.5	1.0	1.5	2	4
MA s per rotation	237	341	114	50	260	340	400	825
Slices per rotation	234	5	7	1	1	4	4	64
Slice width (mm)	232	3.7	1.7	0.5	2.5	4.5	5	10
Table feed (mm/rot)	217	10.2	6.0	0.5	5.0	10	12	29
Pitch	208	1.0	0.1	0.5	1	1	1	2
Scan length (mm)	259	41	4	27	40	40	40	62
CTDI_{free air} (mGy)	198	104	51	17	73	91	127	334
CTDI_w (mGy)	200	72	34	12	51	65	85	215
CTDI_{vol} (mGy)	188	69	35	11	48	63	85	215
DLP (mGy-cm)	184	285	149	45	193	256	341	945
E (mSv)	157	0.8	0.4	0.1	0.5	0.7	0.9	2.1

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam: Brain region, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	242	125	8	120	120	120	130	140
mA	201	235	100	50	160	200	300	600
Time (s) per rotation	237	1.5	0.6	0.5	1.0	1.5	2	3.6
mAs per rotation	230	332	115	50	257	322	400	900
Slices per rotation	229	5	7	1	1	4	4	64
Slice width (mm)	227	5	2	0.5	2.5	5	5	12
Table feed (mm/rot)	206	11	6	0.5	7	10	15	28
Pitch	202	1.0	0.1	0.5	1	11	1	1.5
Scan length (mm)	197	95	44	17	68	87	112	334
CTDI_{free air} (mGy)	197	95	44	17	68	87	112	334
CTDI_w (mGy)	197	65	30	12	48	62	74	215
CTDI_{vol} (mGy)	184	63	31	11	44	61	73	215
DLP (mGy-cm)	182	607	302	107	417	584	701	3046
E (mSv)	154	1.7	0.9	0.3	1.2	1.6	2.1	5.6

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam, Posterior Fossa and Brain: Helical Scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	27	28	24	2	8	23	40	93
No. Scout views per exam	30	1.4	0.5	1	1	1	2	2
f _{nc}	30	74	28	10	50	85	96	100
F _c	30	6	17	0	0	0	0	70
F _{c+nc}	30	20	24	0	2	13	24	90
kVp								
mA								
Time (s) per rotation								
mAs per rotation								
Slices per rotation								
Slice width (mm)								
Table feed (mm/rot)								
Pitch								
Scan length (mm)	36	144	27	100	135	135	135	256
CTDI _{free air} (mGy)	25	75	33	17	48	84	88	138
CTDI _w (mGy)	26	52	24	12	37	54	67	103
CTDI _{vol} (mGy)	24	92	19	11	28	40	58	75
DLP (mGy-cm)	24	617	293	186	437	567	840	1356
E (mSv)	22	2.2	1.1	0.5	1.3	2.3	3.1	4.6

NOTE: Technique factors are only tabulated for the separate scan regions – brain and posterior fossa

Adult Head Exam, Posterior Fossa region, Helical Scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	35	123	6	120	120	120	120	140
mA	29	249	109	50	200	250	300	600
Time (s) per rotation	33	1.0	0.2	0.5	1.0	1.0	1.0	1.5
mAs per rotation	31	242	91	50	200	250	300	450
Slices per rotation	30	15	14	1	3	16	16	64
Slice width (mm)	31	2.3	2.2	0.5	0.6	1.0	4.4	10.0
Table feed (mm/rot)	27	10.5	6.1	0.5	6.4	10.5	15.0	28.8
Pitch	25	0.9	0.2	0.6	0.7	0.9	1.0	1.7
Scan length (mm)	36	42	8	30	40	40	40	76
CTDI _{free air} (mGy)	25	73	33	17	48	76	88	138
CTDI _w (mGy)	26	51	24	12	35	53	65	103
CTDI _{vol} (mGy)	24	42	18	11	28	39	54	75
DLP (mGy-cm)	24	180	86	45	130	164	231	402
E (mSv)	20	0.6	0.3	0.1	0.3	0.5	0.8	1.2

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam, Brain region, Helical scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	35	123	6	120	120	120	120	140
mA	29	250	107	50	200	250	300	600
Time (s) per rotation	33	1.0	0.3	0.5	1.0	1.0	1.0	1.5
mAs per rotation	31	246	91	50	210	250	300	450
Slices per rotation	30	15	14	1	3	16	16	64
Slice width (mm)	31	2.7	2.8	0.5	0.6	1.0	5.0	10.0
Table feed (mm/rot)	27	11.4	5.8	0.5	8.0	10.5	15.0	28.8
Pitch	24	0.9	0.2	0.6	0.7	0.9	1.0	1.4
Scan length (mm)	36	100	19	70	95	95	95	180
CTDI_{free air} (mGy)	25	76	34	17	48	84	97	138
CTDI_w (mGy)	26	53	24	12	38	54	69	103
CTDI_{vol} (mGy)	24	43	19	11	28	40	62	75
DLP (mGy-cm)	24	443	213	107	308	411	603	958
E (mSv)	20	1.6	0.8	0.3	1.0	1.6	2.1	3.2

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam: Posterior Fossa and Brain: Axial scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	188	43	46	1	10	23	63	225
No. Scout views per exam	199	1.1	0.4	1	1	1	1	3
f _{nc}	194	77	25	0	70	85	95	100
F _c	194	4	8	0	0	0	3	95
F _{c+nc}	194	19	25	0	4	10	25	100
kVp								
mA								
Time (s) per rotation								
mAs per rotation								
Slices per rotation								
Slice width (mm)								
Table feed (mm/rot)								
Pitch								
Scan length (mm)	212	135	8	90	135	135	135	200
CTDI _{free air} (mGy)	169	101	46	30	73	91	118	334
CTDI _w (mGy)	169	70	31	21	50	64	81	215
CTDI _{vol} (mGy)	159	69	32	21	49	64	81	215
DLP (mGy-cm)	158	935	438	281	663	868	1100	2908
E (mSv)	148	2.6	1.2	0.7	1.8	2.4	3.0	7.7

NOTE: Technique factors are only tabulated for the separate scan regions – brain and posterior fossa

Adult Head Exam: Posterior Fossa region, Axial scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	206	125	9	120	120	120	130	140
mA	171	233	121	65	160	200	300	550
Time (s) per rotation	204	1.6	0.7	0.6	1.0	1.5	2.0	3.6
mAs per rotation	199	345	122	140	280	340	400	900
Slices per rotation	198	3.7	10.0	1	1	2	4	24
Slice width (mm)	196	4.9	3.1	0.6	3.9	5.0	5.0	12.0
Table feed (mm/rot)	187	12	5	3	7	10	16	29
Pitch	177	1.0	0.1	0.5	1	1	1	1.5
Scan length (mm)	212	95	7	55	95	95	95	141
CTDI _{free air} (mGy)	172	97	42	29	69	88	114	334
CTDI _w (mGy)	171	67	32	21	49	63	75	215
CTDI _{vol} (mGy)	160	66	32	21	48	62	74	215
DLP (mGy-cm)	159	631	310	170	456	584	710	2046
E (mSv)	136	1.8	0.9	0.5	1.3	1.6	2.1	5.6

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam: Brain and Posterior fossa: Hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	162	51	46	1	19	35	72	225
No. Scout views per exam	174	1.2	0.4	1	1	1	1	3
f_{nc}	164	83	17	0	80	90	95	100
F_c	164	4	9	0	0	0	3	50
F_{c+nc}	164	13	16	0	2	8	20	100
kVp								
mA								
Time (s) per rotation								
mAs per rotation								
Slices per rotation								
Slice width (mm)								
Table feed (mm/rot)								
Pitch								
Scan length (mm)	189	137	14	90	135	135	135	256
CTDI _{free air} (mGy)	143	98	40	17	76	88	114	334
CTDI _w (mGy)	144	67	29	12	57	63	80	211
CTDI _{vol} (mGy)	135	65	28	11	48	63	77	211
DLP (mGy-cm)	134	894	387	203	649	862	1080	2852
E (mSv)	124	2.4	1.0	0.7	1.7	2.3	2.9	6.3

NOTE: Technique factors are only tabulated for the separate scan regions – brain and posterior fossa

Adult Head Exam: Posterior Fossa region, Hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	183	127	9	120	120	120	140	140
mA	149	247	98	50	170	220	300	550
Time (s) per rotation	180	1.5	0.5	0.5	1.0	1.5	2.0	3.6
mAs per rotation	174	348	109	50	287	340	400	825
Slices per rotation	171	5.7	7.7	1	2	4	4	64
Slice width (mm)	169	3.5	1.8	0.5	2.5	4.5	5.0	7.0
Table feed (mm/rot)	160	10.8	6.0	2.0	5.0	10.0	10.5	28.8
Pitch	152	1.0	0.2	0.5	1.0	1.0	1.0	2.0
Scan length (mm)	189	41	5	27	40	40	40	62
CTDI_{free air} (mGy)	146	102	43	17	77	90	126	334
CTDI_w (mGy)	147	71	29	12	53	66	85	211
CTDI_{vol} (mGy)	138	68	31	11	50	63	83	211
DLP (mGy-cm)	135	281	134	45	197	259	340	945
E (mSv)	116	0.7	0.4	0.2	0.5	0.7	0.9	2.1

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam: Brain region: Hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	179	125	8	120	120	120	130	140
mA	146	246	102	50	170	220	300	550
Time (s) per rotation	176	1.4	0.5	0.5	1.0	1.5	2.0	3.6
mAs per rotation	170	341	115	50	280	335	400	900
Slices per rotation	167	6	8	1	2	4	4	64
Slice width (mm)	165	4.4	2.4	0.5	2.5	5.0	5.0	10.0
Table feed (mm/rot)	157	12.0	5.5	5.0	8.0	10.0	18.0	28.8
Pitch	146	0.97	0.11	0.5	1.0	1.0	1.0	1.4
Scan length (mm)	189	96	10	55	95	95	95	180
CTDI_{free air} (mGy)	140	95	40	17	73	87	112	334
CTDI_w (mGy)	145	66	27	12	49	62	75	211
CTDI_{vol} (mGy)	135	64	28	11	47	62	73	211
DLP (mGy-cm)	134	615	276	107	437	595	702	2007
E (mSv)	114	1.7	0.7	0.5	1.2	1.7	2.0	4.5

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam: Brain and Posterior fossa: Facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	62	9.2	10.4	1	4	6	10	61
No. Scout views per exam	63	1.1	0.3	1	1	1	1	2
f_{nc}	60	56	33	0	29	60	86	100
F_c	60	7	19	0	0	0	0	95
F_{c+nc}	60	37	33	0	10	25	65	100
kVp								
mA								
Time (s) per rotation								
mAs per rotation								
Slices per rotation								
Slice width (mm)								
Table feed (mm/rot)								
Pitch								
Scan length (mm)	70	136	15	100	135	135	135	225
CTDI _{free air} (mGy)	49	97	57	19	60	87	119	301
CTDI _w (mGy)	49	68	38	14	42	60	80	215
CTDI _{vol} (mGy)	47	66	40	14	41	60	76	215
DLP (mGy-cm)	47	900	552	186	546	800	1095	2907
E (mSv)	46	2.9	1.6	0.5	1.8	2.6	3.4	7.7

NOTE: Technique factors are only tabulated for the separate scan regions – brain and posterior fossa

Adult Head Exam: Posterior fossa region, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	65	128	9	120	120	120	140	140
mA	58	210	88	80	160	180	229	600
Time (s) per rotation	63	1.6	0.7	0.5	1.0	1.5	2.0	4.0
mAs per rotation	62	318	124	64	226	300	400	680
Slices per rotation	62	4	5	1	1	2	4	32
Slice width (mm)	62	40	1.8	0.5	2.5	5.0	5.0	10.0
Table feed (mm/rot)	56	9.0	6.0	3.0	5.0	7.0	10.0	29.0
Pitch	56	1.0	6.0	0.5	1.0	1.0	1.0	1.0
Scan length (mm)	70	41	4	30	40	40	40	60
CTDI_{free air} (mGy)	51	105	67	19	60	91	120	301
CTDI_w (mGy)	51	73	44	14	42	63	91	215
CTDI_{vol} (mGy)	49	72	45	14	41	60	87	215
DLP (mGy-cm)	49	295	185	55	163	239	361	862
E (mSv)	42	0.8	0.5	0.1	0.5	0.8	1.0	1.2

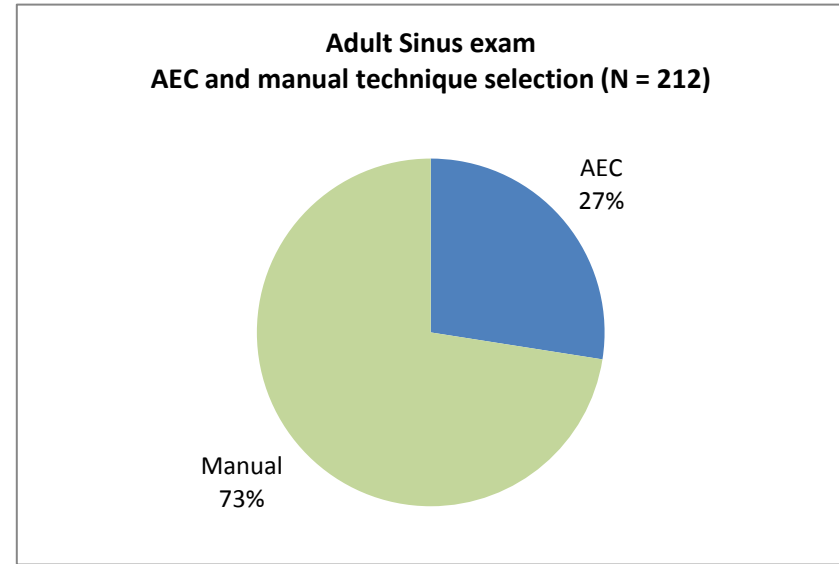
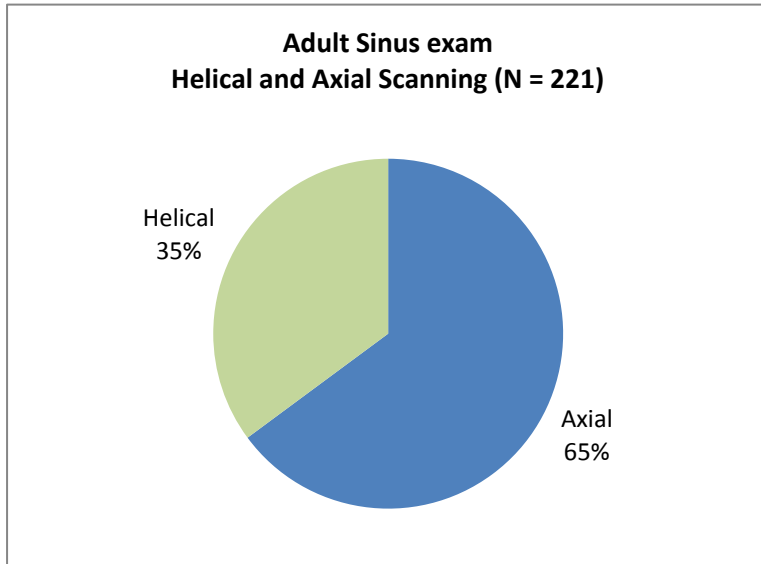
NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Adult Head Exam: Brain region, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week								
No. Scout views per exam								
f_{nc}								
F_c								
F_{c+nc}								
kVp	62	125	8	120	120	120	130	140
mA	54	205	92	80	150	173	225	600
Time (s) per rotation	60	1.6	0.6	0.5	1.0	1.5	2.0	3.0
mAs per rotation	59	304	113	64	225	300	385	680
Slices per rotation	61	4	6	1	1	2	4	32
Slice width (mm)	61	5	3	0.5	4.	5.0	5.0	12.0
Table feed (mm/rot)	56	10.0	6.0	3.0	5.0	10.0	12.8	28.5
Pitch	55	1.0	0.1	0.5	1.0	1.0	1.0	1.5
Scan length (mm)	68	94	8	70	95	95	95	141
CTDI_{free air} (mGy)	51	91	54	19	59	81	106	301
CTDI_w (mGy)	49	62	38	14	38	57	71	215
CTDI_{vol} (mGy)	49	62	38	14	38	57	71	215
DLP (mGy-cm)	48	586	368	131	345	517	678	2046
E (mSv)	41	1.9	1.2	0.3	1.1	1.6	2.3	5.6

NOTE: Exams per week, the number of Scout views per exam, and fractions for contrast and no-contrast phases are provided only for tabulations for entire head (brain and posterior fossa)

Table 10.3 Adult Sinus Exam.



