NATIONWIDE EVALUATION
OF X-RAY TRENDS (NEXT)

TABULATION AND GRAPHICAL SUMMARY OF
2000 SURVEY OF COMPUTED TOMOGRAPHY

August 2007

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

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Tabulation and Graphical Summary of
2000 Survey of Computed Tomography

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Food and Drug Administration
Center for Devices and Radiological Health

in association with

Conference of Radiation Control Program Directors, Inc.'s
Committee on Nationwide Evaluation of X-ray Trends (H-4)

and

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August 2007

The Protocol for the NEXT 2000 Computed Tomography Survey is available online at

EXECUTIVE SUMMARY

As part of the *Nationwide Evaluation of X-ray Trends (NEXT)* survey program in 2000-2001, state radiation control personnel performed measurements related to radiation dose in patients, and they obtained technical data about technique factors, estimates of procedure workload, and information about quality assurance practices at 265 randomly selected computed tomography (CT) facilities located in 39 participating states. *NEXT* surveys, conducted through a cooperative agreement between the U.S. Food and Drug Administration and the Conference of Radiation Control Program Directors, Inc. (CRCPD), are like "snapshots" of collective radiological practice affecting radiation dose in patients.

Trends emerge over the course of time when snapshots are compared. In particular, the results of the 2000-2001 CT are a comprehensive basis for comparison: they reflect the profound advances in CT technology and clinical practice that have occurred since the previous CT survey in 1990, and they offer a template for understanding the impact of even more recent developments in CT—automatic exposure control and large-number multi-slice-array helical scanning—whose assessment will ensue following the 2005-2006 CT survey.

Results are compiled in four categories, and important findings are highlighted for each category:

Workload, techniques factors, and associated dose indices
- Statistics are presented for each of the 24 most common examinations in adult patients done with the most frequently used CT unit at facilities.

- Tabulations are stratified according to scanning mode (axial versus helical) and site of the CT unit (all types of facilities versus hospitals versus facilities other than hospitals).

- The most common exams are those of the head (covering the regions of the brain + posterior fossa) and of the abdomen + pelvis, whose summary statistics are presented in the following tables:

Table E1. Head exam (brain+posterior fossa), axial scanning, all types of facilities							
Variable*	**Mean**		**Standard Deviation**		**Standard Error**		
Exams per week	27.6		27.0		1.8		
Scouts per exam	1.07		0.25		0.02		
No-contrast fraction	0.63		0.27		0.02		
With-contrast fraction	0.07		0.15		0.01		
No-contrast + with-contrast fraction	0.30		0.27		0.02		

Variable*	**Brain**			**Posterior fossa**		
	Mean	**Standard Deviation**	**Standard Error**	**Mean**	**Standard Deviation**	**Standard Error**
kVp	126.6	8.4	0.5	127.6	8.7	0.5
mA	191	62	4	193	64	4
Time (s) **per rotation**	1.97	0.67	0.04	1.98	0.70	0.04
mAs **per rotation**	347	93	6	353	112	7
Slices per contrast phase	10.7	2.7	0.3	11.4	4.9	0.6
Slices per rotation (n)	1.15	0.61	0.04	1.17	0.64	0.04
Slice width (T, mm)	8.38	2.14	0.14	5.58	2.07	0.13
Table increment (I_{axial}, mm)	8.95	2.85	0.18	6.14	3.23	0.21
$I_{axial}/(nT)$	0.992	0.054	0.004	1.00	0.10	0.01
Scanning length (mm)	94	15	2	46	10	1
$CTDI_{free\ air}$ **(mGy)**	89	39	3	92	42	3
$CTDI_{vol}$ **(mGy)**	62	32	2	64	34	3
Dose-length product (mGy-cm)	479	246	36	268	145	21
Effective dose (mSv)	1.2	0.7	0.1	0.7	0.7	0.1

*See pp. 6-15.

Table E2. Abdomen+pelvis exam, helical scanning, all types of facilities			
Variable*	Mean	Standard Deviation	Standard Error
Exams per week	29.3	26.2	2.2
Scouts per exam	1.29	0.46	0.04
No-contrast fraction	0.20	0.21	0.02
With-contrast fraction	0.52	0.36	0.03
No-contrast + with-contrast fraction	0.28	0.34	0.03
kVp	122.9	6.2	0.5
mA	225	60	5
Time (s) per rotation	1.09	0.33	0.03
mAs per rotation	235	71	6
Reconstruction increment (mm)	7.6	1.8	0.2
Slices per rotation (n)	1.12	0.58	0.05
Slice width (T, mm)	7.90	1.67	0.13
Table feed per rotation ($I_{helical}$, mm)	10.04	4.03	0.34
Pitch [$I_{helical}/(nT)$]	1.21	0.35	0.03
Scanning length (mm)	457	83	10
$CTDI_{free\ air}$ (mGy)	59	28	3
$CTDI_{vol}$ (mGy)	17	9	1
Dose-length product (mGy-cm)	777	373	60
Effective dose (mSv)	13.7	7.1	1.2

*See pp. 6-15.

Collective workload, collective effective dose, and numbers of CT facilities in the U.S.

- 45.1 million CT procedures done annually. [Standard error (S.E.) 3.9 million.]

- 7.07 (S.E. 0.36) thousand CT facilities.

- Ratio of the number of pediatric to adult exams: 0.065 (S.E. 0.011).

- 93% (S.E. 2%) of responding facilities professed use of dedicated techniques for pediatric patients; 134 out of 261 facilities responded to this question.

- Whereas the head exam was the most frequently done adult exam, it ranked only fifth in its contribution to adult collective dose per most frequently used CT unit per facility (hospitals and other facilities):

Distribution of Number of Adult Exams
per week per most frequently used CT unit
per facility (N_n, hospitals and other facilities)[1]

All other exams, 20%

Head, 33%

Simple sinus, 6%

Abdomen, 8%

Chest, 11%

Abd+pelvis, 22%
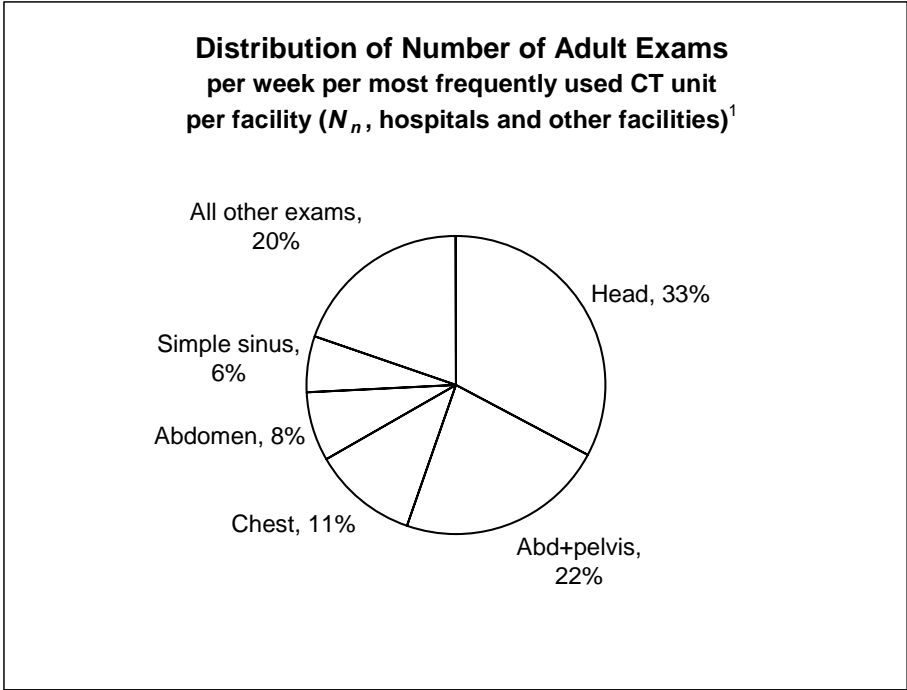
[1]Distribution of **Total N_n = 98** exams per week per most frequently used CT unit per facility. See Table 2.1.