Percent of sites scanning Helical / Axial	Hospitals	Facilities other than hospitals
Helical	70	52
Axial	30	48

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	32	16
manual	68	84

Adult Sinus Exam, All facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	216	11	11	1	3	7	14	70
No. Scout views per exam	225	1.4	0.5	1	1	1	2	4
f _{nc}	216	93	14	20	95	99	100	100
F _c	216	5	13	0	0	0	1	80
F _{c+nc}	216	2	6	0	0	0	2	40
kVp	223	123	7	80	120	120	120	150
mA	211	197	86	40	137	200	250	495
Time (s) per rotation	217	1.0	0.5	0.4	0.8	1.0	1.0	3.6
mAs per rotation	205	196	113	40	120	180	230	890
Slices per rotation	184	8	13	1	1	4	13	64
Slice width (mm)	178	2.2	1.3	0.5	1.0	2.5	3.0	7.0
Table feed (mm/rot)	153	7.0	7.2	0.5	3.0	5.0	8.8	53.0
Pitch	146	0.9	0.3	0.5	0.8	1.0	1.0	2.0
Scan length (mm)	80	91	35	34	72	90	100	240
CTDI _{free air} (mGy)	140	63	44	12	34	54	78	316
CTDI _w (mGy)	140	43	32	7	24	36	50	250
CTDI _{vol} (mGy)	120	49	40	7	26	37	56	242
DLP (mGy-cm)	68	384	255	97	203	329	502	1695
E (mSv)	65	1.1	0.8	0.3	0.5	0.9	1.4	5.0

Adult Sinus Exam, Hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	157	11	12	1	3	7	14	70
No. Scout views per exam	163	1.5	0.6	1	1	1	2	4
f_{nc}	154	93	15	20	95	99	100	100
F_c	154	5	14	0	0	0	2	80
F_{c+nc}	154	2	5	0	0	0	2	40
kVp	161	122	6	110	120	120	120	140
mA	151	207	88	40	148	200	250	495
Time (s) per rotation	156	1.0	0.4	0.4	0.8	1.0	1.0	3.6
mAs per rotation	145	201	123	40	125	170	240	890
Slices per rotation	132	10	14	1	1	4	16	64
Slice width (mm)	129	2.0	1.4	0.5	0.75	2.5	3.0	7.0
Table feed (mm/rot)	109	8	8	1	3	5	10	53
Pitch	100	0.9	0.2	0.5	0.8	1.0	1.0	1.9
Scan length (mm)	64	74	38	8	38	75	100	183
CTDI _{free air} (mGy)	100	63	39	12	36	56	79	192
CTDI _w (mGy)	100	43	27	7	24	37	51	155
CTDI _{vol} (mGy)	86	52	40	10	30	41	61	242
DLP (mGy-cm)	51	400	283	27	217	340	520	1695
E (mSv)	41	1.2	0.9	0.3	0.7	1.0	1.6	5.0

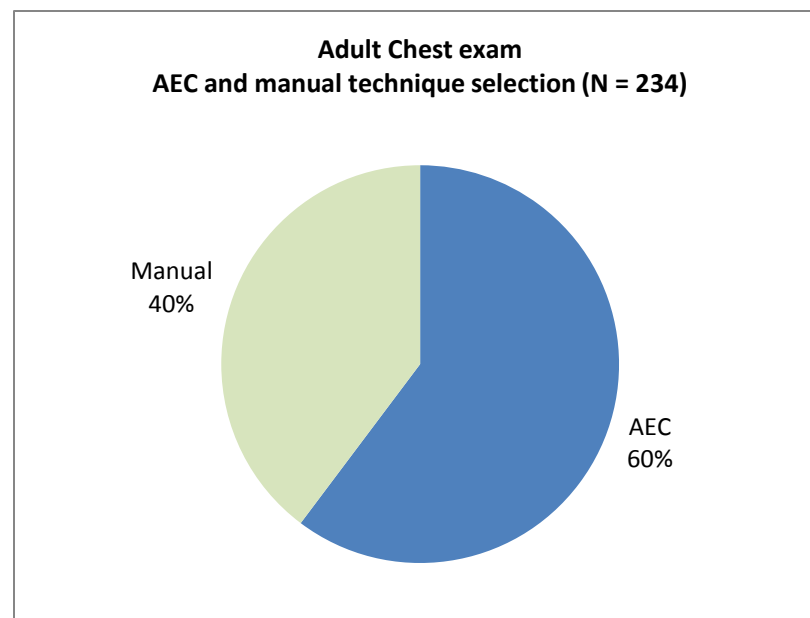
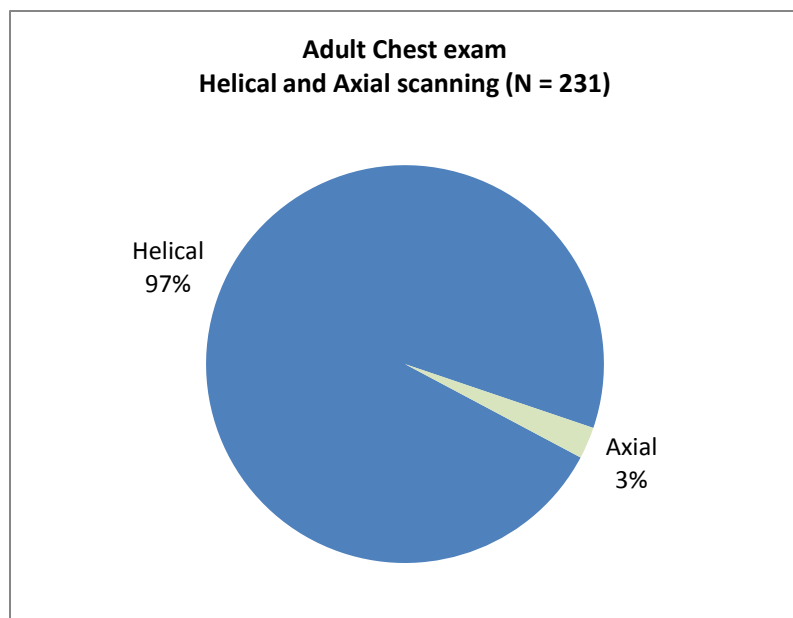
Adult Sinus Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	59	9	8	1	5	7	10	39
No. Scout views per exam	61	1.3	0.5	1	1	1	2	2
f_{nc}	61	95	10	50	95	100	100	100
F_c	61	2	7	0	0	0	0	50
F_{c+nc}	61	3	8	0	0	0	2	40
kVp	61	123	9	80	120	120	120	150
mA	59	174	76	50	120	190	200	440
Time (s) per rotation	60	1.1	0.5	0.4	0.8	1.0	1.0	3.0
mAs per rotation	59	183	86	50	114	200	219	450
Slices per rotation	51	5	8	1	1	2	4	32
Slice width (mm)	49	2.4	1.1	0.5	1.3	2.8	3	5
Table feed (mm/rot)	44	5.2	4.2	0.5	3.0	3.0	6.8	20.0
Pitch	42	1.0	0.3	0.5	1.0	1.0	1.0	2.0
Scan length (mm)	32	92	44	24	73	90	101	240
CTDI _{free air} (mGy)	40	63	56	13	33	53	70	316
CTDI _w (mGy)	40	44	43	7	24	34	48	250
CTDI _{vol} (mGy)	34	42	41	7	20	34	49	199
DLP (mGy-cm)	26	263	157	102	166	205	326	588
E (mSv)	26	0.7	0.4	0.3	0.5	0.6	1.0	1.6

Adult Sinus Exam, Helical scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	129	11	12	1	3	7	14	70
No. Scout views per exam	143	1.5	0.5	1	1	1	2	3
f_{nc}	135	92	16	20	90	99	100	100
F_c	135	5	15	0	0	0	2	80
F_{c+nc}	135	3	6	0	0	0	2	40
kVp	142	123	8	20	120	120	120	150
mA	136	202	88	50	140	200	250	495
Time (s) per rotation	137	0.9	0.3	0.4	0.75	0.8	1.0	2.0
mAs per rotation	131	173	88	40	103	160	200	500
Slices per rotation	117	12	15	1	2	4	16	64
Slice width (mm)	112	1.9	1.2	0.5	0.8	1.3	3.0	5.0
Table feed (mm/rot)	94	8.2	8.5	0.5	5.0	6.1	9.8	53.0
Pitch	87	0.9	0.3	0.5	0.8	1.0	1.0	1.9
Scan length (mm)	41	94	38	34	68	94	105	218
CTDI _{free air} (mGy)	88	57	33	13	33	53	72	192
CTDI _w (mGy)	88	38	21	10	23	34	46	124
CTDI _{vol} (mGy)	76	47	33	10	27	38	55	195
DLP (mGy-cm)	38	397	213	97	213	384	582	921
E (mSv)	36	1.1	0.8	0.3	0.6	1.0	1.6	5.0

Adult Sinus Exam, Axial scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	74	10	9	1	3	7	15	39
No. Scout views per exam	77	1.4	0.6	1	1	1	2	4
f_{nc}	73	97	9	50	96	100	100	100
F_c	73	2	0	0	0	0	0	50
F_{c+nc}	73	1	4	0	0	0	1	30
kVp	76	123	7	110	120	120	120	140
mA	70	188	82	40	130	180	238	445
Time (s) per rotation	75	1.3	0.6	0.6	1.0	1.0	1.5	3.6
mAs per rotation	69	238	141	40	141	200	280	890
Slices per rotation	65	2.4	2.4	1	1	1	4	16
Slice width (mm)	64	2.8	1.3	0.6	2.4	2.8	3.0	7.0
Table feed (mm/rot)	57	5.2	3.8	1.0	3.0	3.8	5.0	24.0
Pitch	55	1.0	0.2	0.5	1.0	1.0	1.0	2.0
Scan length (mm)	39	88	31	36	74	90	100	240
CTDI _{free air} (mGy)	50	70	45	12	35	55	81	178
CTDI _w (mGy)	50	49	34	7	26	37	61	155
CTDI _{vol} (mGy)	43	54	50	7	24	36	60	242
DLP (mGy-cm)	30	368	304	102	171	306	440	1695
E (mSv)	29	0.9	0.8	0.3	0.5	0.8	1.0	4.6

Table 10.4 Adult Chest Exam.



Percent of sites scanning Helical / Axial	Hospitals	Facilities other than hospitals
Helical	98	97
Axial	2	3

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	64	49
manual	36	51

Adult Chest Exam, All facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	227	22	21	1	6	15	30	117
No. Scout views per exam	236	1.5	0.5	1	1	1	2	3
f_{nc}	224	30	25	0	10	21	50	100
F_c	224	60	31	0	40	69	88	100
F_{c+nc}	224	10	21	0	0	0	6	98
kVp	235	122	5	100	120	120	120	140
mA	184	231	124	60	142	201	286	789
Time (s) per rotation	229	0.8	0.4	0.4	0.5	0.8	1.0	3.6
mAs per rotation	214	188	107	40	120	168	225	789
Slices per rotation	210	10	14	1	1	4	16	64
Slice width (mm)	196	3.8	2.7	0.5	1.5	3.0	5.0	10.0
Table feed (mm/rot)	182	16.9	10.7	2.5	10.0	13.7	27.0	55.0
Pitch	171	1.1	0.3	0.5	0.9	1.0	1.4	2.0
Scan length (mm)	77	306	102	160	225	287	375	600
CTDI _{free air} (mGy)	155	48	30	10	29	41	62	225
CTDI _w (mGy)	156	17	9	4	10	15	20	74
CTDI _{vol} (mGy)	135	15	7	4	9	14	19	40
DLP (mGy-cm)	135	394	192	92	254	364	504	999
E (mSv)	136	8	4	2	5	8	11	25

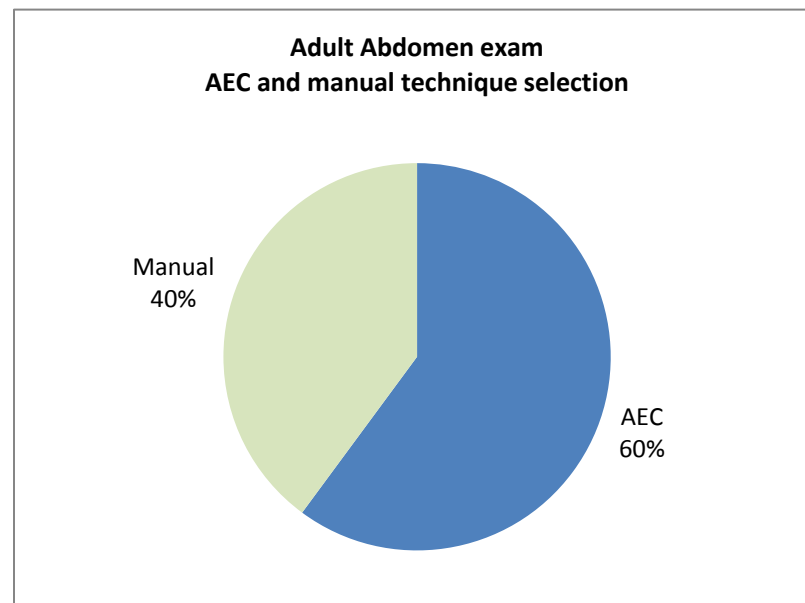
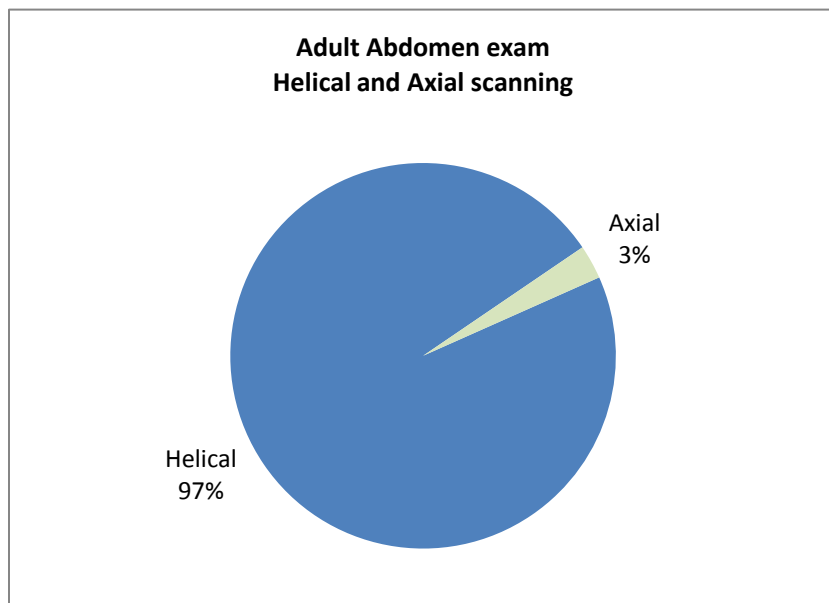
Adult Chest Exam, Hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	164	25	21	1	7	20	35	100
No. Scout views per exam	171	1.5	0.5	1	1	1	2	3
f_{nc}	158	27	24	0	10	20	44	100
F_c	158	63	31	0	47	75	89	100
F_{c+nc}	158	10	22	0	0	1	5	98
kVp	169	122	5	120	120	120	120	140
mA	127	233	115	31	156	220	289	750
Time (s) per rotation	166	0.8	0.4	0.4	0.5	0.8	1.0	3.6
mAs per rotation	155	187	101	31	125	169	225	750
Slices per rotation	150	11	13	1	2	6	16	64
Slice width (mm)	18	3.6	2.7	0.5	1.3	2.5	5.0	10.0
Table feed (mm/rot)	132	18.4	10.6	3.0	10.0	15.0	27.0	55.0
Pitch	122	1.1	0.3	0.6	0.9	1.0	1.4	2.0
Scan length (mm)	50	303	100	160	225	281	369	600
CTDI _{free air} (mGy)	114	47	30	10	29	40	61	225
CTDI _w (mGy)	115	17	9	4	11	15	20	74
CTDI _{vol} (mGy)	99	15	7	4	9	14	19	33
DLP (mGy-cm)	99	392	198	92	248	346	511	999
E (mSv)	91	8	4	2	5	7	11	25

Adult Chest Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	63	14	17	1	5	10	15	117
No. Scout views per exam	65	1.4	0.5	1	1	1	2	3
f_{nc}	65	36	26	0	10	35	50	100
F_c	65	53	30	0	30	55	75	100
F_{c+nc}	65	11	19	0	0	0	10	90
kVp	65	123	7	100	120	120	120	140
mA	53	215	123	80	120	200	280	626
Time (s) per rotation	62	0.9	0.4	0.4	0.6	0.8	1.0	2.0
mAs per rotation	55	176	96	64	110	158	217	633
Slices per rotation	59	8	14	1	1	4	5	64
Slice width (mm)	58	4.3	2.8	0.5	2.5	5.0	5.0	10.0
Table feed (mm/rot)	50	13.0	9.9	2.5	7.0	10.3	15.0	55.0
Pitch	49	1.1	0.3	0.5	1.0	1.0	1.4	2.0
Scan length (mm)	27	311	108	160	236	293	371	600
CTDI _{free air} (mGy)	41	50	33	17	26	44	64	190
CTDI _w (mGy)	39	17	9	6	10	16	21	54
CTDI _{vol} (mGy)	34	15	8	4	9	14	19	40
DLP (mGy-cm)	34	401	181	150	274	382	448	950
E (mSv)	35	8	4	2	5	8	11	20

Adult chest Exam, AEC scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	129	26	23	1	10	20	35	117
No. Scout views per exam	140	1.6	0.5	1	1	2	2	2
f_{nc}	135	29	23	0	10	23	47	100
F_c	135	65	27	0	50	70	89	100
F_{c+nc}	135	6	16	0	0	0	5	95
kVp	140	121	5	100	120	120	120	140
mA	87	244	137	60	137	220	320	750
Time (s) per rotation	136	0.7	0.2	0.4	0.5	0.8	0.8	2.0
mAs per rotation	114	192	118	40	111	165	243	750
Slices per rotation	123	14	16	1	4	8	16	64
Slice width (mm)	109	3.0	2.4	0.5	1.3	2.0	5.0	10.0
Table feed (mm/rot)	101	20.7	12.0	2.5	11.3	18.0	27.5	55.0
Pitch	95	1.1	0.3	0.5	1.0	1.0	1.4	1.7
Scan length (mm)	34	299	88	169	241	281	357	480
CTDI _{free air} (mGy)	83	46	35	11	26	38	52	225
CTDI _w (mGy)	84	17	11	5	9	15	20	74
CTDI _{vol} (mGy)	71	13	7	4	9	12	17	40
DLP (mGy-cm)	71	350	179	92	222	304	417	950
E (mSv)	67	7	4	2	5	6	9	20

Adult Chest Exam, manual technique scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	87	16	17	1	5	10	20	80
No. Scout views per exam	13	1.3	0.5	1	1	1	2	3
f_{nc}	86	32	27	0	10	20	50	100
F_c	86	53	35	0	20	65	84	100
F_{c+nc}	86	16	27	0	0	1	18	98
kVp	92	123	6	120	120	120	120	140
mA	91	212	89	60	160	200	250	626
Time (s) per rotation	90	0.9	0.5	0.5	0.8	0.8	1.0	3.6
mAs per rotation	89	179	71	50	140	176	210	500
Slices per rotation	84	5	6	1	1	2	4	40
Slice width (mm)	84	5.0	2.8	0.6	2.9	5.0	7.0	10.0
Table feed (mm/rot)	78	12.0	5.9	3.0	8.0	10.0	15.0	30.0
Pitch	73	1.1	0.3	0.6	0.9	1.0	1.4	2.0
Scan length (mm)	41	314	115	160	225	300	379	600
CTDI _{free air} (mGy)	70	50	24	10	35	47	64	169
CTDI _w (mGy)	71	17	6	4	13	16	21	41
CTDI _{vol} (mGy)	63	16	7	5	11	16	21	33
DLP (mGy-cm)	63	446	196	129	299	425	550	999
E (mSv)	59	10	5	2	6	9	13	25

Table 10.5 Adult Abdomen Exam.



Percent of sites using Helical / Axial scanning	Hospitals	Facilities other than hospitals
Helical	97	97
Axial	3	3

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	65	49
manual	35	51

Adult Abdomen Exam, All facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	209	15	27	0	3	6	12	206
No. Scout views per exam	214	1.5	0.5	0	1	1	2	3
f_{nc}	198	21	24	0	4	10	31	100
F_c	198	49	35	0	10	50	80	100
F_{c+nc}	198	30	34	0	1	15	58	100
kVp	214	121	5	100	120	120	120	140
mA	163	277	130	40	200	250	340	794
Time (s) per rotation	209	0.8	0.4	0.4	0.6	0.8	1.0	3.6
mAs per rotation	185	234	129	40	160	207	266	1065
Slices per rotation	196	11	14	1	1	4	16	64
Slice width (mm)	189	3.8	2.8	0.5	1.3	3.0	5.0	10.0
Table feed (mm/rot)	181	17.4	10.8	5.0	10.0	15.0	25.0	35.0
Pitch	172	1.1	0.3	0.6	0.9	1.0	1.4	2.0
Scan length (mm)	81	239	74	100	189	240	300	420
CTDI _{free air} (mGy)	151	60	41	13	33	51	74	320
CTDI _w (mGy)	151	21	12	5	13	18	25	92
CTDI _{vol} (mGy)	140	19	10	6	13	17	23	67
DLP (mGy-cm)	140	423	271	114	263	368	489	1856
E (mSv)	130	10	7	2	6	8	12	39

Adult Abdomen Exam, hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	150	18	31	0	3	6	15	206
No. Scout views per exam	153	1.5	0.5	0	1	1	2	3
f_{nc}	138	23	25	0	5	16	33	100
F_c	138	49	34	0	15	50	80	100
F_{c+nc}	138	28	33	0	1	10	50	100
kVp	154	121	5	110	120	120	120	140
mA	110	281	118	40	200	257	339	750
Time (s) per rotation	150	0.8	0.4	0.4	0.5	0.8	0.8	3.6
mAs per rotation	131	235	124	40	158	216	264	972
Slices per rotation	139	12	13	1	2	8	16	64
Slice width (mm)	132	3.5	2.7	0.5	1.3	2.5	5	10
Table feed (mm/rot)	128	18.9	10.7	5.0	10.0	15.0	27.0	55.0
Pitch	122	1.1	0.3	0.6	0.9	1.0	1.4	2.0
Scan length (mm)	49	235	70	113	189	227	280	394
CTDI _{free air} (mGy)	108	59	38	13	33	51	73	226
CTDI _w (mGy)	108	21	11	5	13	18	24	74
CTDI _{vol} (mGy)	101	20	10	6	13	17	24	54
DLP (mGy-cm)	101	426	290	114	261	369	495	1856
E (mSv)	92	10	7	2	6	8	12	39

Adult Abdomen Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	59	7	6.5	1	3	5	10	40
No. Scout views per exam	60	1.5	0.5	1	1	1	2	3
f_{nc}	60	15	22	0	1	9	20	100
F_c	60	48	38	0	10	50	88	100
F_{c+nc}	60	37	36	0	2	29	70	100
kVp	59	121	6	100	120	120	120	140
mA	52	266	153	60	169	220	312	794
Time (s) per rotation	58	0.9	0.5	0.4	0.6	0.8	1.0	3.0
mAs per rotation	53	229	141	48	165	200	266	1065
Slices per rotation	56	8	15	1	1	4	7	64
Slice width (mm)	57	4.6	2.8	0.5	2.5	5.0	5.0	10.0
Table feed (mm/rot)	53	13.8	10.0	5.0	7.5	10.5	15.0	55.0
Pitch	50	1.1	0.3	0.6	1.0	1.0	1.4	1.5
Scan length (mm)	32	246	81	100	195	240	300	420
CTDI _{free air} (mGy)	42	62	48	20	34	52	73	320
CTDI _w (mGy)	42	21	13	7	14	17	26	92
CTDI _{vol} (mGy)	39	19	11	7	13	17	23	67
DLP (mGy-cm)	39	412	218	155	276	368	474	1299
E (mSv)	38	10	7	3	6	8	12	35

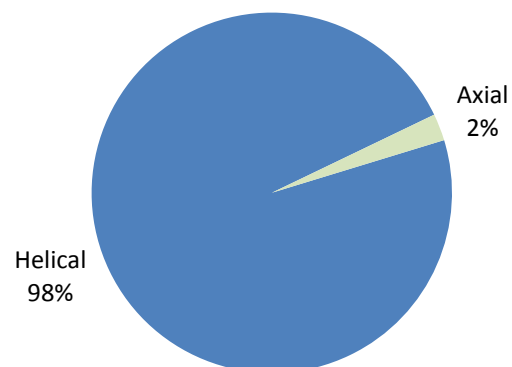
Adult Abdomen Exam, AEC scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	116	16	28	1	3	7	14	206
No. Scout views per exam	127	1.6	0.5	1	1	2	2	2
f_{nc}	119	21	23	0	4	10	32	100
F_c	119	50	35	0	22	55	80	100
F_{c+nc}	119	29	33	0	2	11	50	100
kVp	129	121	5	100	120	120	120	140
mA	82	315	150	40	200	296	400	794
Time (s) per rotation	127	0.7	0.2	0.4	0.5	0.8	0.8	1.5
mAs per rotation	106	253	147	40	163	230	300	1065
Slices per rotation	116	14	15	1	4	16	16	64
Slice width (mm)	108	2.9	2.4	0.5	1.3	1.5	5.0	10.0
Table feed (mm/rot)	104	20.6	11.5	5.0	11.8	18.4	27.5	55.0
Pitch	98	1.1	0.3	0.6	0.9	1.0	1.4	1.8
Scan length (mm)	39	242	76	131	193	225	293	420
CTDI _{free air} (mGy)	84	61	47	17	32	48	79	320
CTDI _w (mGy)	84	22	14	5	12	17	28	92
CTDI _{vol} (mGy)	77	19	11	6	13	17	22	67
DLP (mGy-cm)	77	411	277	114	262	338	469	1856
E (mSv)	69	10	7	2	6	7	12	39

Adult Abdomen Exam, manual technique scanning

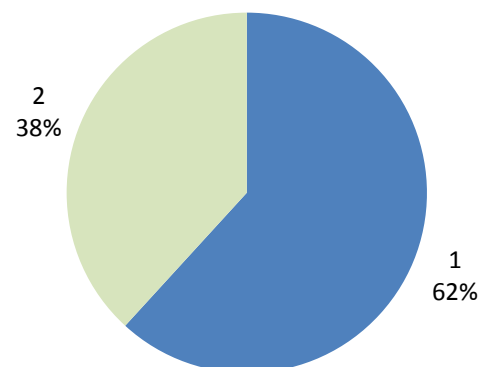
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	78	13	21	0	3	5	12	129
No. Scout views per exam	82	1.3	0.5	1	1	1	2	3
f_{nc}	77	22	26	0	5	10	30	100
F_c	77	45	37	0	6	50	80	100
F_{c+nc}	77	33	37	0	1	15	69	100
kVp	81	122	6	110	120	120	120	140
mA	78	238	91	60	189	240	298	626
Time (s) per rotation	78	1.0	0.5	0.4	0.8	0.8	1.0	3.6
mAs per rotation	76	211	95	48	160	200	226	716
Slices per rotation	76	5	9	1	1	3	4	64
Slice width (mm)	77	5.0	3.0	0.5	3.0	5.0	7.5	10.0
Table feed (mm/rot)	73	13.0	8.1	5.0	8.0	10.5	15.0	53.0
Pitch	70	1.1	0.3	0.6	0.9	1.0	1.2	2.0
Scan length (mm)	41	239	71	100	194	240	300	375
CTDI _{free air} (mGy)	64	59	31	13	39	54	74	185
CTDI _w (mGy)	64	20	9	5	14	19	23	54
CTDI _{vol} (mGy)	60	20	9	8	14	19	25	54
DLP (mGy-cm)	60	445	268	146	284	421	515	1718
E (mSv)	58	10	6	3	6	9	13	39

Table 10.6 Adult Chest and Abdomen and Pelvis Exam.

Adult Chest and Abdomen and Pelvis exam, Helical and Axial scanning (N = 206)



Adult Chest and Abdomen and Pelvis exam, AEC and Manual technique selection (208)



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	97	98
Axial	3	2

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	65	51
Manual	35	49

Adult Chest and Abdomen and Pelvis Exam, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	205	11	20	0	2	5	11	205
No. Scout views per exam	211	1.5	0.5	0	1	1	2	3
f_{nc}	201	12	17	0	0	5	15	100
F_c	201	64	38	0	25	80	95	100
F_{c+nc}	201	24	37	0	0	3	40	100
kVp	213	122	6	100	120	120	120	140
mA	159	265	121	34	195	250	322	750
Time (s) per rotation	209	0.8	0.3	0.4	0.5	0.8	1.0	3.6
mAs per rotation	183	217	116	34	151	200	250	884
Slices per rotation	194	11	14	1	2	4	16	64
Slice width (mm)	181	3.6	2.7	0.4	1.3	2.5	5.0	10.0
Table feed (mm/rot)	178	17.1	10.0	0.8	10.0	15.0	24.8	55.0
Pitch	167	1.1	0.3	0.5	0.9	1.0	1.4	2.0
Scan length (mm)	43	648	108	450	587	630	725	900
CTDI_{free air} (mGy)	143	55	36	11	33	49	71	265
CTDI_w (mGy)	143	19	10	5	13	16	23	76
CTDI_{vol} (mGy)	135	19	14	5	12	16	22	149
DLP (mGy-cm)	135	1211	907	293	746	1014	1372	9430
E (mSv)	124	25	16	6	14	20	32	99

Adult Chest and Abdomen and Pelvis Exam, hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	148	13	22	0	2	5	15	205
No. Scout views per exam	155	1.5	0.5	0	1	1	2	3
f_{nc}	144	13	19	0	0	5	16	100
F_c	144	66	37	0	49	80	95	100
F_{c+nc}	144	21	35	0	0	2	20	100
kVp	156	122	5	120	120	120	120	140
mA	112	271	118	34	200	253	346	750
Time (s) per rotation	154	0.8	0.3	0.4	0.5	0.8	0.8	3.6
mAs per rotation	134	219	111	34	155	200	255	853
Slices per rotation	141	11	13	1	2	8	16	64
Slice width (mm)	131	3.4	2.6	0.5	1.3	2.5	5.0	10.0
Table feed (mm/rot)	130	18.2	10.0	5.0	10.0	15.0	27.0	55.0
Pitch	122	1.1	0.3	0.5	0.9	1.0	1.4	2.0
Scan length (mm)	25	670	115	145	600	650	750	900
CTDI_{free air} (mGy)	105	54	32	11	33	47	69	225
CTDI_w (mGy)	105	19	9	5	13	16	23	74
CTDI_{vol} (mGy)	100	19	15	5	12	16	22	149
DLP (mGy-cm)	100	1228	993	293	749	994	1369	9430
E (mSv)	91	25	17	6	14	20	31	99

Adult Chest and Abdomen and Pelvis Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	57	7.4	12.7	0	2	3	8	80
No. Scout views per exam	55	1.5	0.5	1	1	1	2	3
f_{nc}	56	10	14	0	0	5	11	51
F_c	56	56	42	0	5	80	95	100
F_{c+nc}	56	34	41	0	0	8	81	100
kVp	56	122	7	100	120	120	120	140
mA	46	247	129	60	169	226	295	653
Time (s) per rotation	54	0.8	0.3	0.4	0.6	0.8	1.0	2.0
mAs per rotation	48	208	130	48	149	189	236	884
Slices per rotation	52	9	15	1	1	4	10	64
Slice width (mm)	50	4.2	2.8	0.4	1.5	5.0	5.0	10.0
Table feed (mm/rot)	48	14.0	9.8	0.8	7.5	11.6	15.8	55.0
Pitch	45	1.1	0.3	0.6	0.9	1.0	1.4	1.5
Scan length (mm)	18	617	92	469	571	613	674	800
CTDI _{free air} (mGy)	37	58	44	19	31	49	73	265
CTDI _w (mGy)	37	20	12	8	12	17	26	76
CTDI _{vol} (mGy)	36	19	10	6	12	17	23	55
DLP (mGy-cm)	35	1163	607	397	760	1052	1406	3512
E (mSv)	33	27	16	8	14	23	31	64

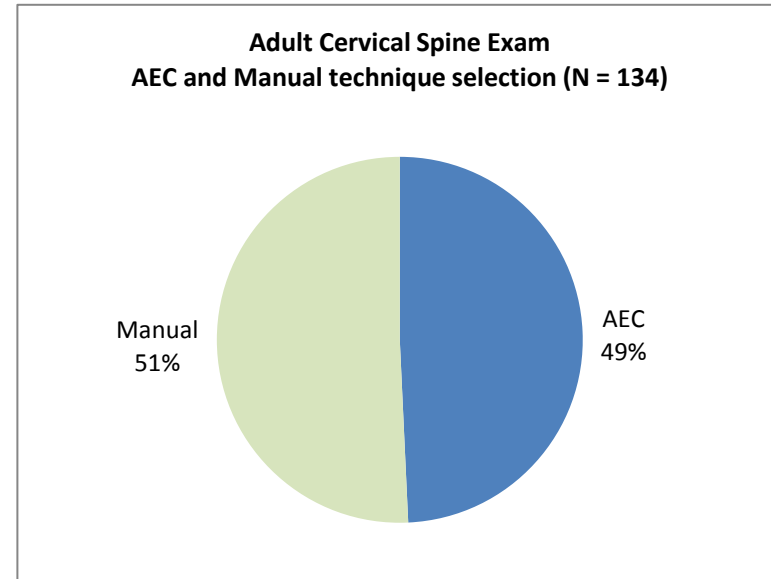
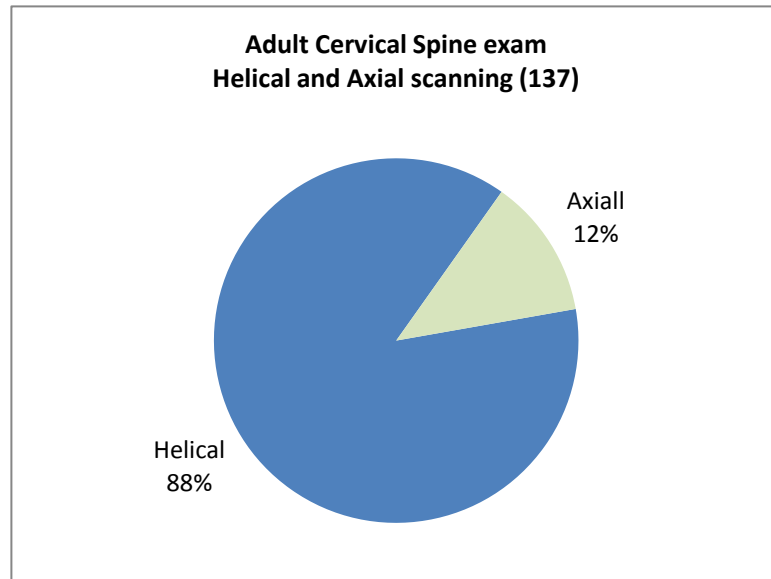
Adult Chest and Abdomen and Pelvis Exam, AEC scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	109	14	24	0	3	5	19	205
No. Scout views per exam	127	1.6	0.5	0	1	2	2	3
f_{nc}	121	12	15	0	1	5	20	75
F_c	121	77	36	0	43	80	95	100
F_{c+nc}	121	23	35	0	0	5	20	100
kVp	128	121	5	100	120	120	120	140
mA	77	296	139	84	200	286	367	750
Time (s) per rotation	126	0.7	0.2	0.4	0.5	0.7	0.8	1.5
mAs per rotation	103	233	134	34	161	200	273	884
Slices per rotation	114	14	15	1	4	16	16	64
Slice width (mm)	104	2.9	2.3	0.5	1.3	1.5	5.0	10.0
Table feed (mm/rot)	102	20.0	10.8	5.0	12.0	18.0	27.4	55.0
Pitch	95	1.1	0.3	0.5	0.9	1.0	1.4	1.8
Scan length (mm)	21	630	104	450	570	625	683	900
CTDI _{free air} (mGy)	79	56	41	11	29	46	72	265
CTDI _w (mGy)	79	20	12	5	12	16	24	76
CTDI _{vol} (mGy)	73	20	18	5	12	16	22	149
DLP (mGy-cm)	73	1237	1130	319	742	993	1372	9430
E (mSv)	66	24	15	6	14	19	31	70

Table. Chest and Abdomen and Pelvis Exam, manual technique scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	77	8.2	10.8	0	2	4	10	50
No. Scout views per exam	81	1.4	0.5	1	1	1	2	3
f_{nc}	75	12	21	0	0	5	10	100
F_c	75	60	42	0	3	90	95	100
F_{c+nc}	75	28	40	0	0	0	65	100
kVp	81	123	7	110	120	120	120	140
mA	79	237	92	60	195	230	300	626
Time (s) per rotation	78	0.9	0.4	0.4	0.7	0.8	1.0	3.6
mAs per rotation	77	198	83	48	150	200	225	522
Slices per rotation	75	6	9	1	1	2	4	64
Slice width (mm)	72	4.9	2.9	0.4	2.5	5.0	7.5	10.0
Table feed (mm/rot)	71	12.6	6.8	0.8	8.0	11.3	15.0	41.0
Pitch	67	1.1	0.3	0.6	0.9	1.0	1.3	2.0
Scan length (mm)	22	666	112	469	600	650	757	900
CTDI _{free air} (mGy)	61	56	29	12	37	49	69	169
CTDI _w (mGy)	61	19	7	5	14	17	22	41
CTDI _{vol} (mGy)	59	18	8	5	12	18	23	42
DLP (mGy-cm)	59	1192	556	293	800	1121	1404	2869
E (mSv)	55	27	18	6	16	21	32	99

Table 10.7 Adult Cervical Spine Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	91	76
Axial	8	24