Figure 1. Distribution of Number of Adult Exams

Distribution of Adult Collective Effective Dose
per week per most frequently used CT unit
per facility (S_n, hospitals and other facilities)[1]

All other exams, 13%

Head, 9%

Abdomen, 10%

Abd+pel, 44%

Chest+abd+pel, 10%

Chest, 15%
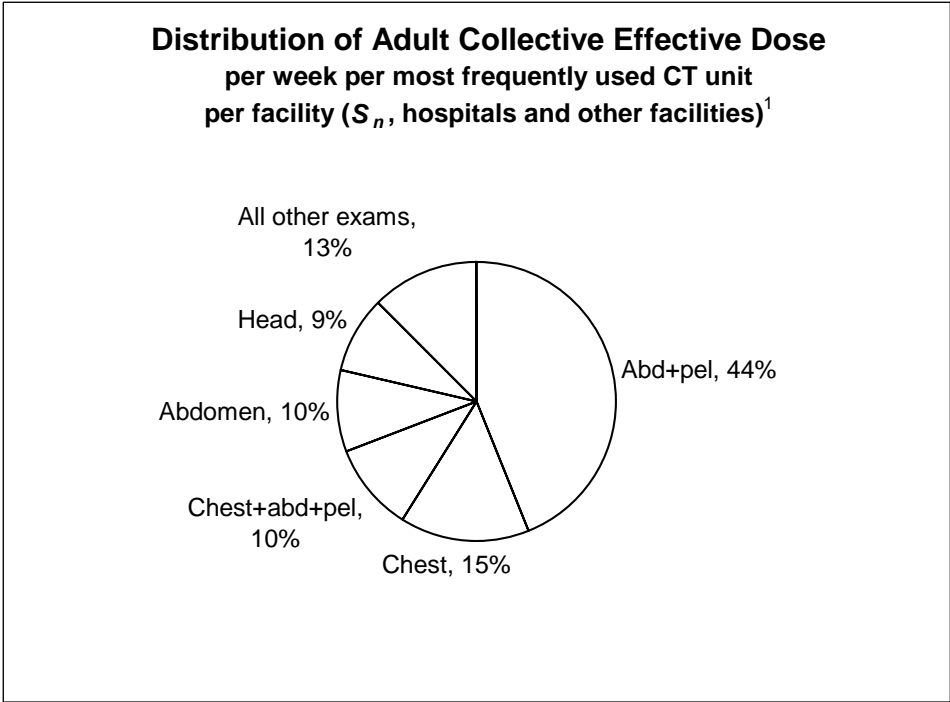
[1]Distribution of **Total S_n = 756** person-mSv per week per most frequently used CT unit per facility. See Table 2.4.

Figure 2. Distribution of Adult Effective Dose

Distribution of CT models versus scanning capabilities and radiation output

- Average number of CT units per CT facility: 1.28 (S.E. 0.05).

- Percentage of CT units capable of multi-slice helical scanning: 23% (S.E. 3%). This capability was introduced into the market in 1998, two years prior to the survey.

- Percentage of the most frequently used CT units capable of CT fluoroscopy: 5.7% (S.E. 1.5%).

- Measurements of $CTDI_{100}$ per x-ray tube current-time product in different CT units, either free-in-air or in a head CT dosimetry phantom, **for the same model CT and same kVp**, on average yielded a mean coefficient of variation (COV) of 20% (S.E. 1%).

  This COV may be associated with

  (a) Variability in scanner-to-scanner radiation output for the same model under the same conditions of operation,

  (b) Imprecision of probe and/or phantom positioning yielding variable scattered-radiation contributions to measured values.

  The COV, independent of variation associated with clinical techniques, is significant because it makes a relatively large contribution to the variability observed in all of the dose indices used to characterize clinical dose in CT.

Facility quality assurance for their most frequently used CT unit

- 92% (S.E. 6%) of facilities have service and maintenance provided by the manufacturer, in-house staff, or a third party. 7% (S.E. 2%) of facilities report "as needed/no regular service" or maintenance.

- 78% (S.E. 6%) of facilities have their most frequently used CT unit tested annually by a medical physicist, and 10% (S.E. 2%) have such medical physicist testing more frequently. 8% (S.E. 2%) of facilities report "as needed/no periodic" medical physicist testing.

- 1% to 2% (with S.E. values of comparable magnitude) of facilities report that the following imaging tests are not done or done on an "as needed" basis: noise, reproducibility, uniformity, contrast scale, resolution, sensitivity. 1% to 7% (S.E. 1% to 2%) of facilities do no or only "as needed" testing for artifacts, for scan-light alignment accuracy, and measurements of CTDI and free-in-air exposure.

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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 particular publication, *Nationwide Evaluation of X-ray Trends (NEXT) Tabulation and Graphical Summary of the 2000 Survey of Computed Tomography*, is the release of data for informational use.

Debbie Gilley, Chairperson
Conference of Radiation Control
Program Directors, Inc.

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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 U.S. clinical facilities. 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/NEXT.asp. Further information on NEXT is available at http://www.fda.gov.

As part of the *Nationwide Evaluation of X-ray Trends (NEXT)* survey program in 2000-2001, state radiation control personnel performed measurements related to radiation dose in patients, and they obtained technical data about technique factors, estimates of procedure workload, and information about quality assurance practices at 265 randomly selected computed tomography (CT) facilities located in 39 participating states. *NEXT* surveys, conducted through a cooperative agreement between the U.S. Food and Drug Administration and the Conference of Radiation Control Program Directors, Inc. (CRCPD), are like "snapshots" of collective radiological practice affecting radiation dose in patients.

Trends emerge over the course of time when snapshots are compared. In particular, the results of the 2000-2001 CT are a comprehensive basis for comparison: they reflect the profound advances in CT technology and clinical practice that have occurred since the previous CT survey in 1990, and they offer a template for understanding the impact of even more recent developments in CT—automatic exposure control and large-number multi-slice-array helical scanning—whose assessment will ensue following the 2005-2006 CT survey.

ACKNOWLEDGMENTS

Affairs), John McCrohan (CDRH), Thomas R. Ohlhaber (CDRH), Petro Shandruk (CDRH), and David C. Spelic (CDRH).

ABSTRACT

Stern, Stanley H., CRCPD Committee on Nationwide Evaluation of X-ray Trends, *Nationwide Evaluation of X-ray Trends (NEXT) Tabulation and Graphical Summary of 2000 Survey of Computed Tomography*, CRCPD Publication #E-07-2, August 2007, 154 pp.

This document presents 2000 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.

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INTRODUCTION

<u>Background</u>

The U.S. Food and Drug Administration (FDA) and the Conference of Radiation Control Program Directors, Inc. (CRCPD) collaborate on the *Nationwide Evaluation of X-ray Trends (NEXT)* program to assess radiation doses of patients in the current practice of diagnostic radiology. Organized under the auspices of the CRCPD *NEXT* Committee, and working from FDA survey protocols, state-based radiation control personnel survey a nationally representative sample of U.S. clinical facilities for radiation exposure associated with a different modality every one-to-two years in order to characterize trends in population dose. Surveyors are specially trained at FDA to conduct surveys, and this training includes hands-on practice in measuring radiation exposure of diagnostic x-ray systems and in interviewing radiologic technologists at clinical facilities.

In 2000[1] a *NEXT* survey of computed tomography (CT) obtained data on patient dose and related clinical techniques, procedure workload, and quality assurance practices. Survey sites were randomly selected from state lists of registered x-ray facilities.[2] Ultimately 39 states and 265 facilities volunteered to be part of the survey. The distribution of facilities amongst the states is presented in Table I.1.[3]

Over the course of the decade that elapsed since the previous *NEXT* survey of CT head examinations in 1990 (Conway et al. 1992; Conway 1994), revolutions in CT technology—including, for example, fast, multi-slice spiral scanning (McNitt-Gray et al. 1999; McCollough and Zink 1999; Hidajat et al. 2001) and three-dimensional rendering (Diederichs et al. 1996)—and in CT practice, such as angiography (Novick and Fishman 1998; Velthuis et al. 1998; Remy-Jardin et al. 1997; 1998) and single-breath hold imaging of large volumes (Henschke et al. 1999; 2001), had led to large increases in the number of patients scanned (Herts et al. 1998). To adequately represent the broad scope and variety of procedures making up CT in the year 2000, a

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[1] The first facility questionnaire of the survey was completed March 21, 2000, and the first on-site visit occurred April 21, 2000. The last facility questionnaire was completed June 20, 2001, and the last on-site visit occurred June 21, 2001. Of the 265 facilities participating, 249 were visited by surveyors no later than December 31, 2000. For all practical purposes, the vast majority of survey results refer to the year 2000, before the January 2001 publicity surrounding the publication of papers in the *American Journal of Roentgenology* on the cancer risk posed by CT radiation to pediatric patients.

[2] FDA provided each participating state with a "primary" and an "alternate" contact list of facilities, each list drawn through random selection. Surveyors were instructed to seek voluntary participation from facilities on the primary list before turning to the alternate list to enlist replacement facilities in lieu of those that had decided not to participate in the survey in the first round of solicitation. Of the 265 facilities participating nationwide, 176 came from primary lists, 61 from alternative lists, and 28 from neither list, selected instead by surveyors themselves as complements to their state inspections and/or travel itineraries during the course of inspections. T-tests comparing the results from the group of 237 facilities randomly selected by FDA to those of the group of 28 facilities selected by the surveyors for nearly all of the on-site survey variables showed no statistically significant differences for the randomly selected group of facilities versus the surveyor-selected group. Hence no distinction is made between these two groups in the data analyses of on-site survey results and facility-questionnaire results.