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	54	32
manual	46	68

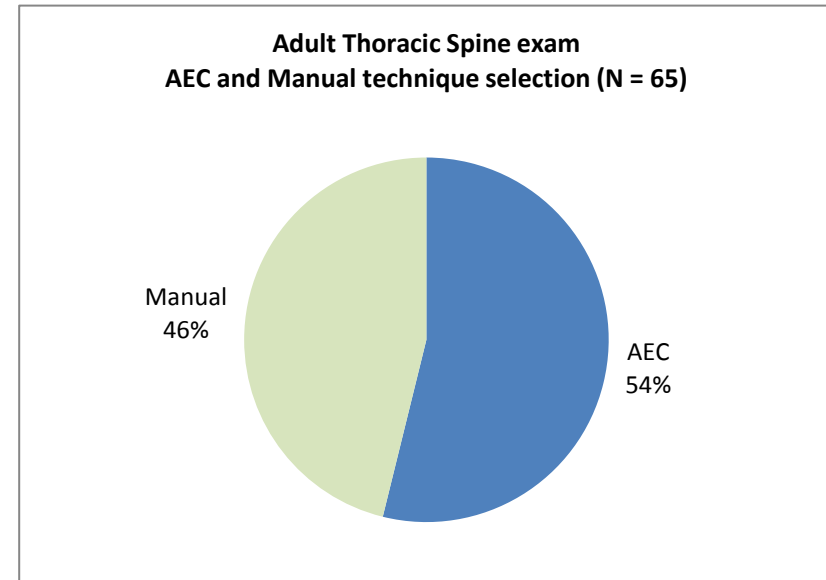
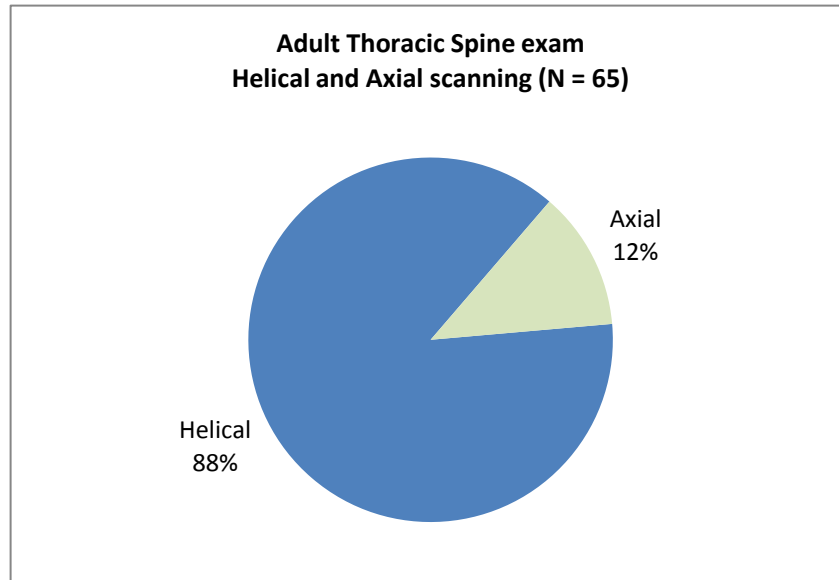
Adult Cervical Spine Exam, all facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	153	8	13	0	2	3	8	77
No. Scout views per exam	139	2	0.5	1	1	2	2	3
f_{nc}	134	93	19	0	95	100	100	100
F_c	134	6	19	0	0	0	3	100
F_{c+nc}	134	1	2	0	0	0	0	11
kVp	138	136	9	120	120	120	135	140
mA	121	291	114	100	200	310	350	715
Time (s) per rotation	132	1.0	0.4	0.4	0.8	1.0	1.0	3.0
mA s per rotation	114	291	123	90	207	260	352	798
Slices per rotation	120	10	15	1	1	4	16	64
Slice width (mm)	115	2.0	1.4	0.5	1.0	2.0	3.0	10.0
Table feed (mm/rot)	98	9.1	9.7	1.0	3.0	5.0	9.0	41.0
Pitch	93	0.9	0.2	0.5	0.8	0.9	1.0	2.0
Scan length (mm)	51	126	67	47	71	113	150	360
CTDI _{free air} (mGy)	88	83	52	22	52	69	105	389
CTDI _w (mGy)	88	31	18	8	20	26	37	132
CTDI _{vol} (mGy)	80	37	24	8	22	31	45	132
DLP (mGy-cm)	80	416	303	87	223	307	555	1452
E (mSv)	75	4.6	4.4	0.8	2.4	3.6	5.4	32.8

Adult Cervical Spine Exam, hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	114	9	14	0	2	4	10	77
No. Scout views per exam	104	1.7	0.5	1	1	2	2	3
f_{nc}	99	93	18	0	95	100	100	100
F_c	99	6	18	0	0	0	4	100
F_{c+nc}	99	1	2	0	0	0	0	10
kVp	104	126	9	120	120	120	140	140
mA	91	302	114	100	210	300	380	715
Time (s) per rotation	100	1.0	0.4	0.4	0.8	1.0	1.0	2.3
mAs per rotation	85	286	117	90	200	260	352	798
Slices per rotation	89	11	14	1	1	4	16	64
Slice width (mm)	85	1.9	1.2	0.5	1.0	1.3	3.0	5.0
Table feed (mm/rot)	74	9.0	9.0	1.0	3.0	5.0	12.5	39.4
Pitch	70	0.9	0.	0.6	0.8	0.8	1.0	1.5
Scan length (mm)	37	121	64	47	66	113	141	360
CTDI _{free air} (mGy)	67	80	41	23	51	68	101	218
CTDI _w (mGy)	67	29	15	8	20	26	36	82
CTDI _{vol} (mGy)	62	36	22	8	21	30	41	105
DLP (mGy-cm)	62	399	293	87	214	303	473	1452
E (mSv)	58	4.6	4.7	0.8	2.3	3.4	4.9	32.8

Adult Cervical Spine Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25th	50th	75th	Max
Exams per week	39	4	7	0	1	2	4	30
No. Scout views per exam	34	2	1	1	1	2	2	2
f_{nc}	35	92	22	0	97	100	100	100
F_c	35	7	21	0	0	0	1	100
F_{c+nc}	35	1	3	0	0	0	0	11
kVp	34	127	9	120	120	120	135	140
mA	30	258	110	120	163	250	300	615
Time (s) per rotation	32	1.2	0.6	0.5	1.0	1.0	1.5	3.0
mA s per rotation	29	307	138	95	219	260	330	700
Slices per rotation	31	9	16	1	1	4	4	64
Slice width (mm)	29	2.7	1.8	0.5	2.0	2.5	3.0	10.0
Table feed (mm/rot)	24	7.7	10.2	1.5	3.0	4.3	7.5	40.0
Pitch	23	0.9	0.2	0.6	0.8	0.8	1.0	1.5
Scan length (mm)	14	135	68	50	92	124	172	300
CTDI_{free air} (mGy)	21	92	77	22	52	70	110	389
CTDI_w (mGy)	21	34	26	12	23	26	40	132
CTDI_{vol} (mGy)	18	41	30	8	23	32	52	132
DLP (mGy-cm)	18	477	335	88	249	321	619	1213
E (mSv)	17	5	3	1	3	4	6	13

Table 10.8 Adult Thoracic Spine Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	89	84
Axial	11	16

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	54	53
manual	46	47

Adult Thoracic Spine Exam, All facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	68	5	7	0	1	2	5	50
No. Scout views per exam	65	1.7	0.4	1	1	2	2	3
f_{nc}	64	90	25	0	95	100	100	100
F_c	64	9	25	0	0	0	3	100
F_{c+nc}	64	1	2	0	0	0	0	10
kVp	66	128	9	120	120	120	140	140
mA	51	273	127	63	176	276	321	750
Time (s) per rotation	64	1.0	0.4	0.4	0.8	1.0	1.0	2.0
mAs per rotation	56	280	167	85	159	240	336	798
Slices per rotation	58	11	17	1	1	4	16	64
Slice width (mm)	54	2.1	1.3	0.5	0.8	2.5	3.0	5.0
Table feed (mm/rot)	49	9.7	9.8	2.0	3.8	6.3	9.4	40.0
Pitch	49	0.9	0.2	0.5	0.8	0.9	1.0	1.5
Scan length (mm)	27	187	99	66	117	162	239	430
CTDI _{free air} (mGy)	44	89	78	16	43	63	101	398
CTDI _w (mGy)	44	31	25	8	16	23	35	132
CTDI _{vol} (mGy)	38	37	26	7	18	30	45	132
DLP (mGy-cm)	38	958	932	53	479	650	1013	4620
E (mSv)	38	17	17	1	7	13	21	81

Adult Thoracic Spine Exam, hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	48	6	8	1	2	3	7	50
No. Scout views per exam	46	1.7	0.5	1	1	2	2	3
f_{nc}	46	90	23	0	95	100	100	100
F_c	46	8	23	0	0	0	3	100
F_{c+nc}	46	1	2	0	0	0	0	10
kVp	47	127	9	120	120	120	140	140
mA	37	283	120	63	200	289	331	750
Time (s) per rotation	46	1.0	0.4	0.4	0.8	1.0	1.0	2.0
mAs per rotation	40	281	166	101	165	241	336	798
Slices per rotation	41	11	15	1	1	4	16	64
Slice width (mm)	39	2.0	1.3	0.5	0.9	1.3	3.0	5.0
Table feed (mm/rot)	36	9.2	8.6	2.5	3.6	6.1	9.5	39.4
Pitch	36	0.9	0.2	0.5	0.8	0.9	1.0	1.5
Scan length (mm)	20	174	94	66	116	154	221	430
CTDI _{free air} (mGy)	32	75	59	16	41	55	90	302
CTDI _w (mGy)	32	26	19	8	15	22	29	104
CTDI _{vol} (mGy)	28	31	19	7	18	28	28	36
75DLP (mGy-cm)	28	801	658	53	398	650	884	3234
E (mSv)	28	14	11	1	7	12	19	50

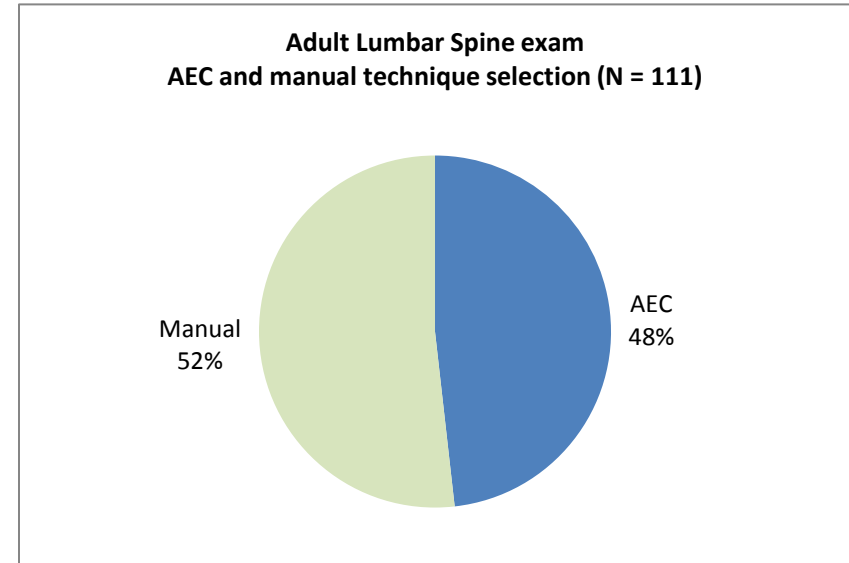
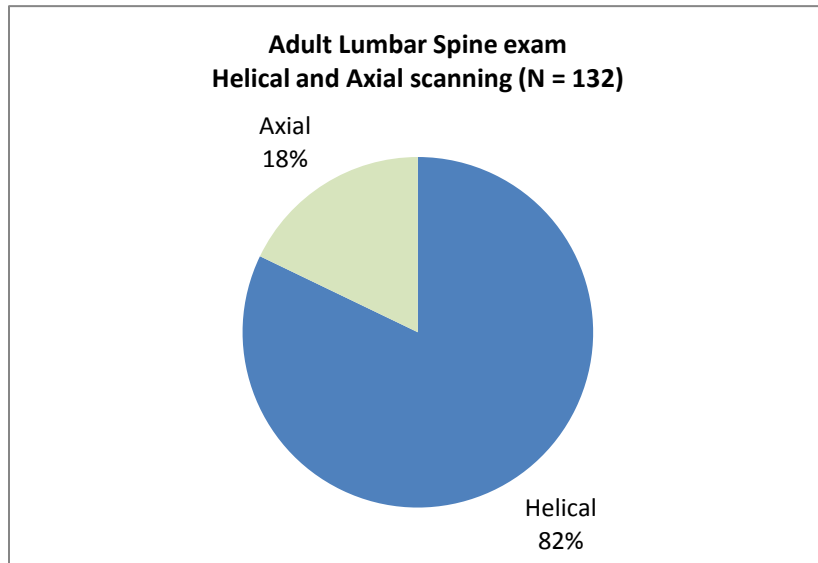
Adult Thoracic Spine Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	19	3	5	0	1	2	2	25
No. Scout views per exam	18	1.7	0.5	1	1	2	2	2
f_{nc}	17	87	30	0	93	100	100	100
F_c	17	12	30	0	0	0	7	100
F_{c+nc}	17	1	1	0	0	0	7	100
kVp	18	129	9	120	120	130	140	140
mA	14	247	144	85	159	196	288	603
Time (s) per rotation	18	1.2	0.5	0.5	0.8	1.0	1.5	2.0
mAs per rotation	15	288	178	85	155	240	348	738
Slices per rotation	17	13	21	1	2	4	16	64
Slice width (mm)	15	2.3	1.3	0.5	0.9	2.5	3.0	5.0
Table feed (mm/rot)	13	11.2	13.0	2.0	4.5	7.5	9.0	40.0
Pitch	13	0.9	0.2	0.7	0.8	1.0	1.0	1.5
Scan length (mm)	7	224	113	90	142	210	307	375
CTDI_{free air} (mGy)	12	125	110	24	60	98	128	389
CTDI_w (mGy)	12	43	35	12	23	33	47	132
CTDI_{vol} (mGy)	10	52	37	8	28	46	61	132
DLP (mGy-cm)	10	1398	1407	288	573	733	1470	4620
E (mSv)	10	26	26	5	11	16	29	81

Adult Thoracic Spine Exam, AEC scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	32	6	10	1	1	3	6	50
No. Scout views per exam	34	1.7	0.4	1	1	2	2	2
f_{nc}	34	91	25	0	97	100	100	100
F_c	34	8	24	0	0	0	2	100
F_{c+nc}	34	1	2	0	0	0	0	100
kVp	35	128	10	120	120	120	140	140
mA	20	290	174	63	159	264	348	750
Time (s) per rotation	35	0.9	0.3	0.4	0.8	0.8	1.0	2.0
mA s per rotation	27	262	193	101	144	180	303	750
Slices per rotation	31	14	16	1	4	16	16	64
Slice width (mm)	30	1.7	1.2	0.5	0.8	1.1	2.9	5.0
Table feed (mm/rot)	26	11.0	10.2	2.5	4.6	8.8	10.9	40.0
Pitch	26	0.9	0.2	0.5	0.8	0.8	1.0	1.4
Scan length (mm)	14	173	98	66	97	160	209	430
CTDI _{free air} (mGy)	21	78	82	16	30	51	88	302
CTDI _w (mGy)	21	28	26	8	13	18	25	104
CTDI _{vol} (mGy)	17	34	24	7	18	26	45	91
DLP (mGy-cm)	17	967	965	53	486	622	827	3234
E (mSv)	17	17	17	1	7	12	16	64

Adult Thoracic Exam, manual technique scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	30	4	8	1	2	2	4	22
No. Scout views per exam	30	1.7	0.5	1	1	2	2	3
f_{nc}	29	89	25	0	95	100	100	100
F_c	29	10	25	0	0	0	3	100
F_{c+nc}	29	1	2	0	0	0	0	10
kVp	30	128	9	120	120	120	139	140
mA	30	261	127	85	200	265	311	440
Time (s) per rotation	28	1.2	0.4	0.5	1.0	1.0	1.6	2.0
mA s per rotation	28	297	167	85	218	258	350	798
Slices per rotation	26	6	17	1	1	2	2	64
Slice width (mm)	23	2.7	1.3	0.6	1.9	3.0	3.0	5.0
Table feed (mm/rot)	22	7.0	9.8	2.0	3.0	5.0	7.2	32.4
Pitch	22	1.0	0.2	0.6	0.8	1.0	1.0	1.5
Scan length (mm)	12	197	99	78	121	159	250	375
CTDI _{free air} (mGy)	22	99	78	24	54	81	112	389
CTDI _w (mGy)	22	33	25	12	22	26	39	132
CTDI _{vol} (mGy)	20	39	26	8	21	33	49	132
DLP (mGy-cm)	20	959	932	214	460	650	1135	4620
E (mSv)	20	18	17	2	7	13	22	81

Table 10.9 Adult Lumbar Spine Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	88	69
Axial	12	31

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	51	39
manual	49	61

Adult Lumbar Spine Exam, all facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	112	7	13	0	2	3	6	112
No. Scout views per exam	113	1.6	0.5	1	1	2	2	3
f _{nc}	111	90	25	0	95	100	100	100
F _c	111	8	22	0	0	0	2	100
F _{c+nc}	111	2	12	0	0	0	0	100
kVp	112	127	9	120	120	120	136	140
mA	94	276	136	63	174	250	350	803
Time (s) per rotation	112	1.1	0.5	0.4	0.8	0.8	1.0	1.0
mA s per rotation	101	282	148	67	180	250	350	1056
Slices per rotation	102	10	15	1	1	4	16	64
Slice width (mm)	96	2.4	1.4	0.5	1.0	2.5	3.0	5.0
Table feed (mm/rot)	82	10.1	9.9	2.0	3.8	6.4	13.1	40.0
Pitch	81	0.9	0.2	0.6	0.8	0.9	1.0	1.5
Scan length (mm)	51	157	87	65	89	131	201	440
CTDI _{free air} (mGy)	78	89	71	21	48	79	106	426
CTDI _w (mGy)	78	31	22	7	17	26	34	132
CTDI _{vol} (mGy)	66	36	24	7	22	30	43	132
DLP (mGy-cm)	66	790	740	75	344	621	887	4546
E (mSv)	64	9	9	1	4	7	11	47

Adult Lumbar Spine Exam, hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	79	8	15	1	2	3	7	112
No. Scout views per exam	79	1.6	0.5	1	1	2	2	3
f_{nc}	78	90	26	0	94	100	100	100
F_c	78	7	20	0	0	0	2	100
F_{c+nc}	78	3	14	0	0	0	0	100
kVp	78	127	9	120	120	120	139	140
mA	64	278	119	63	200	280	350	750
Time (s) per rotation	77	1.0	0.5	0.4	0.8	1.0	1.0	3.6
mAs per rotation	70	272	133	72	170	243	349	798
Slices per rotation	68	10	14	1	1	4	16	64
Slice width (mm)	66	2.2	1.4	0.5	1.0	2.5	3.0	5.0
Table feed (mm/rot)	56	10.5	10.0	2.5	3.8	6.7	15.0	40.0
Pitch	56	0.9	0.2	0.5	0.8	0.9	1.0	1.5
Scan length (mm)	33	161	92	66	90	140	200	440
CTDI _{free air} (mGy)	53	81	53	22	45	72	104	302
CTDI _w (mGy)	53	28	17	11	17	23	34	104
CTDI _{vol} (mGy)	46	32	17	9	19	29	39	76
DLP (mGy-cm)	46	750	603	75	384	637	853	3234
E (mSv)	45	9	9	1	4	7	11	47

Table. Adult Lumbar Spine Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25th	50th	75th	Max
Exams per week	32	4	5	0	1	2	4	25
No. Scout views per exam	32	1.5	0.5	1	1	2	2	2
f_{nc}	31	88	29	0	97	100	100	100
F_c	31	11	28	0	0	0	1	100
F_{c+nc}	31	1	2	0	0	0	0	10
kVp	32	128	9	120	120	120	136	140
mA	28	269	173	130	159	220	300	803
Time (s) per rotation	33	1.3	0.7	0.5	0.8	1.0	1.5	3.0
mAs per rotation	29	306	183	67	210	279	401	1056
Slices per rotation	32	11	19	1	1	4	8	64
Slice width (mm)	29	2.5	1.2	0.5	1.3	3.0	3.0	5.0
Table feed (mm/rot)	26	9.3	9.9	2.0	3.3	5.3	10.7	40.0
Pitch	25	0.9	0.2	0.5	0.8	1.0	1.0	1.5
Scan length (mm)	18	149	79	65	88	114	200	312
CTDI_{free air} (mGy)	24	109	98	21	57	89	114	426
CTDI_w (mGy)	24	37	31	7	24	28	40	132
CTDI_{vol} (mGy)	20	44	34	7	26	31	53	132
DLP (mGy-cm)	20	883	1000	162	162	589	939	4546
E (mSv)	19	9	7	2	5	8	11	30