[3] The survey research design had a target sample of 350 facilities in 50 states and the District of Columbia, and this target sample was broken down into sub-samples proportional to state populations (with at least one facility assigned to each state).

major decision was made to gather information on the most commonly done routine CT examinations and procedures as a group (Stern et al. 2000). In other words, instead of the usual *NEXT* survey studying only one particular diagnostic procedure, CT as a modality was to be characterized as a *whole*. This strategy was enabled by expanding the survey to two parts, both focusing on the most frequently used CT unit at each facility:

(1) During site visits, *NEXT* program surveyors measured free-in-air exposure at the gantry isocenter as well as exposure in the center hole and in a peripheral hole of a standard FDA adult head CT dosimetry phantom. Interviews with facility x-ray technologists provided information about technique factors and workload, particularly for routine exams of the adult head (i.e., brain and posterior fossa), the single most commonly done examination.

(2) A separate questionnaire provided to facilities captured their techniques and procedure workloads for the other principal routine adult examinations: abdomen, pelvis, chest, sinus, etc.

Additional innovative features of the survey included data acquisition on quality assurance practice, on pediatric workloads, and on the numbers and capabilities of all of the CT units available at the facilities. While the survey was ongoing, FDA staff transmitted several updates to the surveyors incorporating corrections and refinements to the protocol, and for the first time in the history of the program, survey data were transferred electronically via Excel-based spreadsheets to FDA staff for review and analysis.

Data reduction and analysis

Raw data transmitted by surveyors were checked at FDA for logical and physical measurement self-consistency. For example, there were checks on

- Workloads for particular examinations versus total workload versus the number of CT scanners at a facility;
- Exposure values measured free-in-air versus those measured in the head phantom central and peripheral holes;
- Clinically used slice widths and mAs versus those used during exposure measurements;
- Numbers of slices reported for brain versus posterior fossa regions of head;
- Table feed versus table speed versus reported values of rotation time, number of simultaneous slices acquired, and pitch.

As a general rule, whenever there was any doubt about the consistency or accuracy of reported or measured values, those values were excluded from the statistical analyses and compilations presented here. In a fraction of returns, reported values were re-normalized according to indications from surveyor or facility comments so as to accurately represent clinical conditions or actual workloads.

All statistics were calculated by means of Microsoft Excel, and percentile points were interpolated by Excel algorithms.

The following conventions apply throughout this summary of survey data:

Statistical conventions

The standard deviation (S.D.) of the distribution of values of variable x is generally estimated from a sample as

$$S.D. = \sqrt{\{\sum(x_i - \langle x \rangle)^2/(N\text{-}1)\}}, \qquad\qquad \text{(Equation I.1)}$$

where $\langle x \rangle$ is the mean value of x (estimated as $\sum x_i/N$); N is the sample size, i.e., the number of data points x_i; and $\sum$ denotes a summation from $i = 1$ to $i = N$.

The standard error (S.E.) of the mean $\langle x \rangle$ is generally estimated as

$$S.E. = S.D./\sqrt{N}. \qquad\qquad \text{(Equation I.2)}$$

Histogram convention

Abscissa labels of histograms refer to the midpoints of the intervals represented by the bar widths. A formal description of which data points are counted in which bins follows:

Columns (bins) along the abscissa are labeled with values $b_0 + kb$, i.e., in terms of integer ($k = 0, 1, 2\ldots$) multiples kb of bin width b, where b_0 is the smallest-value bin label displayed. Associated abscissa values a (> 0) are counted as falling within the bin denoted $b_0 + kb$ if abscissa values are within limits as follows:

$$b_0 + kb - b/2 < a \le b_0 + kb + b/2. \qquad\qquad \text{(Equation I.3)}$$

For the column marked by the *smallest-value* label b_0 *(i.e., $k = 0$)*, when $b_0 - b/2 = 0$, then associated abscissa values a (≥ 0) are counted if they fall within the bin limits as follows. (Note that here the lower limit 0 is *included* as part of the interval):

$$0 \le a \le b_0 + b/2. \qquad\qquad \text{(Equation I.4)}$$

For any graph where $b_0 - b/2 > 0$, no abscissa values $a \le b_0 - b/2$ are observed in the sample that are less than or equal to the minimum bin limit associated with the smallest-value label b_0 displayed. No values of $a > (b_0 + kb)_{max} + b/2$ are observed that are greater than the upper bin limit associated with the *largest-value* bin label $(b_0 + kb)_{max}$ displayed.

Table I.1. Participating state sub-sample allotment and number of facilities actually surveyed

Participating State	Facility Allotment Proportional to Population[1]	Number of Facilities Actually Surveyed
Alabama	6	6
Alaska	1	1
Arizona	6	1
Arkansas	3	3
California	43	40
Colorado	5	5
Connecticut	4	4
Florida	19	14
Hawaii	2	2
Idaho	2	3
Illinois	16	16
Iowa	4	4
Kansas	3	3
Kentucky	5	5
Louisiana	6	6
Maine	2	2
Maryland	7	7
Massachusetts	8	7
Michigan[2]	13	12
Minnesota	6	6
Mississippi	4	4
Missouri	7	6
Nevada	2	2
New Hampshire	2	2
New Jersey	10	10
North Carolina	10	10
North Dakota	1	1
Ohio	14	11
Oklahoma	4	4
Oregon	4	4
Pennsylvania	15	15
South Carolina	5	5
South Dakota	1	1
Texas	26	17
Utah	3	3
Vermont	1	1
Virginia	9	8
Washington	7	7
Wisconsin	7	7
Totals	**293**	**265**

[1]Each participating state was alloted at least one facility to survey.

[2]Only 12 primary sites, not 13, were inadvertently provided to the Michigan surveyor.

PART 1.
EXAMINATION-BASED STATISTICS OF WORKLOAD, TECHNIQUE, AND DOSE

The following tables and graphs summarize the distributions of examination workloads, technique settings, and dose-index values associated with the most common adult examinations or procedures performed with the most frequently used CT unit in each facility surveyed. Results are presented for 24 categories of examination whose data were obtained from the questionnaire provided to facility respondents (mostly x-ray technologists) and from dosimetric measurements surveyors did on site. Of these 24 categories, information was elicited for 12 examination categories explicitly pre-identified in the questionnaire part of the survey instrument (Stern et al. 2000). This pre-identified group comprises approximately 98% of the weekly workload of procedures done with the most frequently used CT units in the facilities surveyed, and the exams are listed in order of descending frequency:

- *head (brain + posterior fossa)*
- *abdomen + pelvis*
- *chest*
- *abdomen*
- *simple sinus*
- *pelvis*
- *spine (cervical, thoracic, or lumbosacral)*
- *chest + abdomen + pelvis*
- *skull (facial bones, orbits, sella turcica, or complex sinuses)*
- *kidney*
- *liver*
- *pancreas*

For examinations in this group, data are stratified according to whether procedures are done in axial-scanning or helical-scanning (spiral-scanning) mode, and according to practice in hospitals (including outpatient departments associated with hospitals) versus practice in facilities other than hospitals (i.e., private individual practices engaged in one particular specialty—or in general practice—including free-standing imaging centers; multi-specialty practices including school infirmaries, clinics; and mobile CT unit practices.)

The second group of 12 examinations consists of categories identified by facilities themselves in response to the questionnaire headings *"Other 1"* and *"Other 2."* This group comprises approximately 2% of the weekly workload of procedures done with the most frequently used CT units in the facilities surveyed, and they are listed in order of decreasing frequency:

- *neck (soft tissue)*
- *extremities*
- *bone mineral densitometry*
- *urography*
- *high-resolution chest (for interstitial disease)*
- *radiation-therapy treatment planning*
- *dental study*
- *biopsy*
- *appendix*
- *shoulder*
- *chest (for pulmonary embolism)*
- *cardiac CT angiography* [4]

For examinations in this group, data are provided when available and are presented in stratified forms when sufficient data from such strata are reported.[4] For example, only hospitals report that they do the shoulder exam in helical-scanning mode, and no other strata are presented.

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[4] Technique and dose-index data obtained from two facilities doing cardiac CT angiography are not included in this summary because the data are significantly discrepant from values generally associated with this examination (Coles et al. 2006).

For each category of routine adult CT examination or procedure done with the most frequently used CT unit at each facility, statistics are presented for three classes of variables:

> (1) Workload data including number of scout views and frequency of various contrast phases

> (2) CT-unit clinical settings and exam-protocol techniques

> (3) Dosimetric quantities associated with the clinical settings and protocols

Surveyor measurements

Surveyors measured x-ray exposure at the isocenter free-in-air

  (1) With the filtration typical for head exams, and
  (2) Separately with the filtration typical for body exams.

$CTDI_{free\ air}$ was evaluated from the free-in-air measurements. It is tabulated because it is the index most closely related to the inherent radiation output of a CT unit apart from how such radiation would be mediated by the presence of a phantom as a scattering and absorbing medium.

Surveyors also measured x-ray exposure in a polymethyl methacrylate (PMMA) head dosimetry phantom (with head filtration) in

  (3) The central hole (along the axis of rotation) and in
  (4) A peripheral hole.

$CTDI_{100,central}$, $CTDI_{100,peripheral}$, $CTDI_w$, and $CTDI_{vol}$ were evaluated from the head-phantom measurements. Of these four quantities, $CTDI_{vol}$ is tabulated because it is the index most clinically relevant as it incorporates CT *pitch*, whereas the others do not.

The following section describes in detail how these dose index evaluations and associated quantities (dose-length product and effective dose) were inferred for body as well as for head exams.

Description of tabulated variables

Each variable and its method of evaluation is described as follows in the order in which the variables appear in the tabulations. (Note: In general for each exam variable, if a CT facility did not report data sufficient to evaluate that variable, then the corresponding data of that facility for that variable were not included in the evaluation of sample statistics.)

In most cases, the number of exams per week was estimated by the facility respondent not relying on written records.

Note that the number of "exams per week" refers to the number of exams, procedures, or studies, not necessarily to the number of unique individual patients undergoing the procedures. For example, if Mr. Smith has an abdomen+pelvis exam on Monday and then a follow-up abdomen+pelvis on Thursday, the facility would count his procedures as contributing 2 patient exams per week to their total in the abdomen+pelvis exam category, even though only one particular individual (Mr. Smith) was involved. Second example: if Mr. Smith had only one abdomen+pelvis exam that week (on Monday) and Mr. Jones had only one abdomen+pelvis exam that week also (say on Thursday), then the facility would count their procedures as contributing 2 patient exams per week to their total in the abdomen+pelvis exam category. In this second example, two different people were involved in a total of 2 patient exams. Third example: if Mr. Smith, a trauma patient, had one abdomen+pelvis exam on Tuesday and a head exam the same day, the facility would count two separate procedures, one in the abdomen+pelvis category and one in the head exam category.

If a CT facility reports *zero* weekly exams for a particular exam category, the value zero is *not* included in the evaluation of statistics for the variable "exams per week." Also, if a CT facility does not report any information about the number of exams it does, it is not counted in the statistics. In other words, "**Exams per week**" refers to the number of exams per week per most frequently used CT unit per facility *in facilities actually doing those kinds of exams*.

Also referred to as "scanograms" or "topograms," "scout" views are captured at fixed positions (i.e., no rotation) of the x-ray source and detectors while the table moves. One or more scout views typically precede each examination or procedure so that patient anatomy can be previewed in order to facilitate setting anatomically appropriate boundaries on scanning.

f_{nc}

Fraction (estimated by facility respondent) of the weekly number of exams (of a particular category) completed in **one phase** of scanning with **no contrast medium** injected into the patient.

f_c

Fraction (estimated by facility respondent) of the weekly number of exams (of a particular category) completed in **one phase** of scanning **with contrast medium** injected into the patient.

f_{cnc}

Fraction (estimated by facility respondent) of the weekly number of exams (of a particular category) completed in **two phases** of scanning, **with and without contrast medium** injected into the patient.

It is assumed for simplicity that most kinds of examinations or procedures are completed in one of three and only three ways: (1) entirely without contrast, (2) entirely with contrast, and (3) in two phases, namely, with and without contrast. Furthermore, for each category it is assumed that *not all* the exams are done the same way, but that a fraction falls into each of these three categories. Respondents were therefore asked to constrain their estimates of these contrast-phase fractions so that

$$f_{nc} + f_c + f_{cnc} = 1. \qquad\qquad \text{(Equation 1.1)}$$

For example, for abdomen+pelvis exams, what fraction per week at a particular facility is done in one phase only, namely, without any contrast whatsoever? What fraction is done in one phase only, but with contrast? What fraction is done in two phases, with and without contrast? Procedures involving two phases yield twice the patient dose as procedures involving a single phase because after scanning without contrast *the entire region is typically scanned a second time* following injection of contrast medium.

kVp

Peak x-ray tube potential typically applied during the examination, reported by the facility respondent.

mA

X-ray tube current typically applied during the examination, reported by the facility respondent.

time (s) per rotation

Time per single rotation of the x-ray source-detector assembly typically applied during the examination, reported by the facility respondent.

mAs per rotation

X-ray tube current-time product per single rotation of the x-ray source-detector assembly, characteristic of the examination, evaluated as the product of *mA* and the *time per rotation*, reported by the facility respondent. (Note: true mAs per rotation, not mAs per rotation divided by the pitch, was evaluated for this analysis.)

> **slices per contrast phase**
>
> Number (reported by facility respondent) of tomographic images (tomograms, "slices") typically obtained during a single contrast-phase of an exam and associated with scanning over length **L**.

Each image ("slice") corresponds to a tomographic cross section of a volume at a particular axial location along the axis of rotation (z-axis).

> **reconstruction increment (mm)**
>
> In helical scanning, the typical spatial interval (reported by the facility respondent) along the axis of rotation (z-axis) at which successive images are reconstructed.

Each image ("slice") corresponds to a tomographic cross section of a volume interpolated for a particular axial location along the axis of rotation (z-axis).

> **slices per rotation (n)**
>
> Typical number of distinct tomographic images (associated with tomographic sections or "slices") acquired simultaneously per single rotation of the x-ray source-detector assembly.

The value of **n** was either reported by surveyors or facility respondents, or it was inferred from the identification of the CT system model (as a single-slice unit, or, for example, from its date of manufacture) and from slice-width and table-increment or table-feed information.

> **slice width (T, mm)**
>
> Nominal thickness (reported by the facility respondent) of a single tomographic section as defined by its clinical setting, indicated on the control panel, and typically used during the examination.

The nominal thickness approximates the full width at half maximum of the sensitivity profile along the axis of rotation (z-axis) of a single tomographic section centered at the system isocenter.

For CT scanners operating in multi-slice (**n > 1**) mode, **nT** represents the nominal width (x-ray field "coverage") along z of multiple, adjacent tomographic sections ("slices") simultaneously acquired in a single rotation.

> **table increment (I_{axial}, mm)**
>
> In a sequence of axial scanning, the **table increment** is the distance (reported by the facility respondent) along the axis of rotation (z-axis) through which the table moves between successive rotations of the x-ray source-detector assembly.

> **table feed per rotation ($I_{helical}$, mm)**
>
> During helical scanning, the **table feed per rotation** is the distance (reported by the facility respondent) along the axis of rotation (z-axis) at which the table moves at a constant rate per rotation of the x-ray source-detector assembly.

When the ratio $I_{axial}/(nT) = 1$, the multiple tomographic sections are acquired contiguously; when the ratio $I_{axial}/(nT) > 1$, there are spatial gaps between successive acquisitions; when the ratio $I_{axial}/(nT) < 1$, the successive acquisitions overlap each other spatially. [5] Values for I_{axial} and **T** were reported by the facility respondent, and **n** (the number of slices per rotation) was inferred as indicated in the preceding description of that variable.

For *axial* scanning, we evaluated **L** according to the following formula: [6]

$$L = I_{axial} \times \text{\textbf{slices per contrast phase}}/n - (I_{axial} - nT), \qquad \text{(Equation 1.2)}$$

where values for I_{axial}, for the number of **slices per contrast phase**, and for **T** were reported by the facility respondent, and where **n** (the number of slices per rotation) was inferred as indicated above. The **number of slices per contrast phase/n** is just the **number of rotations** done in a single phase.

For *helical* scanning, approximately 85% of those facilities reporting a scanning length provided values of **L** directly in their responses; the remaining 15% provided instead values for the number of rotations in a single phase, and in these cases we approximated **L** simply as the product of the **number of rotations** and the reported **table feed per rotation**, $I_{helical}$.

$CTDI_{free\ air}$ is formally defined as the integral (divided by **nT**) of the dose profile (with no phantom present) along the z-axis between limits of -50 mm and +50 mm with respect to the isocenter (Jessen et al. 1999),

---

[5] We apply the ratio $I_{axial}/(nT)$ to evaluate axial-scanning mode $CTDI_{vol}$ in a way consistent with the International Electrotechnical Commission definition of axial-scanning mode $CTDI_{vol}$ (IEC 2002).

[6] This formula corresponds to the one of Shrimpton et al. (p. 5, 1991) with different notation and adapted for multi-slice scanning.

and it can be practicably approximated by measuring the average air kerma free-in-air at the isocenter (Leitz et al. 1995). $CTDI_{free\ air}$ depends on the techniques (e.g., **kVp**, **mAs**) used during the examination.