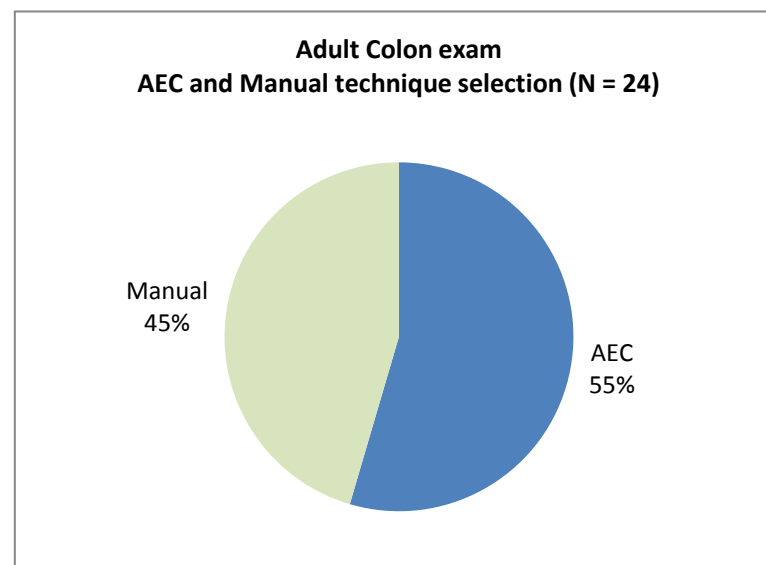
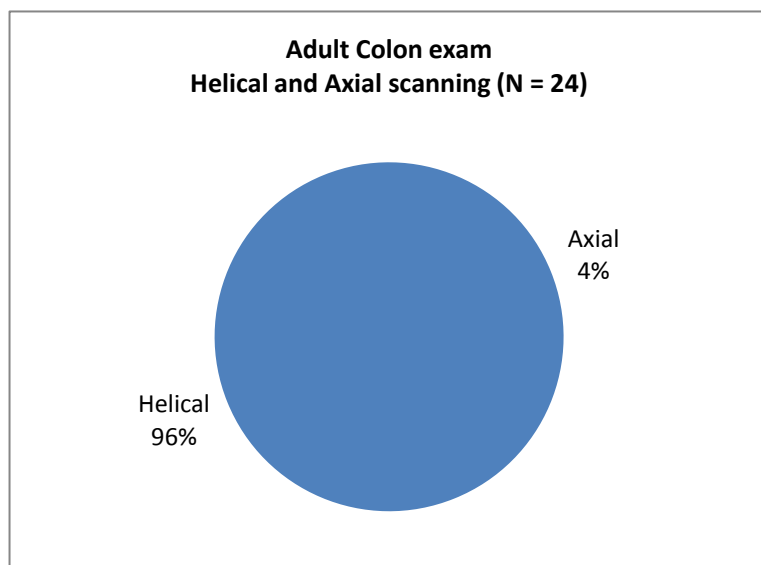
Table. Adult Lumbar Spine Exam, AEC scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	49	9	19	1	1	3	6	112
No. Scout views per exam	53	1.7	0.4	1	1	2	2	2
f_{nc}	52	89	25	0	9	100	100	100
F_c	52	7	20	0	0	0	3	100
F_{c+nc}	52	4	17	0	0	0	0	100
kVp	53	127	9	120	120	120	140	140
mA	35	301	188	63	158	246	361	803
Time (s) per rotation	53	0.9	0.2	0.4	0.8	0.8	1.0	1.5
mAs per rotation	44	251	175	67	151	216	301	1056
Slices per rotation	47	13	16	1	4	8	16	64
Slice width (mm)	45	1.9	1.4	0.5	0.8	1.3	3.0	5.0
Table feed (mm/rot)	36	11.7	10.3	2.5	4.9	8.8	15.0	40.0
Pitch	36	0.9	0.2	0.5	0.8	0.9	1.0	1.5
Scan length (mm)	20	156	92	66	87	135	212	430
CTDI _{free air} (mGy)	35	78	81	21	32	51	90	426
CTDI _w (mGy)	35	28	25	7	14	20	31	128
CTDI _{vol} (mGy)	28	32	26	7	16	24	35	130
DLP (mGy-cm)	28	853	992	75	348	570	763	4546
E (mSv)	27	9	9	1	4	5	11	45

Table. Adult Lumbar Spine Exam, manual technique scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	55	4.5	4.3	1	2	3	6	22
No. Scout views per exam	58	1.5	0.5	1	1	2	2	3
f_{nc}	56	90	25	0	97	100	100	100
F_c	56	9	25	0	0	0	1	100
F_{c+nc}	56	1	2	0	0	0	0	100
kVp	58	127	9	120	120	120	135	140
mA	58	260	92	130	200	250	311	535
Time (s) per rotation	56	1.3	0.7	0.5	1.0	1.0	2.0	3.6
mAs per rotation	56	307	121	95	224	290	400	798
Slices per rotation	52	6	13	1	1	2	4	64
Slice width (mm)	48	2.8	1.3	0.6	2.5	3.0	3.0	5.0
Table feed (mm/rot)	44	7.9	8.1	2.0	3.0	5.0	7.5	40.0
Pitch	43	0.9	0.2	0.6	0.8	1.0	1.0	1.5
Scan length (mm)	30	153	84	65	94	128	189	440
CTDI _{free air} (mGy)	42	99	60	22	58	88	119	389
CTDI _w (mGy)	42	33	20	11	22	28	40	132
CTDI _{vol} (mGy)	37	39	23	8	26	32	45	132
DLP (mGy-cm)	37	743	497	162	339	655	1011	2551
E (mSv)	36	9	8	2	5	7	10	47

Table 10.10 Adult Colon Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	100	100
Axial	0	0

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	62	55
manual	38	45

Table. Adult Colon Exam, All Facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	64	1.6	8.8	0	0	0	0	70
No. Scout views per exam	25	1.6	1.0	0	1	2	2	4
f_{nc}	22	56	47	0	4	75	100	100
F_c	22	31	44	0	0	0	80	100
F_{c+nc}	22	3	11	0	0	0	0	50
kVp	22	120	2	120	120	120	120	130
mA	17	357	217	120	200	300	440	852
Time (s) per rotation	23	0.7	0.3	0.4	0.5	0.8	0.8	2.0
mAs per rotation	19	275	266	60	150	190	257	1010
Slices per rotation	15	11	16	1	4	4	16	64
Slice width (mm)	16	3.1	2.0	0.6	2.3	2.8	3.8	8.0
Table feed (mm/rot)	12	20.2	15.2	3.0	10.4	15.0	27.8	55.0
Pitch	9	1.1	0.3	0.8	1.0	1.0	1.2	1.5
Scan length (mm)	3	420	60	260	390	420	450	480
CTDI _{free air} (mGy)	9	74	90	15	31	41	72	303
CTDI _w (mGy)	9	24	25	6	13	15	24	87
CTDI _{vol} (mGy)	6	23	20	9	12	16	22	63
DLP (mGy-cm)	6	762	611	266	414	455	988	1831
E (mSv)	5	10	9	4	5	7	8	25

Table. Adult Colon Exam, Hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	43	2.1	10.7	0	0	0	0	70
No. Scout views per exam	16	1.2	0.8	0	1	1	2	2
f_{nc}	10	39	44	0	2	15	75	100
F_c	10	59	43	0	0	80	91	100
F_{c+nc}	10	2	5	0	0	0	0	15
kVp	13	120	0	120	120	120	120	120
mA	9	295	152	120	200	300	308	655
Time (s) per rotation	14	0.7	0.2	0.5	0.5	0.6	0.8	1.0
mAs per rotation	11	257	246	94	152	190	238	972
Slices per rotation	9	7	7	1	1	4	16	16
Slice width (mm)	88	4	2	1	2	3	5	8
Table feed (mm/rot)	8	19.3	11.7	7.0	10.4	15.8	27.8	40.0
Pitch	6	1.0	0.2	0.8	0.8	1.0	1.1	1.2
Scan length (mm)	3	420	60	360	390	420	450	480
CTDI _{free air} (mGy)	4	57	34	26	30	52	79	98
CTDI _w (mGy)	4	20	9	12	13	19	26	31
CTDI _{vol} (mGy)	3	17	7	11	14	16	20	24
DLP (mGy-cm)	3	673	426	401	427	455	808	1164
E (mSv)	2	6	2	5	5	6	7	7

Table. Adult Colon Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	21	0.4	0.6	0	0	0	1	2
No. Scout views per exam	9	2.2	1.1	1	2	2	2	4
f_{nc}	10	85	34	0	100	100	100	100
F_c	10	10	32	0	0	0	0	100
F_{c+nc}	10	5	16	0	0	0	0	50
kVp	9	121	3	120	120	120	120	130
mA	8	426	266	120	200	370	638	852
Time (s) per rotation	9	0.8	0.5	0.4	0.5	0.8	1.0	2.0
mAs per rotation	8	299	307	60	144	180	305	1010
Slices per rotation	6	17	24	4	4	6	14	64
Slice width (mm)	8	2.5	1.1	0.6	2.2	2.5	3.2	4.0
Table feed (mm/rot)	4	22.0	22.7	3.0	12.0	15.0	25.0	55.0
Pitch	3	1.3	0.3	1.0	1.2	1.4	1.4	1.5
Scan length (mm)	0	-	-	-	-	-	-	-
CTDI _{free air} (mGy)	5	87	121	15	32	41	44	303
CTDI _w (mGy)	5	27	33	6	14	15	16	87
CTDI _{vol} (mGy)	3	29	29	9	12	16	39	63
DLP (mGy-cm)	3	852	854	266	362	458	1145	1831
E (mSv)	3	12	11	4	6	8	17	25

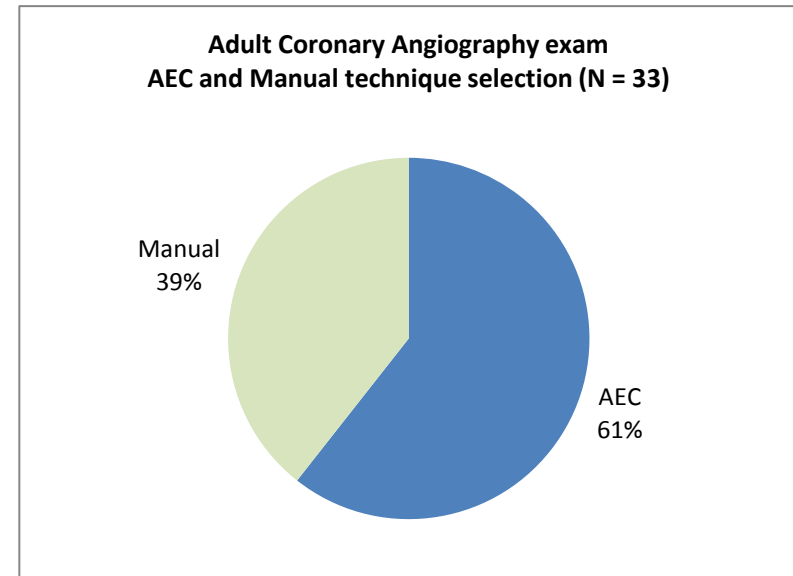
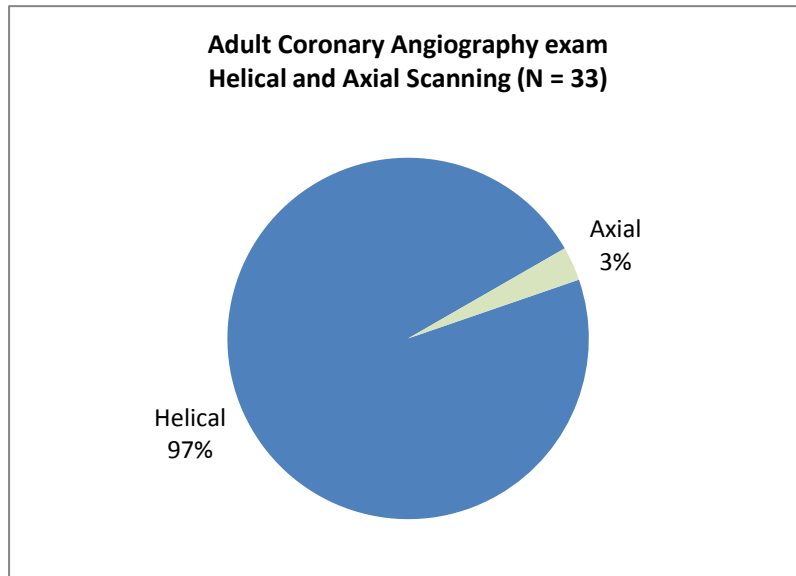
Table. Adult Colon Exam, AEC scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	9	10	23	0	1	1	2	70
No. Scout views per exam	12	1.8	0.8	1	1	2	2	4
f_{nc}	10	59	45	0	16	75	100	100
F_c	10	39	43	0	0	25	80	100
F_{c+nc}	10	2	5	0	0	0	0	15
kVp	12	12	0	120	120	120	120	120
mA	7	483	254	120	322	440	664	852
Time (s) per rotation	12	0.7	0.2	0.4	0.5	0.6	0.8	1.0
mAs per rotation	9	412	339	154	190	264	426	1010
Slices per rotation	8	16	20	1	4	12	16	64
Slice width (mm)	7	3.0	2.0	0.6	2.0	2.5	3.4	7.0
Table feed (mm/rot)	6	25.0	17.2	7.0	12.9	22.8	28.5	55.0
Pitch	5	1.0	0.3	0.8	0.8	1.0	1.2	1.4
Scan length (mm)	2	390	42	360	375	390	405	420
CTDI _{free air} (mGy)	4	115	130	26	30	65	149	303
CTDI _w (mGy)	4	36	35	12	13	22	45	87
CTDI _{vol} (mGy)	3	30	29	11	14	16	39	63
DLP (mGy-cm)	3	895	811	401	427	453	1142	1831
E (mSv)	2	15	14	5	10	15	20	25

Table. Adult Colon Exam, manual technique scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	9	1.3	1.5	0	0.5	1	1	5
No. Scout views per exam	10	1.7	1.0	1	1	2	2	4
f_{nc}	8	69	45	0	38	100	100	100
F_c	8	25	46	0	0	0	0	100
F_{c+nc}	8	6	18	0	0	0	0	100
kVp	10	121	3	120	120	120	120	130
mA	10	268	139	120	200	225	225	626
Time (s) per rotation	9	0.7	0.2	0.5	0.5	0.5	0.5	1.0
mAs per rotation	10	151	60	60	106	150	150	250
Slices per rotation	6	6	5	1	4	4	4	16
Slice width (mm)	8	3.2	2.1	1.3	2.2	2.8	2.8	8.0
Table feed (mm/rot)	6	15.8	12.8	3.0	9.4	14.2	14.2	40.0
Pitch	4	1.2	0.2	1.0	1.0	1.1	1.1	1.5
Scan length (mm)	1	480	-	480	480	480	480	480
CTDI _{free air} (mGy)	5	41	21	15	32	41	41	72
CTDI _w (mGy)	5	15	7	6	14	15	15	24
CTDI _{vol} (mGy)	3	16	8	9	12	16	16	24
DLP (mGy-cm)	3	629	473	266	362	458	458	1164
E (mSv)	3	6	2	4	6	7	7	8

Table 10.11 Adult Coronary Angiography Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	96	100
Axial	4	0

Percent of sites using AEC /manual technique	Hospitals	Facilities other than hospitals
AEC	64	50
manual	36	50

Adult Coronary Angiography Exam, All Facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	72	2	5	0	0	0	2	25
No. Scout views per exam	38	1.5	0.6	0	1	2	2	2
f_{nc}	26	0	0	0	0	0	0	0
F_c	26	55	49	0	0	98	100	100
F_{c+nc}	26	45	49	0	0	3	100	100
kVp	34	122	7	100	120	120	120	140
mA	26	359	197	20	204	348	493	750
Time (s) per rotation	31	0.6	0.2	0.4	0.4	0.5	0.8	1.0
mAs per rotation	27	196	91	20	152	199	254	373
Slices per rotation	23	26	27	1	4	16	64	64
Slice width (mm)	22	1.4	1.0	0.5	0.6	0.8	2.5	3.0
Table feed (mm/rot)	17	12.4	13.9	1.5	3.0	5.7	13.5	40.0
Pitch	6	1.2	0.3	0.6	1.0	1.2	1.5	1.5
Scan length (mm)	4	147	41	101	122	147	173	195
CTDI _{free air} (mGy)	15	68	31	5	50	69	86	119
CTDI _w (mGy)	15	24	10	2	17	25	31	38
CTDI _{vol} (mGy)	4	20	13	2	17	23	26	33
DLP (mGy-cm)	4	424	304	35	259	487	652	687
E (mSv)	4	8	6	1	5	9	12	14

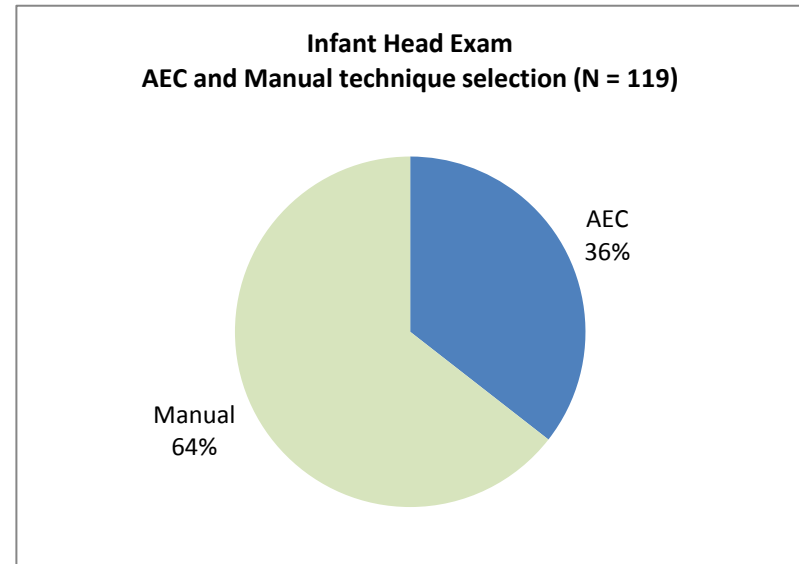
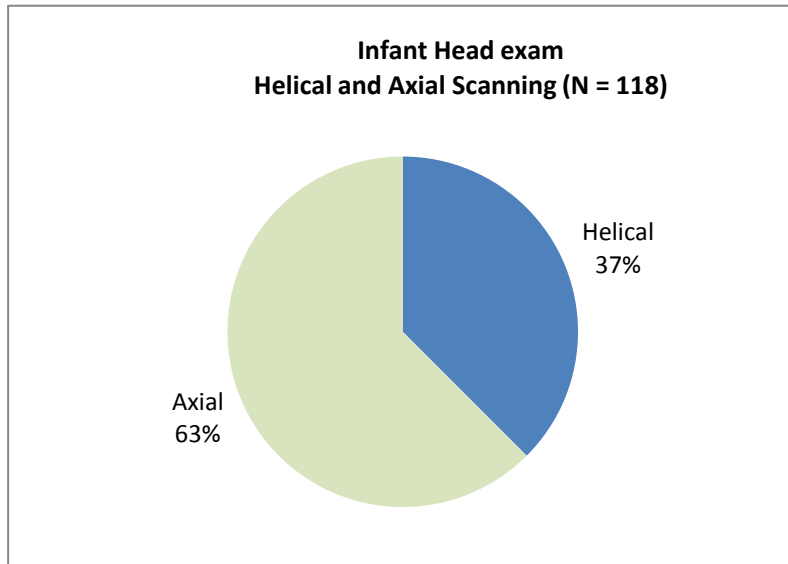
Adult Coronary Angiography, hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	51	2.5	5.4	0	0	0	2	25
No. Scout views per exam	29	1.4	0.7	0	1	2	2	2
f_{nc}	19	0	0	0	0	0	0	0
F_c	19	58	51	0	0	100	100	100
F_{c+nc}	19	42	51	0	0	0	100	100
kVp	26	122	8	100	120	120	120	140
mA	18	345	211	20	202	323	484	750
Time (s) per rotation	24	0.6	0.2	0.4	0.4	0.5	0.8	1.0
mAs per rotation	20	185	89	20	125	199	249	350
Slices per rotation	18	25	26	1	5	16	56	64
Slice width (mm)	16	2.0	3.2	0.5	0.6	0.8	2.5	13.5
Table feed (mm/rot)	12	12.0	13.8	1.5	3.3	5.2	13.3	40.0
Pitch	4	1.1	0.4	0.6	0.9	1.2	1.4	1.5
Scan length (mm)	3	163	33	129	147	165	180	195
CTDI _{free air} (mGy)	11	67	30	5	58	69	82	119
CTDI _w (mGy)	11	24	10	2	20	25	30	38
CTDI _{vol} (mGy)	2	12	14	2	7	12	17	22
DLP (mGy-cm)	2	338	428	35	186	338	489	640
E (mSv)	2	4	4	1	2	4	5	7

Adult Coronary Angiography, Facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	21	0.8	1.6	0	0	0	1	5
No. Scout views per exam	9	1.6	0.5	1	1	2	2	2
f_{nc}	7	0	0	0	0	0	0	0
F_c	7	48	49	0	8	20	100	100
F_{c+nc}	7	52	49	0	0	80	93	100
kVp	8	121	4	120	120	120	120	130
mA	8	390	169	190	258	380	502	626
Time (s) per rotation	7	0.6	0.2	0.3	0.5	0.6	0.8	1.0
mAs per rotation	7	227	97	152	156	166	294	373
Slices per rotation	5	30	31	4	4	16	64	64
Slice width (mm)	7	1.8	1.2	0.6	0.6	2.5	2.8	3.0
Table feed (mm/rot)	5	13.4	15.8	1.5	3.0	7.8	15.0	40.0
Pitch	2	1.3	0.4	1.0	1.1	1.3	1.4	1.5
Scan length (mm)	1	101	-	101	101	101	101	101
CTDI _{free air} (mGy)	4	71	39	30	42	71	99	112
CTDI _w (mGy)	4	35	11	14	16	25	34	36
CTDI _{vol} (mGy)	2	28	7	24	26	28	31	33
DLP (mGy-cm)	2	510	250	334	422	510	599	687
E (mSv)	2	12	2	11	12	12	13	14

Adult Coronary Angiography, AEC scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	9	10	23	0	1	1	2	70
No. Scout views per exam	12	1.8	0.8	1	1	2	2	4
f_{nc}	10	59	45	0	16	75	100	100
F_c	10	39	43	0	0	25	80	100
F_{c+nc}	10	2	5	0	0	0	0	15
kVp	12	120	0	120	120	120	120	120
mA	7	483	254	120	322	440	664	852
Time (s) per rotation	12	0.7	0.2	0.4	0.5	0.6	0.8	1.0
mAs per rotation	9	412	339	154	190	264	426	1010
Slices per rotation	8	16	20	1	4	12	16	64
Slice width (mm)	7	3.0	2.0	0.6	2.0	2.5	3.4	7.0
Table feed (mm/rot)	6	24.6	17.2	7.0	12.9	22.8	28.5	55.0
Pitch	5	1.0	0.3	0.8	0.8	1.0	1.2	1.4
Scan length (mm)	2	390	42	360	375	390	405	420
CTDI _{free air} (mGy)	4	115	130	26	30	65	149	303
CTDI _w (mGy)	4	36	35	12	13	22	45	87
CTDI _{vol} (mGy)	3	30	29	11	13	16	39	63
DLP (mGy-cm)	3	895	811	401	427	453	1142	1831
E (mSv)	2	15	14	5	10	15	20	25

Adult Coronary Angiography Exam, manual technique scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	11	5.0	6.7	0	1	2	2	21
No. Scout views per exam	13	1.6	0.5	1	1	2	2	2
f_{nc}	10	0	0	0	0	0	0	0
F_c	10	62	49	0	5	100	100	100
F_{c+nc}	10	38	49	0	0	0	0	100
kVp	13	124	80	120	120	120	120	140
mA	13	383	216	20	207	375	375	750
Time (s) per rotation	12	0.7	0.2	0.4	0.5	0.6	0.6	1.0
mAs per rotation	12	201	84	20	158	199	199	352
Slices per rotation	9	15	21	1	4	4	4	64
Slice width (mm)	10	1.8	1.1	0.5	0.8	1.9	1.9	3.0
Table feed (mm/rot)	7	6.4	5.5	1.5	3.0	3.8	3.8	15.0
Pitch	3	1.3	0.3	1.0	0.2	1.4	1.4	1.5
Scan length (mm)	2	162	46	129	146	162	162	195
CTDI _{free air} (mGy)	8	62	30	5	49	73	73	95
CTDI _w (mGy)	8	24	11	2	18	26	26	36
CTDI _{vol} (mGy)	3	16	12	2	12	22	22	24
DLP (mGy-cm)	3	454	364	35	338	640	640	687
E (mSv)	3	7	7	1	4	7	7	14

Table 10.12 Infant Head Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	39	18
Axial	61	82

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	35	36
manual	65	64

Infant Head Exam, All facilities								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	135	1	2	0	0	1	1	13
No. Scout views per exam	120	1.2	0.4	0	98	100	100	100
f_{nc}	95	93	20	0	98	100	100	100
F_c	95	1	8	0	0	0	0	75
F_{c+nc}	95	6	16	0	0	0	2	100
kVp	120	115	11	80	120	120	120	140
mA	113	167	74	30	120	150	200	445
Time (s) per rotation	114	1.0	0.5	0.3	0.8	1.0	1.0	3.0
mA s per rotation	109	158	97	15	100	128	200	890
Slices per rotation	97	7	10	1	2	4	8	64
Slice width (mm)	91	3.6	1.7	0.5	2.3	5.0	5.0	7.0
Table feed (mm/rot)	77	11.9	6.7	3.0	8.1	10.0	15.0	39.4
Pitch	71	1.0	0.2	0.5	1.0	1.0	1.0	1.4
Scan length (mm)	40	102	26	60	79	100	120	160
CTDI _{free air} (mGy)	76	41	21	6	28	39	49	166
CTDI _w (mGy)	74	28	15	5	19	27	35	121
CTDI _{vol} (mGy)	59	32	31	5	20	28	36	242
DLP (mGy-cm)	32	317	260	54	218	275	332	1574
E (mSv)	43	1.1	0.9	0.2	0.6	1.0	1.2	5.7

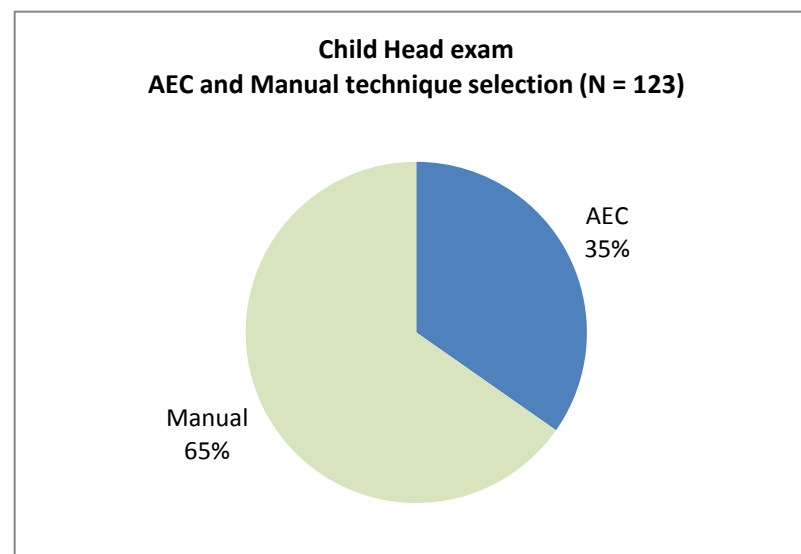
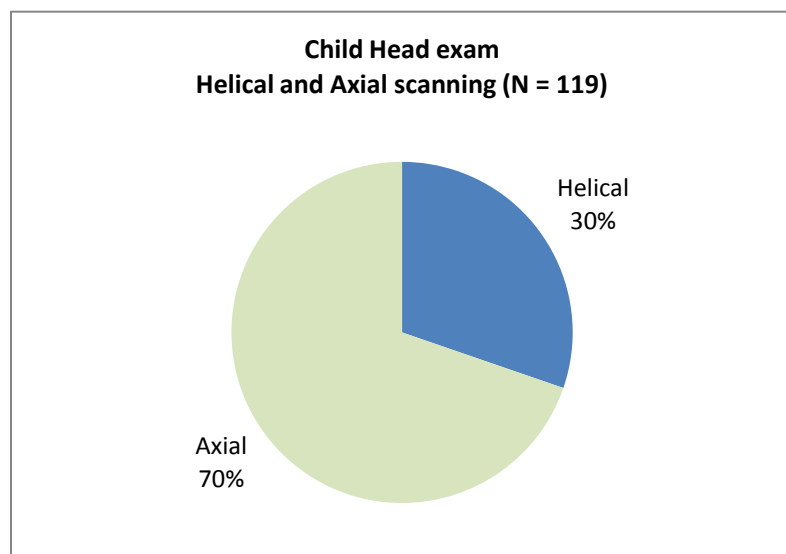
Infant Head Exam, Hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	112	1.3	1.7	0	0	1	1	13
No. Scout views per Exam	108	1.2	0.4	1	1	1	1	3
f_{nc}	89	93	20	0	98	100	100	100
F_c	89	1	9	0	0	0	0	75
F_{c+nc}	89	6	17	0	0	0	2	100
kVp	109	114	12	80	120	120	120	140
mA	103	167	75	30	120	150	200	445
Time (s) per rotation	104	1.0	0.4	0.5	0.8	1.0	1.0	3.0
mA per rotation	99	158	100	15	100	135	200	890
Slices per rotation	88	7	8	1	2	4	8	64
Slice width (mm)	83	3.5	1.8	0.5	1.8	4.0	5.0	7.0
Table feed (mm/rot)	70	11.9	6.7	3.0	8.3	10.0	13.4	39.4
Pitch	64	1.0	0.2	0.5	1.0	1.0	1.0	1.4
Scan length (mm)	47	90	35	30	61	100	120	160
CTDI _{free air} (mGy)	68	40	22	6	28	39	49	166
CTDI _w (mGy)	66	28	16	5	18	26	34	121
CTDI _{vol} (mGy)	52	32	33	5	19	27	34	242
DLP (mGy-cm)	38	269	258	38	103	238	319	1574
E (mSv)	41	1.1	0.9	0.1	0.5	0.9	1.2	5.7

Infant Head Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	23	0.5	1.3	0	0	0	1	6
No. Scout views per exam	11	1.1	0.3	1	1	1	1	2
f_{nc}	5	98	4	90	100	100	100	100
F_c	5	0	0	0	0	0	0	0
F_{c+nc}	5	2	4	0	0	0	0	10
kVp	10	118	8	100	120	120	120	120
mA	9	174	68	80	130	150	240	280
Time (s) per rotation	9	1.0	0.6	0.3	0.7	1.0	1.0	2.0
mA per rotation	9	156	75	83	110	126	160	282
Slices per rotation	8	12	21	1	2	4	6	64
Slice width (mm)	7	4.2	1.4	1.5	4.0	5.0	5.0	5.0
Table feed (mm/rot)	7	12.6	6.7	3.0	8.8	10.0	19.0	20.0
Pitch	7	0.9	0.2	0.5	0.9	1.0	1.0	1.0
Scan length (mm)	2	90	42	60	75	90	105	120
CTDI _{free air} (mGy)	7	47	13	33	39	44	52	70
CTDI _w (mGy)	7	33	10	19	25	31	40	47
CTDI _{vol} (mGy)	7	37	11	24	29	39	43	55
DLP (mGy-cm)	2	275	59	234	254	275	296	317
E (mSv)	3	1.3	0.5	1.0	1.1	1.2	1.5	1.9

Infant Head Exam, helical scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	38	1.1	1.0	0	1	1	1	6
No. Scout views per exam	43	1.3	0.4	1	1	1	1.5	2
f_{nc}	35	95	19	0	98	100	100	100
F_c	35	0	0.3	0	0	0	0	1
F_{c+nc}	35	5	19	0	0	0	1	100
kVp	43	114	10	80	110	120	120	120
mA	39	159	60	30	110	150	200	300
Time (s) per rotation	39	0.8	0.4	0.3	0.6	0.8	1.0	2.0
MA s per rotation	37	134	69	15	90	113	170	300
Slices per rotation	31	12	16	1	4	8	16	64
Slice width (mm)	26	2.7	2.0	0.5	1.0	2.5	5.0	7.0
Table feed (mm/rot)	23	10.5	5.3	3.0	6.8	10.0	13.1	24.0
Pitch	19	1.0	0.4	0.5	0.7	1.0	1.0	1.4
Scan length (mm)	6	112	36	75	81	109	139	160
CTDI _{free air} (mGy)	22	35	16	6	21	34	46	65
CTDI _w (mGy)	22	23	10	5	15	22	29	42
CTDI _{vol} (mGy)	15	30	19	6	19	28	37	84
DLP (mGy-cm)	4	363	136	263	288	313	388	562
E (mSv)	11	1.1	0.7	0.2	0.6	1.1	1.2	2.7

Infant Head Exam, Axial scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	62	1.7	2.1	0	1	1	2	13
No. Scout views per exam	74	1.2	0.4	1	1	1	1	3
f_{nc}	56	91	21	0	95	100	100	100
F_c	56	3	11	0	0	0	0	75
F_{c+nc}	56	6	15	0	0	0	5	90
kVp	74	115	12	80	120	120	120	140
mA	71	171	82	30	120	150	200	445
Time (s) per rotation	72	1.0	0.5	0.5	0.8	1.0	1.0	3.0
mAs per rotation	69	170	109	60	113	140	220	890
Slices per rotation	64	4	4	1	2	4	4	16
Slice width (mm)	63	3.9	1.6	0.6	2.5	5.0	5.0	6.0
Table feed (mm/rot)	52	12.8	7.2	3.0	10.0	10.0	18.0	39.4
Pitch	51	1.0	0.1	0.5	1.0	1.0	1.0	1.0
Scan length (mm)	33	101	24	60	90	100	120	144
CTDI _{free air} (mGy)	52	43	23	9	31	39	49	166
CTDI _w (mGy)	50	31	17	5	22	29	36	121
CTDI _{vol} (mGy)	42	34	35	5	21	29	36	242
DLP (mGy-cm)	27	318	277	54	217	255	331	1574
E (mSv)	30	1.2	1.0	0.2	0.7	0.9	1.4	5.7

Table 10.13 Child Head Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	40	18
Axial	60	82

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	38	36
manual	62	64

Child Head Exam, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	152	3	4	0	1	2	4	30
No. Scout views per exam	145	1.2	0.4	1	1	1	1	3
f_{nc}	127	94	17	0	96	100	100	100
F_c	127	1	6	0	0	0	0	50
F_{c+nc}	127	5	15	0	0	0	1	100
kVp	143	117	10	80	120	120	120	140
mA	135	184	79	30	133	170	207	520
Time (s) per rotation	135	1.0	0.4	0.5	0.8	1.0	1.0	3.0
mAs per rotation	127	174	117	15	113	150	200	960
Slices per rotation	117	6	10	1	2	4	4	64
Slice width (mm)	109	4.0	1.8	0.5	2.5	5.0	5.0	8.0
Table feed (mm/rot)	90	11.4	6.4	3.0	6.6	10.0	15.0	39.4
Pitch	85	1.0	0.2	0.5	1.0	1.0	1.0	2.0
Scan length (mm)	42	128	30	80	109	123	143	225
CTDI_{free air} (mGy)	84	48	36	8	30	44	54	305
CTDI_w (mGy)	84	32	24	4	21	31	37	198
CTDI_{vol} (mGy)	66	36	36	3	21	31	39	242
DLP (mGy-cm)	36	374	180	125	228	301	525	806
E (mSv)	49	1.4	1.4	0.1	0.6	1.1	1.5	7.8

Child Head Exam, Hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	121	3.6	4.2	0	1	2	5	30
No. Scout views per exam	121	1.2	0.4	1	1	1	1	3
f_{nc}	109	93	18	0	95	100	100	100
F_c	109	1	6	0	0	0	0	50
F_{c+nc}	109	6	1	0	0	0	2	100
kVp	120	118	10	80	120	120	120	140
mA	113	190	77	30	150	175	220	520
Time (s) per rotation	114	1.0	0.4	0.5	0.8	1.0	1.0	3.0
mAs per rotation	106	182	123	15	120	157	215	960
Slices per rotation	98	6	9	1	2	4	5	64
Slice width (mm)	92	4.0	1.9	0.5	2.5	5.0	5.0	8.0
Table feed (mm/rot)	78	11.5	6.5	3.0	7.0	10.0	14.6	39.4
Pitch	72	1.0	0.2	0.5	1.0	1.0	1.0	1.5
Scan length (mm)	48	110	40	31	79	120	140	216
CTDI _{free air} (mGy)	71	50	38	13	33	44	54	305
CTDI _w (mGy)	71	34	25	9	22	32	38	198
CTDI _{vol} (mGy)	56	39	38	9	22	31	40	242
DLP (mGy-cm)	39	373	274	78	208	299	531	1574
E (mSv)	43	1.4	1.5	0.4	0.6	1.1	1.5	7.8