For each category of examination and for each facility providing sufficient data, we estimated $CTDI_{free\ air}$ (for the clinically applied techniques) according to the following formula:

$$CTDI_{free\ air} = 0.876 \times (mAs\ per\ rotation)_{clinical} \times [X_{free\ air}/(nT \times mAs)]_{measured} \times R_{fkVp}. \quad (Eqn.\ 1.3)$$

In this formula,

0.876 (mm-mGy/mR)	is the product of the 100-mm sensitive-volume length of the ionization chamber used in the *NEXT* survey measurements and the ratio of air kerma (mGy) free-in-air to exposure (mR) (ICRU 1992).
(mAs per rotation)$_{clinical}$	is the current-time product typically used during the clinical examination, determined from the clinically applied **mA** and **time-per-rotation** values provided by the facility respondent.
$(X_{free\ air})_{measured}$ (mR)	is the exposure free-in-air measured by the *NEXT* surveyor for the facility's most frequently used CT unit. Measurements were made with a 100-mm pencil ionization chamber positioned at the isocenter, aligned along the axis of rotation, and with the CT unit operating in a single-slice, axial-scanning mode. According to the *NEXT* survey protocol (Stern et al. 2000), separate measurements of $X_{free\ air}$ were made for head versus body filtrations, and these values were applied respectively for examinations of the head and body.
$(nT)_{measured}$ (mm)	is the product of the number of simultaneous slices acquired per rotation and the nominal slice width, and it refers to the nominal "coverage" of the x-ray field along the axis of rotation selected for the measurement of $X_{free\ air}$. For the *NEXT* survey measurements, **n** was generally set to 1. With head filtration, **T** used in the measurement of $X_{free\ air}$ was that of the clinical head-exam technique, typically 5 mm or 10 mm. With body filtration, **T** used in the measurement of $X_{free\ air}$ was fixed at 5 mm.
$mAs_{measured}$	refers to the x-ray tube current-time product (per rotation) selected for the measurement of $X_{free\ air}$.
R_{fkVp}	is a normalization factor, namely, the ratio of $CTDI_{free\ air}$ (per mAs) at the clinically applied *kVp* to the $CTDI_{free\ air}$ (per mAs) at the *kVp* used for the survey measurements. For each particular examination and procedure and for each facility, we evaluated the normalization ratio R_{fkVp} from independently measured values of $CTDI_{free\ air}$ per *current-time product* versus *kVp* (ImPACT 2005), if available, for the same CT model as that used clinically. If ImPACT 2005 data were not available for the CT model used clinically, $CTDI_{free\ air}$ was not evaluated.

In order to define the clinically relevant dose indices tabulated in Part 1 of this report and described below, the following ancillary dose indices are introduced here: $CTDI_{100}$, $CTDI_{100,p}$, $CTDI_{100,c}$, $CTDI_w$.

$CTDI_{100}$ refers to the integral (divided by nT) of the dose profile along the z-axis between limits of -50 mm and +50 mm (where the dose profile is centered at z = 0, the location of the tomographic plane). Subscript "p" indicates the average of $CTDI_{100}$ measured in the four peripheral holes (equiangular at 90°) of a right-circular cylindrical dosimetry phantom whose central axis is aligned along the CT axis of rotation; subscript "c" indicates $CTDI_{100}$ measured along the phantom central axis (Leitz et al. 1995; Jessen et al. 1999; IEC 2002). Note that while the quantities $CTDI_{100,p}$ and $CTDI_{100,c}$ imply the presence of a dosimetry phantom (made of polymethyl methacrylate, PMMA) as an x-ray absorbing and scattering matrix, the medium itself to which the dose refers is **air** (not PMMA), i.e., $CTDI_{100,p}$ and $CTDI_{100,c}$ refer to energy absorbed per mass of **air** along axes of the PMMA phantom.

For exams of the head, $CTDI_{100,p}$ was approximated from exposure (X_p) values measured by *NEXT* surveyors with a 100-mm long pencil ionization chamber in the head (16-cm diameter) dosimetry phantom along a *single* peripheral axis (not an average of four values 90° apart) and from values for clinically applied technique factors provided by facility respondents:

$$CTDI_{100,p} = 0.876 \times (mAs\ per\ rotation)_{clinical} \times [X_p/(nT \times mAs)]_{measured} \times R_{pkVp}. \quad \text{(Equation 1.4)}$$

$nT_{measured}$ and $mAs_{measured}$ refer respectively to the nominal z-axis coverage by the x-ray field and the current-time product selected for measurement of X_p. R_{pkVp} is a normalization factor analogous to that described for $CTDI_{free\ air}$. In this case, however, it is the ratio of $CTDI_{100,p}$ (per mAs) at the clinically applied kVp to the $CTDI_{100,p}$ (per mAs) at the kVp used for the survey measurements. R_{pkVp} is estimated from independently measured head-phantom values of $CTDI_{100,p}$ per *current-time product* versus *kVp* (ImPACT 2005) for the same CT model as that used clinically.

An analogous expression is used for $CTDI_{100,c}$:

$$CTDI_{100,c} = 0.876 \times (mAs\ per\ rotation)_{clinical} \times [X_c/(nT \times mAs)]_{measured} \times R_{ckVp}. \quad \text{(Equation 1.5)}$$

In this case X_c refers to exposure values measured by *NEXT* surveyors with a 100-mm long pencil ionization chamber in the head phantom along the phantom central axis, and R_{ckVp} is the ratio of $CTDI_{100,c}$ (per mAs) at the clinically applied kVp to the $CTDI_{100,c}$ (per mAs) at the kVp used for the survey measurements. Again, R_{ckVp} is estimated from independently measured values, namely, head-phantom values of $CTDI_{100,c}$ per *current-time product* versus *kVp* (ImPACT 2005) for the same CT model as that used clinically.

To evaluate $CTDI_{100,p}$ and $CTDI_{100,c}$ for body exams, we used expressions analogous to those above for head exams. However, since CT head (not body) dosimetry phantoms were used in the *NEXT* survey, we applied different normalizations factors, S_{pkVp} and S_{ckVp} instead of R_{pkVp} and R_{ckVp}, respectively, in equations for $CTDI_{100,p}$ and $CTDI_{100,c}$ for body exams: S_{pkVp} is the ratio of *body-phantom* $CTDI_{100,p}$ (per mAs) at the clinically applied *kVp* to the *head-phantom* $CTDI_{100,p}$ (per mAs) at the *kVp* used for the survey measurements, where the ratio is estimated from the independently measured values contained in the ImPACT database (ImPACT 2005). S_{ckVp} is the ratio of *body-phantom* $CTDI_{100,c}$ (per mAs) at the clinically applied *kVp* to the *head-phantom* $CTDI_{100,c}$ (per mAs) at the *kVp* used for the survey measurements, where the ratio is estimated from the independently measured values contained in the ImPACT database (ImPACT 2005).

$CTDI_w$ is the "weighted" computed tomography dose index (IEC 2002), and it is formally defined as the following weighted sum (Leitz et al. 1995; Jessen et al. 1999; IEC 2002):

$$CTDI_w = (2/3)CTDI_{100,p} + (1/3)CTDI_{100,c}. \quad \text{(Equation 1.6)}$$

For an approximately linear increase in magnitude of $CTDI_{100}$ as a function of radius between the phantom central axis and phantom periphery, the preceding expression for $CTDI_w$ approximates the average dose in the central tomographic section of a cylindrical dosimetry phantom undergoing multiple and contiguous (i.e., *pitch = 1*) scans over a length of 100 mm.

$CTDI_{vol}$ approximates the dose averaged over the volume swept out in distance I_{axial} or $I_{helical}$ of table translation of the central tomographic area in a series of scans of a dosimetry phantom. Formally,

$$CTDI_{vol} = CTDI_w/[I_{axial}/(nT)] \text{ (axial)}; \quad CTDI_{vol} = CTDI_w/pitch \text{ (helical)}. \qquad \text{(Equation 1.7)}$$

For each category of examination and for each facility providing sufficient data, we evaluated $CTDI_{vol}$ in terms of $CTDI_w$ (divided by the ratio $I_{axial}/(nT)$ or the **pitch**, respectively for axial or helical scanning) according to Equation 1.7. $CTDI_w$ is given by Equation 1.6; the ratio $I_{axial}/(nT)$ or the **pitch** was evaluated from facility information (as indicated in the preceding descriptions); and $CTDI_{100,p}$ and $CTDI_{100,c}$ were evaluated respectively according to Equations 1.4 and 1.5 for head exams and according to analogous equations (as described in the paragraphs preceding Equation 1.6.) for body exams.

Note: For each particular examination and procedure and for each facility, if ImPACT 2005 data were not available to evaluate any one of the normalization ratios R_{pkVp}, R_{ckVp}, S_{pkVp}, or S_{ckVp} for the CT model used clinically, $CTDI_{vol}$ was not evaluated; nor was $CTDI_{vol}$ evaluated for axial scanning if the ratio $I_{axial}/(nT)$ could not be determined, nor $CTDI_{vol}$ for helical scanning if the **pitch** could not be determined.

We evaluated the dose-length product according to the following equation (EC 2004):

$$DLP = CTDI_{vol} \times L, \qquad \text{(Equation 1.8)}$$

where the factors $CTDI_{vol}$ and **L** were determined as indicated in the preceding descriptions of these variables. Notes: (1) If insufficient data were provided by a facility to determine $CTDI_{vol}$ or **L**, then **DLP** was not evaluated for that facility record. (2) For examinations of the head done in helical-scanning mode, mean values ‹**L**› rather than individual-facility values **L** were used. See the discussion in a following section of notes about the head examination.