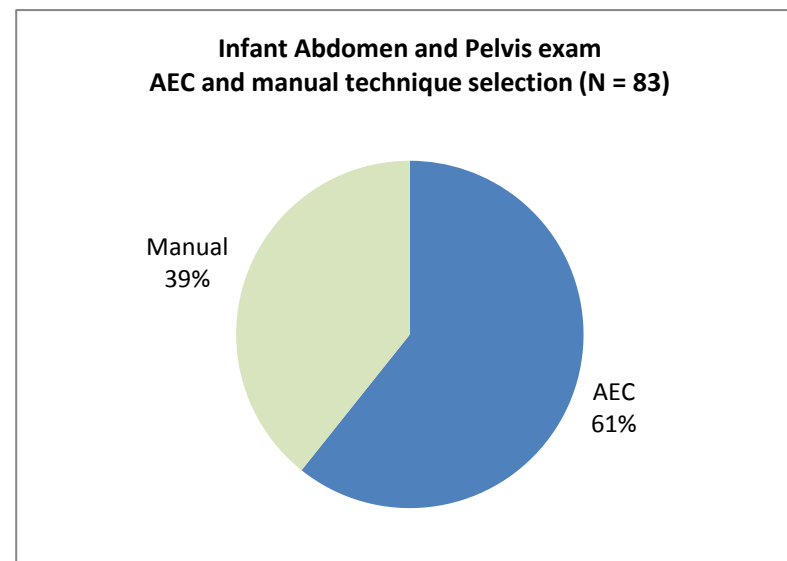
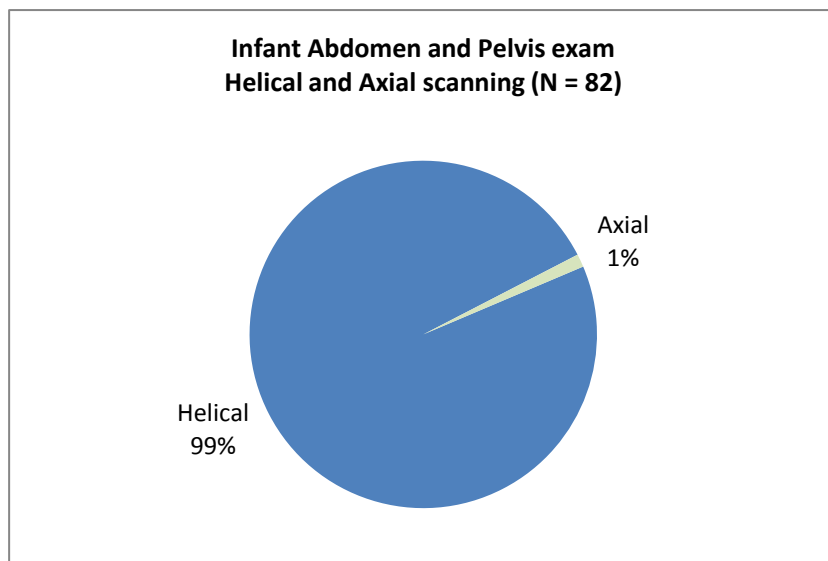
Child Head Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	31	0.9	1.1	0	0	1	1	6
No. Scout views per exam	23	1.1	0.3	1	1	1	1	2
f_{nc}	17	98	5	80	100	100	100	100
F_c	17	1	3	0	0	0	0	10
F_{c+nc}	17	1	2	0	0	0	0	10
kVp	22	117	13	80	120	120	120	140
mA	21	150	86	45	90	125	200	335
Time (s) per rotation	20	0.9	0.3	0.5	0.8	1.0	1.0	2.0
mAs per rotation	20	131	77	25	88	115	160	315
Slices per rotation	18	7	16	1	1	2	4	64
Slice width (mm)	16	4.2	1.5	0.5	3.0	5.0	5.0	7.0
Table feed (mm/rot)	13	10.0	6.4	3.0	5.0	7.5	15.0	20.0
Pitch	13	1.1	0.3	0.8	1.0	1.0	1.0	2.0
Scan length (mm)	8	113	53	53	84	100	129	225
CTDI _{free air} (mGy)	12	31	19	8	13	34	46	58
CTDI _w (mGy)	12	21	13	4	11	17	33	41
CTDI _{vol} (mGy)	10	25	16	3	13	22	35	55
DLP (mGy-cm)	7	252	142	102	160	219	332	461
E (mSv)	6	0.9	0.7	0.1	0.5	0.8	1.4	1.9

Child Head Exam, Helical scanning

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	37	3.1	5.0	0	1	2	3	30
No. Scout views per exam	42	1.3	0.5	1	1	1	2	2
f_{nc}	36	95	12	50	95	100	100	100
F_c	36	2	8	0	0	0	0	50
F_{c+nc}	36	3	9	0	0	0	2	50
kVp	41	117	7	90	120	120	120	120
mA	39	175	68	30	148	170	207	350
Time (s) per rotation	39	0.9	0.3	0.5	0.7	0.8	1.0	2.0
mAs per rotation	36	147	73	15	100	130	200	315
Slices per rotation	29	13	17	1	2	4	16	64
Slice width (mm)	25	3.2	2.2	0.5	1.0	3.0	5.0	7.0
Table feed (mm/rot)	20	10.6	5.6	3.0	6.9	10.0	13.3	24.0
Pitch	17	0.9	0.3	0.5	0.7	0.9	1.0	1.5
Scan length (mm)	3	135	13	120	130	140	143	145
CTDI _{free air} (mGy)	21	40	18	9	26	42	52	73
CTDI _w (mGy)	21	26	12	6	17	27	34	46
CTDI _{vol} (mGy)	13	33	19	9	19	31	41	84
DLP (mGy-cm)	3	440	232	210	323	437	555	674
E (mSv)	11	1.2	0.7	0.4	0.6	1.1	1.5	2.7

Child Head Exam, Axial scanning								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	90	3.3	3.6	0	1	2	5	20
No. Scout views per exam	99	1.1	0.4	1	1	1	1	3
f_{nc}	85	93	19	0	98	100	100	100
F_c	85	1	5	0	0	0	0	33
F_{c+nc}	85	6	18	0	0	0	1	100
kVp	98	118	11	80	120	120	120	140
mA	92	188	83	50	130	170	205	520
Time (s) per rotation	92	1.0	0.4	0.5	0.8	1.0	1.0	3.0
mAs per rotation	87	186	131	63	123	160	210	960
Slices per rotation	86	4	4	1	2	4	4	16
Slice width (mm)	82	4.2	1.6	0.6	3.0	5.0	5.0	8.0
Table feed (mm/rot)	68	11.7	6.7	3.0	6.5	10.0	15.3	39.4
Pitch	66	1.0	0.2	0.5	1.0	1.0	1.0	2.0
Scan length (mm)	38	128	32	80	102	120	143	225
CTDI _{free air} (mGy)	61	51	41	8	34	44	54	305
CTDI _w (mGy)	61	34	27	4	22	32	37	198
CTDI _{vol} (mGy)	51	38	39	2	21	31	39	242
DLP (mGy-cm)	32	374	178	125	243	301	525	806
E (mSv)	36	1.4	1.6	0.1	0.6	1.0	1.5	7.8

Table 10.14 Infant Abdomen and Pelvis Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	99	100
Axial	1	0

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	59	67
manual	41	33

Infant Abdomen and Pelvis Exam, All facilities

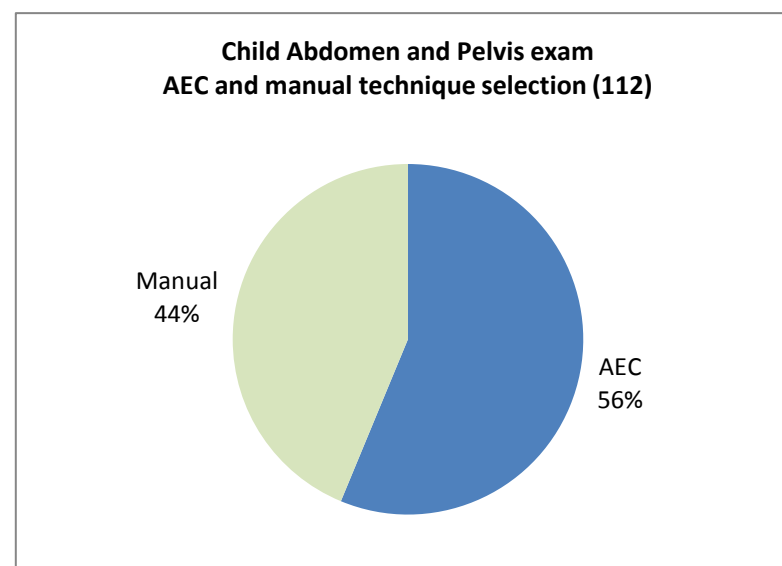
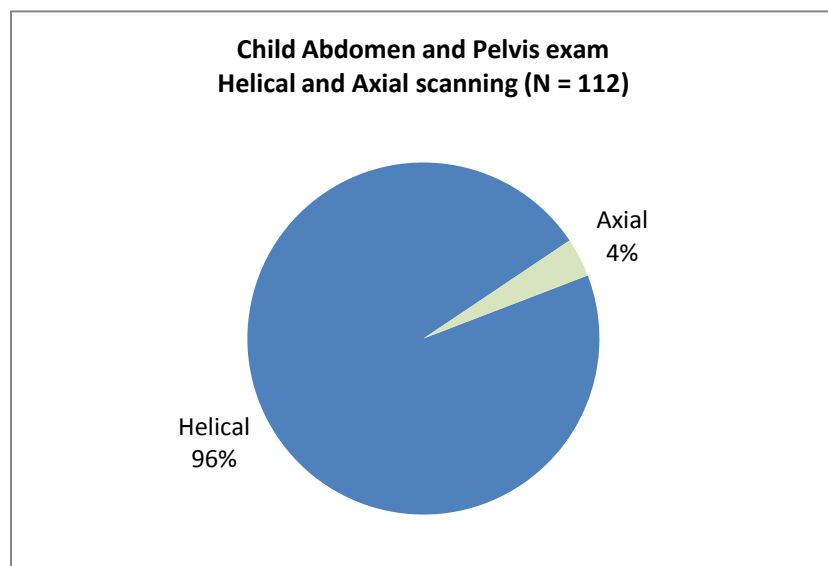
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	105	0.7	1.7	0	0	0	1	14
No. Scout views per exam	85	1.4	0.5	0	1	1	2	2
f_{nc}	54	32	38	0	1	10	50	100
F_c	54	54	42	0	1	60	97	100
F_{c+nc}	54	14	30	0	0	0	5	99
kVp	84	114	12	80	110	120	120	120
mA	73	130	76	20	70	120	160	510
Time (s) per rotation	77	0.7	0.2	0.3	0.5	0.6	0.8	1.5
mAs per rotation	66	91	53	10	49	80	120	255
Slices per rotation	65	12	14	4	4	8	16	64
Slice width (mm)	57	3.1	2.2	0.5	1.3	2.5	5.0	10.0
Table feed (mm/rot)	50	17.7	9.2	5.0	9.7	16.5	24.8	40.0
Pitch	45	1.1	0.2	0.7	1.0	1.0	1.4	1.8
Scan length (mm)	21	144	55	75	93	150	169	240
CTDI _{free air} [Head] (mGy)	42	24	16	2	11	18	37	60
CTDI _{free air} [Body] (mGy)	41	22	17	2	9	17	33	79
CTDI _w [Head] (mGy)	42	15	10	2	7	14	20	42
CTDI _w [Body] (mGy)	41	7	5	1	3	6	9	23
CTDI _{vol} [Head] (mGy)	36	14	9	2	7	11	18	39
CTDI _{vol} [Body] (mGy)	36	7	5	1	3	6	8	19
DLP [Head] (mGy-cm)	36	220	176	30	107	163	283	680
DLP [Body] (mGy-cm)	36	109	96	12	47	77	130	349
E (mSv)	20	7.1	6.2	0.5	1.7	5.0	11.1	18.3

Infant Abdomen and Pelvis Exam, hospitals only								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	84	0.8	1.8	0	0	0	1	14
No. Scout views per exam	75	1.4	0.5	0	1	1	2	2
f_{nc}	48	29	37	0	1	10	50	100
F_c	48	54	42	0	2	61	98	100
F_{c+nc}	48	16	31	0	0	0	6	99
kVp	74	116	12	80	113	120	120	120
mA	63	132	79	20	75	125	160	510
Time (s) per rotation	69	0.7	0.2	0.3	0.5	0.6	0.8	1.5
mAs per rotation	58	93	55	10	51	80	120	255
Slices per rotation	55	12	13	1	4	8	16	64
Slice width (mm)	50	3.1	2.3	0.5	1.3	2.5	5.0	10.0
Table feed (mm/rot)	44	18.0	9.5	5.0	9.8	18.0	26.0	40.0
Pitch	40	1.1	0.2	0.7	1.0	1.0	1.3	1.8
Scan length (mm)	19	147	55	75	99	150	184	240
CTDI _{free air} [Head] (mGy)	36	24	17	2	11	20	34	60
CTDI _{free air} [Body] (mGy)	35	22	18	2	9	18	31	79
CTDI _w [Head] (mGy)	36	15	10	2	7	14	20	42
CTDI _w [Body] (mGy)	35	7	6	1	3	6	9	23
CTDI _{vol} [Head] (mGy)	31	13	8	2	8	13	18	34
CTDI _{vol} [Body] (mGy)	31	7	5	1	3	6	8	18
DLP [Head] (mGy-cm)	31	218	166	30	100	170	285	680
DLP [Body] (mGy-cm)	31	109	93	12	48	79	130	349
E (mSv)	18	6.6	5.8	0.5	1.5	5.0	10.7	17.7

Infant Abdomen and Pelvis Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	21	0.4	0.8	0	0	0	0	3
No. Scout views per exam	9	1.2	0.4	1	1	1	1	2
f_{nc}	5	58	42	0	40	50	99	100
F_c	5	40	39	0	1	50	59	90
F_{c+nc}	5	2	4	0	0	0	1	10
kVp	9	116	7	100	110	120	120	120
mA	9	111	59	50	60	80	165	200
Time (s) per rotation	7	0.7	0.2	0.4	0.5	0.8	0.8	1.0
mAs per rotation	7	75	46	30	36	80	90	160
Slices per rotation	9	15	21	1	4	4	16	64
Slice width (mm)	7	3.4	1.7	0.6	2.3	3.8	5.0	5.0
Table feed (mm/rot)	6	16	7.2	7.0	11.0	15.0	18.8	27.0
Pitch	5	1.1	0.3	0.8	0.8	1.0	1.4	1.5
Scan length (mm)	2	122	66	75	98	122	145	169
CTDI _{free air} [Head] (mGy)	6	22	15	9	12	16	33	43
CTDI _{free air} [Body] (mGy)	6	21	13	9	11	16	32	38
CTDI _w [Head] (mGy)	6	15	9	7	8	13	21	30
CTDI _w [Body] (mGy)	6	7	5	3	4	6	10	14
CTDI _{vol} [Head] (mGy)	5	15	14	7	7	8	10	39
CTDI _{vol} [Body] (mGy)	5	7	7	3	3	4	5	19
DLP [Head] (mGy-cm)	5	228	248	54	115	138	170	66
DLP [Body] (mGy-cm)	5	108	122	24	50	59	80	324
E (mSv)	2	10.5	11.0	2.7	6.6	10.5	14.4	18.3

Table 10.15 Child Abdomen and Pelvis Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	96	100
Axial	4	0

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	57	50
manual	43	50

Child Abdomen and Pelvis Exam, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	123	2.4	3.9	0	0	1	2	23
No. Scout views per exam	115	1.3	0.5	0	1	1	2	2
f_{nc}	94	35	38	0	1	15	50	100
F_c	94	53	42	0	2	50	98	100
F_{c+nc}	94	12	27	0	0	0	5	100
kVp	111	116	11	80	120	120	120	140
mA	93	148	101	20	80	140	180	750
Time (s) per rotation	105	0.7	0.2	0.3	0.5	0.7	0.8	1.5
mAs per rotation	87	104	79	10	60	80	135	600
Slices per rotation	89	11	14	1	3	6	16	64
Slice width (mm)	79	3.4	2.3	0.5	1.4	3.0	5.0	10.0
Table feed (mm/rot)	72	17.5	9.6	3.0	8.0	17.8	26.6	40.0
Pitch	64	1.1	0.2	0.7	0.9	1.0	1.3	1.8
Scan length (mm)	25	253	82	138	188	240	300	428
CTDI _{free air} [Head] (mGy)	58	28	26	3	11	23	41	180
CTDI _{free air} [Body] (mGy)	59	28	28	2	10	21	38	180
CTDI _w [Head] (mGy)	60	18	17	2	8	16	23	130
CTDI _w [Body] (mGy)	59	9	9	1	4	8	12	57
CTDI _{vol} [Head] (mGy)	50	18	19	3	8	13	22	132
CTDI _{vol} [Body] (mGy)	49	9	9	1	4	7	11	58
DLP [Head] (mGy-cm)	50	493	790	71	200	321	530	5664
DLP [Body] (mGy-cm)	49	206	360	17	62	112	218	2480
E (mSv)	36	13.0	25.6	0.9	2.5	5.5	14.1	152