"Effective dose" is formally defined as the weighted sum of "equivalent doses" in radiosensitive tissues or organs (ICRP 1991). "Equivalent dose" means the average absorbed dose in a tissue or organ, where the radiation quality (e.g., x-ray versus neutron radiation) is accounted for. In the summation of equivalent doses comprising the effective dose, the weighting factor for each tissue is proportional to the radiation "detriment" of the potential cancer associated with that particular kind of tissue. "Detriment" is quantified as the product the following factors: (1) the lifetime probability of fatal cancer and of severe genetic effects generated in that organ, (2) the relative amount of life lost for that type of cancer (where the average amount of life lost is ~ 15 years), (3) the relative severity (related to the lethality fraction) of that type of cancer. Since the sum comprising effective dose includes all of the radiosensitive tissues of the body, a procedure yielding effective dose value **E** carries the same radiation detriment as that associated

with a whole-body dose of equivalent value in millisieverts (mSv). Hence, the potential radiation detriments associated with different procedures irradiating different organs in the body can be directly compared to each other by assessing their respective effective doses.

For each category of CT examination or procedure and for each facility, we estimated an effective dose value E separately for axial scanning and for helical scanning by means of the following equations. (Note that if insufficient data were available from a facility to determine any single factor of these equations, then E was not evaluated for that particular CT examination and facility.) For axial scanning,

$$E = (f_{nc} + f_c + 2\, f_{cnc}) \times (L/L_{exam}) \times CTDI_{free\ air} \times (E_{n\ calc}\,/\,[I_{axial}/(nT)]); \qquad \text{(Equation 1.9)}$$

and for helical scanning,

$$E = (f_{nc} + f_c + 2\, f_{cnc}) \times (L/L_{exam}) \times CTDI_{free\ air} \times (E_{n\ calc}\,/\,pitch). \qquad \text{(Equation 1.10)}$$

$f_{nc},\ f_c,\ f_{cnc}$
are the respective fractions (described previously) of the number of exams per week done without, with, and with + without contrast medium.

L is the scanning length (mm) during a single phase of the examination, evaluated as indicated in the preceding description of this variable.

L_{exam} is a reference length (mm) covering the region of clinical interest in a single phase of the examination or procedure modeled with an anthropomorphic, mathematical phantom (Jones and Wall 1985, based on Cristy 1980) used to estimate organ doses. This length is bounded by reference "start" and "stop" locations for scanning along the z-axis. Listed in Table 1.1 are the particular start and stop locations and the values of L_{exam} used in the determination of the *normalized* effective dose $E_{n\ calc}$ (described below).

$CTDI_{free\ air}$
is the free-in-air computed tomography dose index (mGy) associated with the clinical exam, evaluated from *NEXT* survey measurements and other factors as described above.

$E_{n\ calc}$ is the *normalized* effective dose (for a single phase of CT scanning with $I_{axial}/(nT) = 1$ for axial scanning or $pitch = 1$ for helical scanning) that is associated with the particular examination, with the examination's clinical techniques, and with the CT model used at the facility. $E_{n\ calc}$ equals the effective dose E (mSv) per $CTDI_{free\ air}$ (mGy). It was evaluated by means of the *ImPACT Patient Dosimetry Calculator* (ImPACT 2005), based on organ dose calculations (Jones and Shrimpton 1991, 1993) modeling 23 types of CT scanner and irradiation condition in Monte Carlo simulations of radiation transport in the anthropomorphic, mathematical phantom (Cristy 1980) applied by Jones and Wall (1985).

For each category of examination and for each facility, $E_{n\ calc}$ was evaluated by matching the facility's most frequently used CT model and clinical kVp with the particular Monte Carlo organ-dose output set recommended by ImPACT. (When either the CT model or kVp could not be matched to the ImPACT data set, $E_{n\ calc}$ was not evaluated.) The Excel-based macro of the dosimetry calculator combines the appropriate values of organ dose from the Jones and Shrimpton database (1991, 1993) with ICRP 1991 tissue weighting factors to yield $E_{n\ calc}$.

$I_{axial}/(nT)$
is the ratio of table increment to nominal x-ray field coverage along z, described previously in more detail, evaluated by us from data reported by the facility respondent for I_{axial} and T and from the value inferred for n as indicated above.

$pitch$ is the ratio $I_{helical}/(nT)$, described previously in more detail, evaluated by us from data reported by the facility respondent for $I_{helical}$ and T and from the value inferred for n as indicated above.

Table 1.1. Phantom z-axis coordinates[1] and exam reference lengths[2] (L_{exam}) used in the evaluation of effective dose

Routine Adult-Exam Region[3]	Lower Bound (mm)	Upper Bound (mm)	L_{exam} (mm)	Source[4]
Brain	845	940	95	Lower bound: identified as the upper bound of the posterior fossa (Shrimpton et al. 1991). Upper bound: vertex (Newton et al. 1987).
Posterior Fossa	805	845	40	Shrimpton et al. 1991.
Sinus	805	870	65	Lower bound: hard palate; upper bound: top of frontal sinus (Newton et al. 1987).
Skull (facial bones, orbits, sella turcica, or complex sinuses)	750	870	120	Lower bound: hyoid bone; upper bound: supraorbital ridge (Newton et al. 1987).
Dental (maxillo-orthodontic) study	750	805	55	Lower bound: hyoid bone; upper bound: hard palate.
Cervical Spine	700	805	105	Cristy 1980.
Neck, soft tissue	690	850	160	Lower bound: clavicular heads; upper bound: inferior aspect of the sella (Wiggins (III) 2002).
Shoulders	610	690	80	Lower bound: inferior surface of glenoid; upper bound: acromioclavicular joint (Anderson and Berland 1989; Webb et al. 1991).
Thoracic Spine	350	700	350	Cristy 1980.
Heart	450	565	115	Cristy 1980.
Chest	435	675	240	Lower bound: lowest extent of diaphragm; upper bound: pulmonary apices (Goldberg et al. 1987).
Abdomen	240	435	195	Lower bound: aortic bifurcation; upper bound: top of the diaphragm (Goldberg et al. 1987).
Liver	270	430	160	Cristy 1980.
Pancreas	335	405	70	Cristy 1980.
Kidneys	270	380	110	Cristy 1980.
Lumbosacral Spine (also presumed region of bone mineral densitometry)	220	350	130	Cristy 1980.
Pelvis (also presumed region for exams of the appendix)	40	240	200	Lower bound: symphysis pubis; upper bound: iliac crest (Goldberg et al. 1987; Anderson and Berland 1989; Webb et al. 1991).

[1]Refers to the coordinate system of the reference phantom (Jones and Wall 1985) applied by Jones and Shrimpton (1991, 1993), based on the anthropomorphic, mathematical adult model of Cristy (1980), in the calculation of organ doses and normalized effective doses. In the phantom coordinate system, z = 0 locates the base of the torso, and z = 940 mm locates the apex.

[2]L_{exam} = Upper Bound minus Lower Bound. See preceding discussion on the evaluation of $E_{n\ calc}$.

[3]The lower and upper bounds for the region covered in the routine head exam as a whole are 805 mm and 940 mm, respectively (L_{head} = 135 mm); for the abodmen+pelvis (including urography), the bounds are 40 mm and 435 mm, respectively (L_{AP} = 395 mm); for the chest+abdomen+pelvis (including biopsies and radiation-therapy treatment planning), the bounds are 40 mm and 675 mm, respectively (L_{CAP} = 635 mm).

[4]For some exams we inferred z-axis bounds for L_{exam} from the results and analysis of the NRPB CT survey (Shrimpton et al. 1991). For other exams, we inferred bounds by associating anatomic landmarks identified from facility protocols or from the exam region per se with corresponding locations in the anthropomorphic, mathematical reference phantom (Cristy 1980).

Notes for particular exam regions

Head

The routine adult head exam covers the regions of the brain and posterior fossa. As approximately 63% of facilities change at least one technique factor (usually the slice width) in covering the brain versus the posterior fossa (pf), technique and dose statistics are reported separately for these two distinct regions. In addition, for the head as a *whole region*, i.e., as a single category of examination, we report workload, contrast-phase, and dose statistics as well. In this category, approximately 87% of facilities sampled use axial scanning exclusively for the head, 9% of them use helical scanning exclusively, while the remaining 4% use a combination of axial scanning for the brain and helical scanning for the posterior fossa regions. (In the tabulations that follow for the head examination as a whole region done by those facilities using the axial+helical scanning combination, we report statistics for only one variable, namely, the number of exams per week.)

Depending on whether the dosimetric and dose-related variables are intrinsically "intensive" (i.e., non-additive, e.g., $CTDI_{free\ air}$, $CTDI_{vol}$) or intrinsically "extensive" (i.e., additive, e.g., *L, DLP, E*), evaluation of dose statistics for the head region as a whole is slightly different than dosimetric evaluation for the brain and posterior fossa separately and for the other examination categories. In the case of the head exam, for *each facility record*, the clinical $CTDI_{free\ air}$ is evaluated as the weighted sum of the clinical $CTDI_{free\ air}$ corresponding to the brain region plus that corresponding to the posterior fossa region, where the respective weighting factors for the two regions are the mean observed scanning lengths *L* for the brain and posterior fossa as fractions of their summed length. The clinical $CTDI_{vol}$ for the head as a whole region is evaluated in an analogous way, i.e., as a weighted sum of the respective $CTDI_{vol}$ values corresponding to the brain and posterior fossa. On the other hand, with the exception described in the following paragraph, all *L, DLP,* and *E* values are determined *for each facility record* by simply summing their respective contributions from the brain and posterior fossa regions directly, with no weighting factors necessary.

As relatively few facilities do routine head exams for adults in the helical-scanning mode, and even fewer of these facilities reported values for *L*, the estimation of statistics for *DLP* would be limited by the number of reported values for *L*—severely limited especially for the brain region, where only one value of L was reported—were *DLP* to be evaluated for each facility record as the product $CTDI_{vol} \times L$. Instead, for head exams done in helical-scanning mode, we approximated *DLP* for each facility record as follows:

$$DLP_{brain} = CTDI_{vol,\ brain} \times (\langle L \rangle_{head} - \langle L \rangle_{pf}) \qquad \text{(Equation 1.11)}$$

$$DLP_{pf} = CTDI_{vol,\ pf} \times \langle L \rangle_{pf} \qquad \text{(Equation 1.12)}$$

$$DLP_{head} = CTDI_{vol,\ head} \times \langle L \rangle_{head}. \qquad \text{(Equation 1.13)}$$

Here $CTDI_{vol,\ brain}$, $CTDI_{vol,\ pf}$, and $CTDI_{vol,\ head}$ are the respective values of the volume *CTDI* for the brain, posterior fossa, and head as a whole, evaluated for the clinical conditions at **each** facility, as described in preceding paragraphs. $\langle L \rangle_{head}$ and $\langle L \rangle_{pf}$ correspond to the **mean** values of

scanning length, respectively for the head region as a whole and posterior fossa, where each mean is evaluated over the ensemble of facility records reporting values *L*.

Simple sinus
The facility questionnaire did not distinguish between typical positioning of the patient for this exam, namely, with the head tilted in order to obtain coronal views, versus no tilting to yield axial views, which are more commonly used in other exams. Statistics presented therefore correspond to workloads, clinical techniques, and dose indices representative of the pool of data reported for both positions without distinction. Furthermore, although the bounding values along the z-axis delimiting L_{sinus} (see preceding table) were modeled for the head with no tilt, we presume that the results for effective dose are approximately valid as well for coronal views with the head tilted.

Spine (cervical, thoracic, or lumbosacral)
The facility questionnaire did not distinguish between the cervical, thoracic, or lumbosacral regions of the spine. Statistics presented therefore correspond to workloads, clinical techniques, and dose indices representative of the pool of data reported for all three regions without distinction. However, since the relative locations of these regions of the spine are so significantly different from each other, for each facility and its reported clinical technique factors we evaluated effective dose values separately for each region. Each evaluation applied Equations 1.9 and 1.10 cited in the preceding discussion of effective dose, but with different values calculated for $E_{n\ calc}$ *(cervical),* $E_{n\ calc}$ *(thoracic),* and $E_{n\ calc}$ *(lumbosacral),* each according to the respective scanning bounds for these regions, tabulated in the preceding table.

Skull (including exams of the facial bones, orbits, sella turcica, and complex sinuses)
The facility questionnaire did not distinguish between various possible exams of the skull. All statistics presented therefore correspond to variables representative of the pool of data reported for all exams of the skull without distinction.

Extremities
Facilities reporting extremity examinations in the questionnaire did not distinguish between any of the extremities. All statistics presented therefore correspond to variables representative of the pool of data reported for all exams of the extremities without distinction. The anthropomorphic, mathematical phantom (Cristy 1980; Jones and Wall 1985) used to evaluate effective dose is not generally suitable to model exams of the extremities, and so no effective dose values were estimated for these exams.

Radiation Therapy Treatment Planning and Biopsy
Facilities reporting these kinds of examinations in the facility questionnaire did not distinguish between different body regions. All statistics presented for these examination categories therefore correspond respectively to variables representative of the pool of data without distinction reported for all exams of the radiation therapy category and separately for all exams of the biopsy category. For both exam categories the reference region used in the calculation of $E_{n\ calc}$ for the estimation of effective dose is the region of the chest+abdomen+pelvis (lower bound 40 mm; upper bound 675 mm; $L_{exam} = 635$ mm).

Table 1.2. Head exam (brain+posterior fossa), axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	27.6	27.0	1.8	0.1	3.0	7.5	20.0	40.0	79.9	190.0	222
Scouts per exam	1.07	0.25	0.02	1.00	1	1	1	1	2	2	227
f_{nc}	0.63	0.27	0.02	0.00	0.12	0.50	0.70	0.84	0.97	1.00	250
f_c	0.07	0.15	0.01	0.00	0.00	0.00	0.01	0.05	0.36	1.00	250
f_{cnc}	0.30	0.27	0.02	0.00	0.00	0.10	0.25	0.50	0.80	1.00	250
Axial brain+helical p.f. exams per week	19.2	16.2	4.3	0.2	1	6	18	31	42	56	14
kVp, mA											
Time (s) per rotation											
mAs per rotation											
Slices per contrast phase											
Slices per rotation (n)		For technique statistics, see Table 1.8 for the brain and Table 1.14 for the posterior fossa.									
Slice width (T, mm)											
Table increment (I_{axial}, mm)											
$I_{axial}/(nT)$											
L (mm)	139	19	2	85	104	130	140	150	179	192	148
$CTDI_{free\ air}$ (mGy)	90	40	3	21	37	59	83	117	160	253	182
$CTDI_{vol}$ (mGy)	63	33	3	12	26	43	58	75	110	326	161
DLP (mGy-cm)	811	354	35	186	329	587	767	1010	1480	1914	103
E (mSv)	2.1	1.1	0.1	0.6	0.8	1.3	1.8	2.5	4.5	6.2	90

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Head (brain+posterior fossa) 250 Hospitals and Other Facilities

Distribution of $CTDI_{free\ air}$ Head (brain+posterior fossa) 182 Hospitals and Other Facilities

Distribution of Effective Dose (E) Head (brain+posterior fossa) 90 Hospitals and Other Facilities
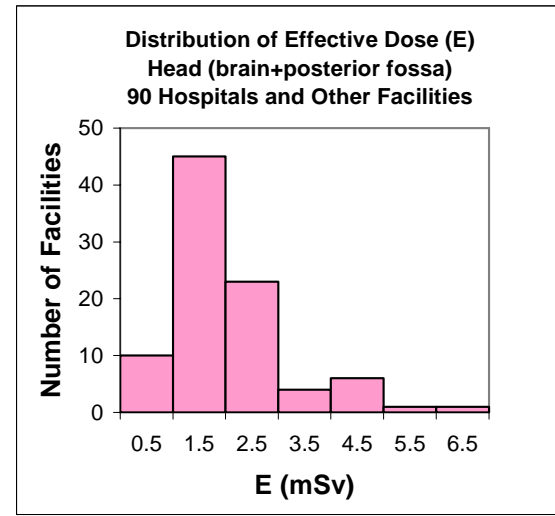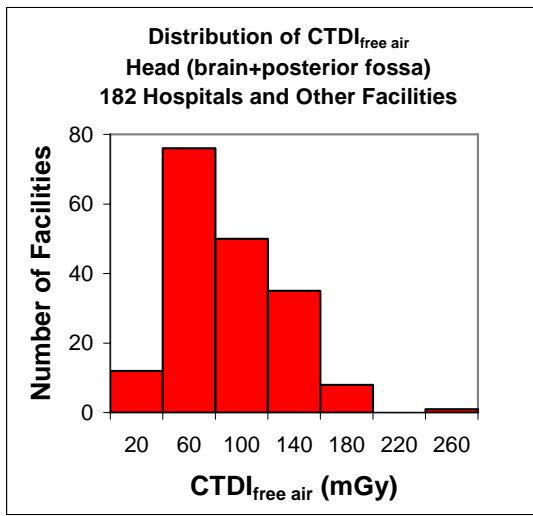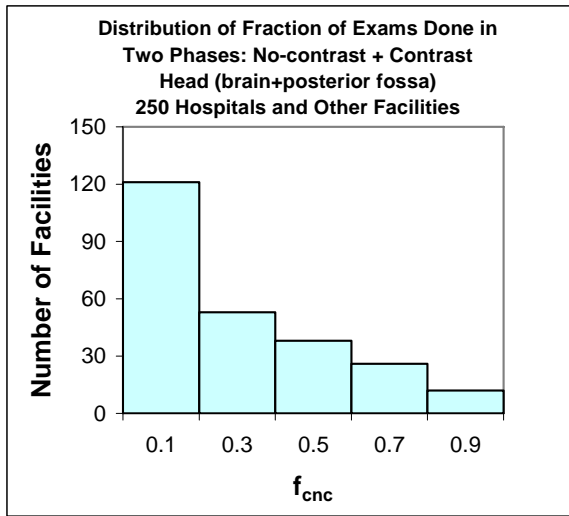
Table 1.3. Head exam (brain+posterior fossa), axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	33.2	27.5	2.2	0.1	4.0	13.5	25.0	46.8	85.0	190.0	159
Scouts per exam	1.08	0.27	0.02	1.00	1	1	1	1	2	2	166
f_{nc}	0.67	0.24	0.02	0.00	0.20	0.50	0.73	0.87	0.98	1.00	181
f_c	0.08	0.16	0.01	0.00	0.00	0.00	0.01	0.08	0.39	1.00	181
f_{cnc}	0.25	0.23	0.02	0.00	0.00	0.08	0.20	0.40	0.75	1.00	181
Axial brain+helical p.f. exams per week	19.4	16.9	4.7	0.2	1	6	18	31	43	56	13
kVp, mA											
Time (s) per rotation											
mAs per rotation											
Slices per contrast phase			For technique statistics, see Table 1.9 for the brain and Table 1.15 for the posterior fossa.								
Slices per rotation (n)											
Slice width (T, mm)											
Table increment (I_{axial}, mm)											
$I_{axial}/(nT)$											
L (mm)	140	19	2	90	113	130	140	150	173	192	112
$CTDI_{free\,air}$ (mGy)	86	35	3	29	40	57	78	110	148	186	133
$CTDI_{vol}$ (mGy)	58	22	2	12	29	42	54	72	95	116	118
DLP (mGy-cm)	791	333	37	186	355	607	743	963	1421	1914	83
E (mSv)	2.0	1.1	0.1	0.6	0.9	1.4	1.7	2.5	4.2	6.2	73