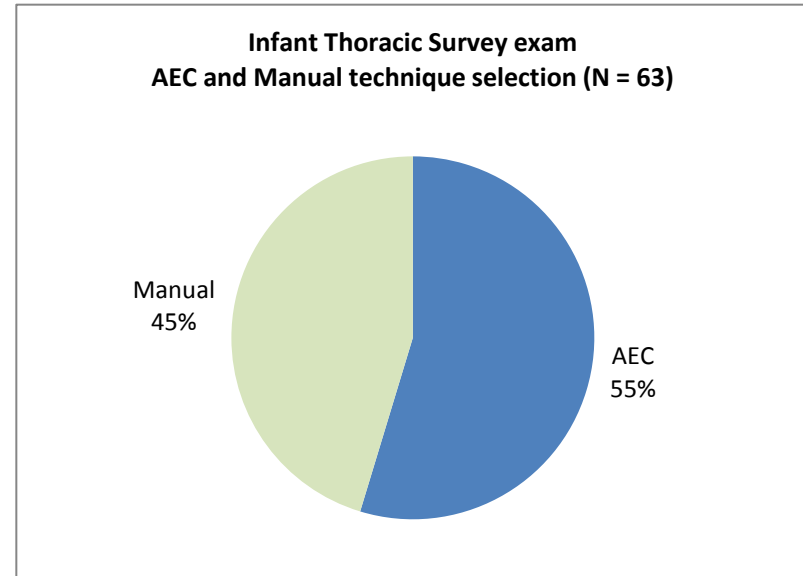
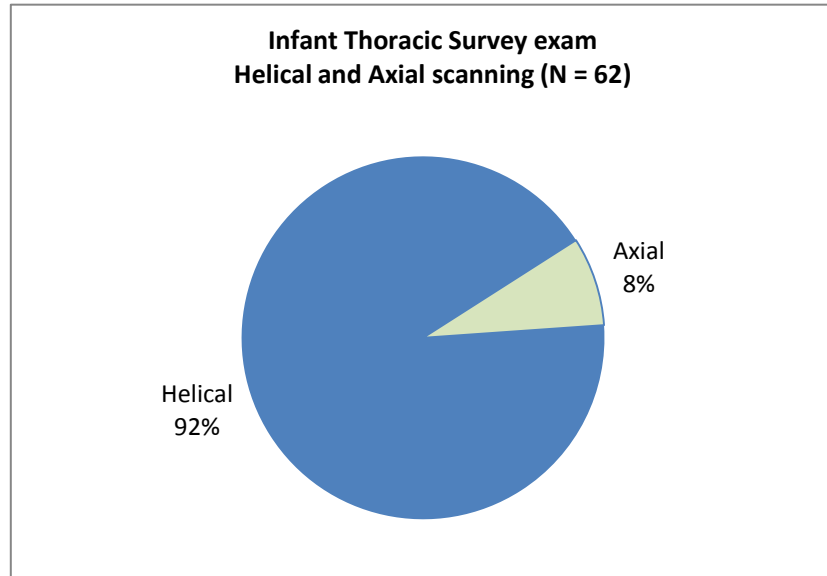
Child Abdomen and Pelvis Exam, Hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	98	2.9	4.2	0	1	2	3	23
No. Scout views per exam	99	1.3	0.5	0	1	1	2	2
f_{nc}	82	31	35	0	0	10	50	100
F_c	82	56	41	0	3	62	98	100
F_{c+nc}	82	13	29	0	0	0	5	100
kVp	95	116	11	80	120	120	120	140
mA	78	159	106	20	100	150	180	750
Time (s) per rotation	91	0.7	0.2	0.3	0.5	0.6	0.8	1.5
mAs per rotation	74	111	83	10	63	90	150	600
Slices per rotation	74	11	13	1	3	8	16	64
Slice width (mm)	65	3.4	2.4	0.5	1.3	2.5	5.0	10.0
Table feed (mm/rot)	63	18.7	9.5	3.0	10.0	20.0	27.0	40.0
Pitch	55	1.1	0.2	0.7	1.0	1.0	1.3	1.8
Scan length (mm)	21	266	83	138	200	270	320	428
CTDI _{free air} [Head] (mGy)	48	31	28	3	17	26	42	180
CTDI _{free air} [Body] (mGy)	49	30	29	2	16	23	39	180
CTDI _w [Head] (mGy)	50	19	19	2	11	16	23	130
CTDI _w [Body] (mGy)	49	10	9	8	5	9	12	57
CTDI _{vol} [Head] (mGy)	41	19	20	3	9	18	24	132
CTDI _{vol} [Body] (mGy)	40	10	10	1	4	9	12	58
DLP [Head] (mGy-cm)	41	522	862	71	216	384	620	5664
DLP [Body] (mGy-cm)	40	235	393	17	81	150	271	2480
E (mSv)	30	14.9	28	1.0	2.8	7.0	16.4	151.9

Child Abdomen and Pelvis Exam, facilities other than hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	25	0.5	0.5	0	0	0	1	1
No. Scout views per exam	16	1.4	0.5	1	1	1	2	2
f_{nc}	12	66	41	0	40	83	99	100
F_c	12	31	40	0	0	12	60	100
F_{c+nc}	12	3	4	0	0	1	4	10
kVp	16	115	11	80	118	120	120	120
mA	15	94	50	40	55	80	105	225
Time (s) per rotation	14	0.7	0.2	0.4	0.5	0.7	0.8	1.0
mAs per rotation	13	67	33	20	48	56	80	135
Slices per rotation	15	12	18	1	3	4	11	64
Slice width (mm)	14	3.3	1.8	0.5	2.1	3.8	5.0	5.0
Table feed (mm/rot)	9	9.3	5.4	3.0	5.0	7.8	11.3	20.0
Pitch	9	1.0	0.3	0.7	0.8	1.0	1.0	1.5
Scan length (mm)	4	185	29	150	168	187	204	215
CTDI _{free air} [Head] (mGy)	10	16	11	8	10	11	16	44
CTDI _{free air} [Body] (mGy)	10	15	11	8	10	10	16	44
CTDI _w [Head] (mGy)	10	12	8	6	7	8	14	27
CTDI _w [Body] (mGy)	10	6	4	2	3	4	7	13
CTDI _{vol} [Head] (mGy)	9	10	4	6	7	9	10	18
CTDI _{vol} [Body] (mGy)	9	5	2	2	4	4	5	9
DLP [Head] (mGy-cm)	9	223	92	104	178	214	264	423
DLP [Body] (mGy-cm)	9	78	31	28	59	84	87	128
E (mSv)	6	3.2	1.4	1.9	2.6	2.6	3.9	5.5

Table 10.16 Infant Thoracic Survey Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	91	100
Axial	9	0

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	53	60
manual	47	40

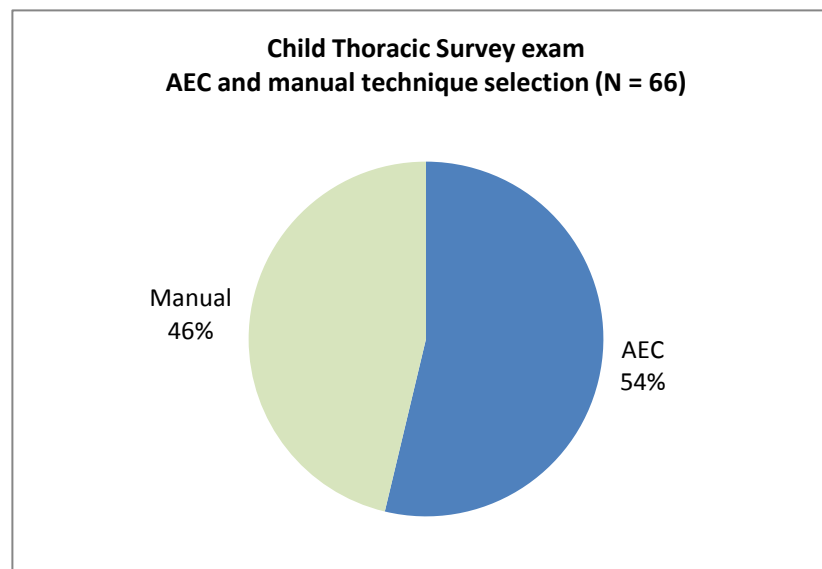
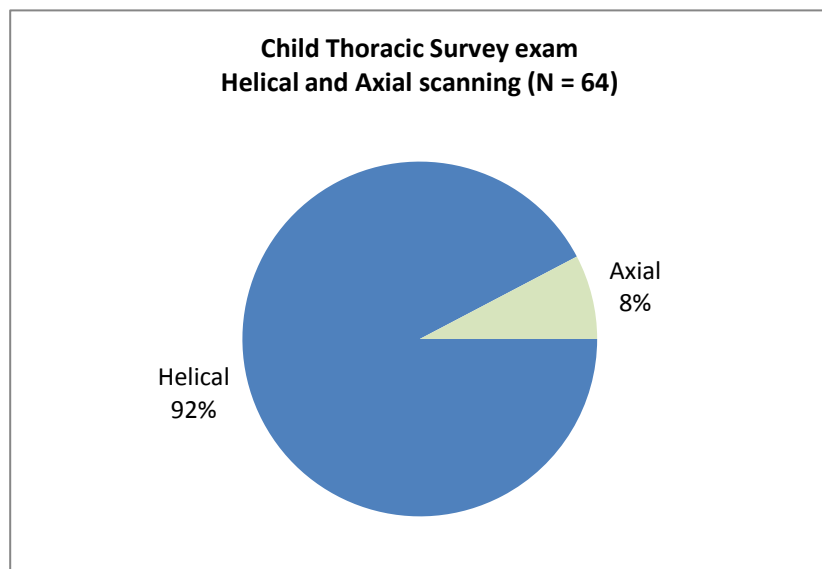
Infant Thoracic Survey Exam, All facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	96	0.3	0.5	0	0	0	0	2
No. Scout views per exam	66	1.3	0.5	0	1	1	2	2
f _{nc}	36	54	42	0	9	50	100	100
F _c	36	39	42	0	0	20	80	100
F _{c+nc}	36	7	22	0	0	0	0	95
kVp	63	114	12	80	120	120	120	120
mA	54	116	80	26	51	100	140	510
Time (s) per rotation	60	0.7	0.3	0.4	0.5	0.8	0.8	2.0
mAs per rotation	52	85	69	15	34	64	107	300
Slices per rotation	49	12	15	1	4	8	16	64
Slice width (mm)	40	3.2	2.2	0.5	1.4	2.5	5.0	10.0
Table feed (mm/rot)	34	17.1	10.8	2.0	9.3	15.0	22.5	60.0
Pitch	32	1.1	0.3	0.5	1.0	1.1	1.3	1.5
Scan length (mm)	13	114	45	75	84	90	146	210
CTDI _{free air} [Head] (mGy)	34	23	20	4	7	17	33	86
CTDI _{free air} [Body] (mGy)	33	23	22	3	6	15	33	86
CTDI _w [Head] (mGy)	33	15	11	2	5	11	24	38
CTDI _w [Body] (mGy)	33	7	7	1	3	5	9	27
CTDI _{vol} [Head] (mGy)	27	15	14	2	4	8	21	58
CTDI _{vol} [Body] (mGy)	28	8	9	1	2	4	9	41
DLP [Head] (mGy-cm)	27	171	167	21	48	70	247	634
DLP [Body] (mGy-cm)	28	86	101	8	19	19	41	109
E (mSv)	12	3.3	3.2	0.4	0.7	2.2	4.7	9.6

Infant Thoracic Survey Exam, Hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	78	0.3	0.5	0	0	0	1	2
No. Scout views per exam	60	1.3	0.5	0	1	1	2	2
f_{nc}	34	53	43	0	6	50	100	100
F_c	34	39	42	0	0	20	88	100
F_{c+nc}	34	8	23	0	0	0	0	95
kVp	57	113	13	80	120	120	120	120
mA	48	113	83	26	54	100	143	510
Time (s) per rotation	55	0.7	0.3	0.4	0.5	0.8	0.8	2.0
mAs per rotation	47	87	71	15	34	64	116	300
Slices per rotation	43	11	13	1	4	8	16	64
Slice width (mm)	37	3.3	2.3	0.5	1.5	2.5	5.0	10.0
Table feed (mm/rot)	32	17.1	11.1	2.0	8.8	15.0	22.9	60.0
Pitch	30	1.1	0.3	0.5	1.0	1.1	1.3	1.5
Scan length (mm)	13	114	45	75	84	90	146	210
CTDI _{free air} [Head] (mGy)	31	24	21	4	7	18	33	86
CTDI _{free air} [Body] (mGy)	30	23	22	3	6	15	32	86
CTDI _w [Head] (mGy)	30	15	11	2	5	11	23	38
CTDI _w [Body] (mGy)	30	8	7	1	2	5	9	27
CTDI _{vol} [Head] (mGy)	25	15	14	2	4	9	22	58
CTDI _{vol} [Body] (mGy)	26	8	9	1	2	4	9	41
DLP [Head] (mGy-cm)	25	179	171	21	46	92	250	634
DLP [Body] (mGy-cm)	26	90	104	8	19	42	117	446
E (mSv)	12	3.3	3.2	0.4	0.7	2.2	4.7	9.6

Infant Thoracic Survey Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	18	0.1	0.3	0	0	0	0	1
No. Scout views per exam	5	1.2	0.4	1	1	1	1	2
f_{nc}	1	100	-	-	-	-	-	-
F_c	1	0	-	-	-	-	-	-
F_{c+nc}	1	0	-	-	-	-	-	-
kVp	5	118	4	110	120	120	120	120
mA	5	86	43	40	50	80	130	130
Time (s) per rotation	4	0.6	0.2	0.4	0.5	0.6	0.8	0.8
mAs per rotation	4	59	29	32	38	53	73	98
Slices per rotation	5	23	26	4	6	8	32	64
Slice width (mm)	3	2.5	2.2	0.6	1.3	2.0	3.5	5.0
Table feed (mm/rot)	2	16.0	5.7	12.0	14.0	16.0	18.0	20.0
Pitch	2	1.0	0	1.0	1.0	1.0	1.0	1.0
Scan length (mm)	0	-	-	-	-	-	-	-
CTDI _{free air} [Head] (mGy)	3	19	16	9	10	10	24	38
CTDI _{free air} [Body] (mGy)	3	19	16	9	10	10	24	38
CTDI _w [Head] (mGy)	3	13	10	7	7	7	15	24
CTDI _w [Body] (mGy)	3	6	5	3	3	3	7	11
CTDI _{vol} [Head] (mGy)	2	7	0.2	7	7	7	7	7
CTDI _{vol} [Body] (mGy)	2	3	0.1	3	3	3	3	3
DLP [Head] (mGy-cm)	2	76	2	74	75	76	76	77
DLP [Body] (mGy-cm)	2	33	1	32	33	33	33	34
E (mSv)	0	-	-	-	-	-	-	-

Table 10.17 Thoracic Survey Exam.



Percent of sites using Helical/ Axial scanning	Hospitals	Facilities other than hospitals
Helical	93	88
Axial	7	12

Percent of sites using AEC / manual technique	Hospitals	Facilities other than hospitals
AEC	53	56
manual	47	44

Child Thoracic Survey Exam, All Facilities

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	95	0.8	1.8	0	0	0	1	10
No. Scout views per exam	69	1.3	0.5	0	1	1	2	2
f_{nc}	45	55	43	0	10	50	100	100
F_c	45	37	42	0	0	10	87	100
F_{c+nc}	45	8	23	0	0	0	0	95
kVp	64	115	13	80	120	120	120	140
mA	53	126	76	30	80	120	150	510
Time (s) per rotation	61	0.7	0.3	0.4	0.5	0.8	0.8	2.0
mAs per rotation	51	97	69	15	49	80	116	300
Slices per rotation	51	12	17	1	4	6	16	64
Slice width (mm)	41	3.4	2.2	0.5	1.5	3.0	5.0	10.0
Table feed (mm/rot)	3	16.6	10.5	2.0	10.0	15.0	21.0	60.0
Pitch	36	1.1	0.3	0.5	0.9	1.0	1.4	2.0
Scan length (mm)	12	152	60	100	111	122	187	280
CTDI _{free air} [Head] (mGy)	31	28	20	4	12	26	44	86
CTDI _{free air} [Body] (mGy)	31	27	22	3	11	22	41	86
CTDI _w [Head] (mGy)	32	17	11	3	9	15	26	38
CTDI _w [Body] (mGy)	31	9	7	1	4	7	13	27
CTDI _{vol} [Head] (mGy)	28	16	13	2	7	13	23	58
CTDI _{vol} [Body] (mGy)	27	9	9	1	3	6	12	41
DLP [Head] (mGy-cm)	28	257	207	39	105	185	332	680
DLP [Body] (mGy-cm)	27	136	128	16	46	97	199	466
E (mSv)	14	5.6	6.0	0.5	1.1	3.6	6.0	18.4

Child Thoracic Survey Exam: hospitals

Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	77	0.9	1.9	0	0	0	1	10
No. Scout views per exam	59	1.3	0.5	0	1	1	2	2
f_{nc}	39	51	43	0	0	20	90	100
F_c	39	40	43	0	0	20	90	100
F_{c+nc}	39	9	24	0	0	0	0	95
kVp	54	116	12	80	120	120	120	140
mA	43	134	80	30	98	120	158	510
Time (s) per rotation	52	0.7	0.3	0.4	0.5	0.8	0.8	2.0
mAs per rotation	42	104	73	15	50	80	146	300
Slices per rotation	43	11	16	1	3	4	16	24
Slice width (mm)	36	3.5	2.3	0.5	1.5	3.0	5.0	10.
Table feed (mm/rot)	33	17.0	10.9	2.0	10.0	15.0	22.5	60
Pitch	32	1.1	0.3	0.5	0.8	1.1	1.4	1.5
Scan length (mm)	12	152	60	100	111	122	187	280
CTDI _{free air} [Head] (mGy)	27	30	21	4	14	26	44	86
CTDI _{free air} [Body] (mGy)	27	29	22	3	12	23	41	86
CTDI _w [Head] (mGy)	28	18	11	3	10	16	26	38
CTDI _w [Body] (mGy)	27	9	7	1	5	8	13	27
CTDI _{vol} [Head] (mGy)	25	17	13	3	8	14	24	58
CTDI _{vol} [Body] (mGy)	24	9	9	1	4	7	12	41
DLP [Head] (mGy-cm)	24	276	212	40	114	195	390	680
DLP [Body] (mGy-cm)	24	148	130	16	55	99	217	466
E (mSv)	13	5.9	6.1	0.5	1.7	4.0	6.3	18.4

Thoracic Survey Exam, facilities other than hospitals								
Variable	N	Mean	SDEV	Min	25 th	50 th	75 th	Max
Exams per week	18	0.5	1.4	0	0	0	0	6
No. Scout views per exam	9	1.2	0.4	1	1	1	1	2
f_{nc}	5	94	12	73	99	100	100	100
F_c	5	4	8	0	0	0	0	18
F_{c+nc}	5	2	4	0	0	0	1	9
kVp	9	110	17	80	110	120	120	120
mA	9	86	46	35	50	80	100	170
Time (s) per rotation	8	0.7	0.2	0.4	0.5	0.8	0.9	1.0
mAs per rotation	8	63	35	26	32	60	89	113
Slices per rotation	7	17	23	1	4	6	20	64
Slice width (mm)	5	2.6	1.6	0.6	2.0	2.5	3.0	5.0
Table feed (mm/rot)	4	13.8	8.1	3.0	9.8	16.0	20.0	20.0
Pitch	4	1.3	0.5	1.0	1.0	1.0	1.3	2.0
Scan length (mm)	0	-	-	-	-	-	-	-
CTDI _{free air} [Head] (mGy)	4	18	17	8	9	10	19	44
CTDI _{free air} [Body] (mGy)	4	18	17	8	9	10	19	44
CTDI _w [Head] (mGy)	4	11	11	4	6	7	12	27
CTDI _w [Body] (mGy)	4	5	5	2	3	3	6	12
CTDI _{vol} [Head] (mGy)	3	6	1	4	6	7	7	7
CTDI _{vol} [Body] (mGy)	3	3	1	2	2	3	3	3
DLP [Head] (mGy-cm)	3	97	23	70	89	108	110	113
DLP [Body] (mGy-cm)	3	40	13	26	36	47	48	49
E (mSv)	1	0.8	-	0.8	0.8	0.8	0.8	0.8