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Head (brain+posterior fossa)
181 Hospitals

Distribution of $CTDI_{free\,air}$
Head (brain+posterior fossa)
133 Hospitals

Distribution of Effective Dose (E)
Head (brain+posterior fossa)
73 Hospitals
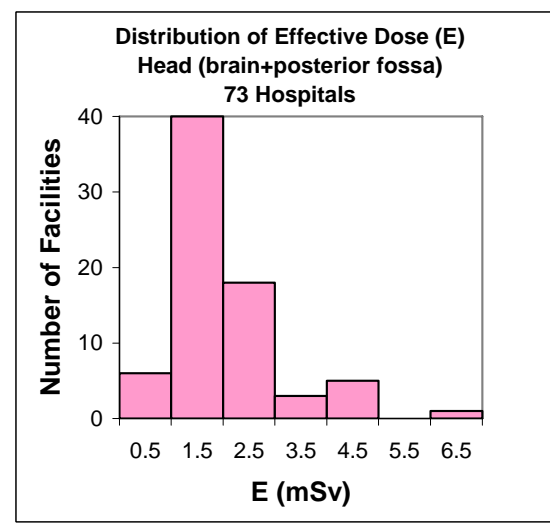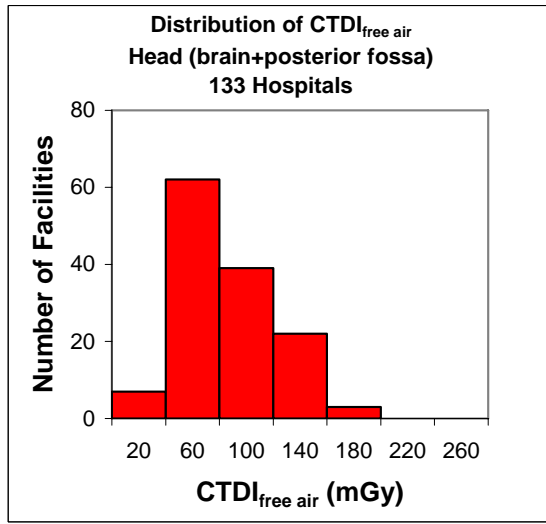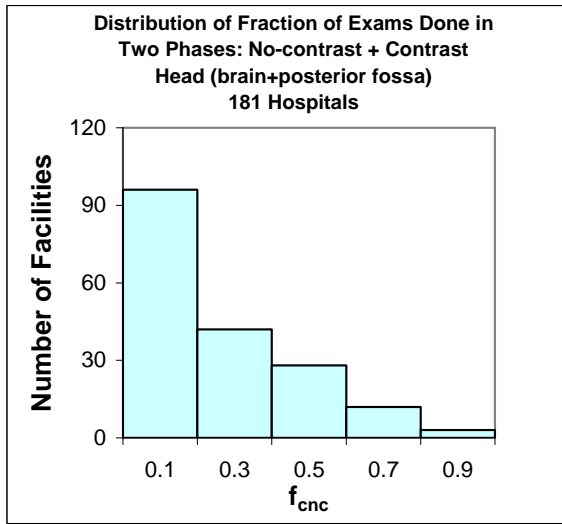
Table 1.4. Head exam (brain+posterior fossa), axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	13.4	19.6	2.5	1.0	2.0	4.0	5.5	12.3	59.7	112.9	63
Scouts per exam	1.03	0.18	0.02	1.00	1	1	1	1	1	2	61
f_{nc}	0.52	0.30	0.04	0.00	0.02	0.25	0.50	0.80	0.93	1.00	69
f_c	0.05	0.11	0.01	0.00	0.00	0.00	0.00	0.05	0.23	0.60	69
f_{cnc}	0.43	0.31	0.04	0.00	0.03	0.15	0.40	0.75	0.98	1.00	69
Axial brain+helical p.f. exams per week	17.1										1
kVp, mA											
Time (s) per rotation											
mAs per rotation											
Slices per contrast phase			For technique statistics, see Table 1.10 for the brain and Table 1.16 for the posterior fossa.								
Slices per rotation (n)											
Slice width (T, mm)											
Table increment (I_{axial}, mm)											
$I_{axial}/(nT)$											
L (mm)	137	22	4	85	94	125	138	150	180	188	36
$CTDI_{free\ air}$ (mGy)	101	50	7	21	31	65	90	137	171	253	49
$CTDI_{vol}$ (mGy)	76	50	8	15	23	51	71	89	136	326	43
DLP (mGy-cm)	892	430	96	211	320	568	901	1188	1496	1733	20
E (mSv)	2.1	1.3	0.3	0.7	0.7	1.2	1.9	2.6	4.7	5.3	17

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Head (brain+posterior fossa), 69 Facilities Other than Hospitals

Distribution of CTDI_free air Head (brain+posterior fossa)s, 49 Facilities Other than Hospitals

Distribution of Effective Dose (E) Head (brain+posterior fossa), 17 Facilities Other than Hospitals
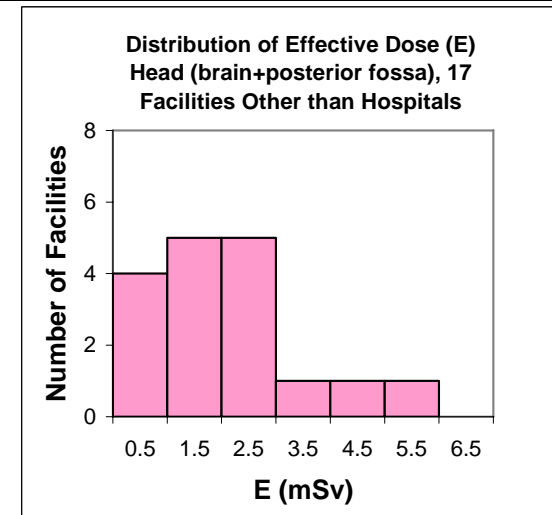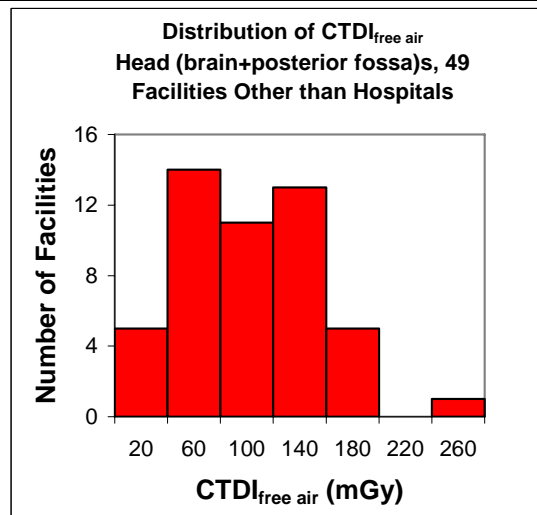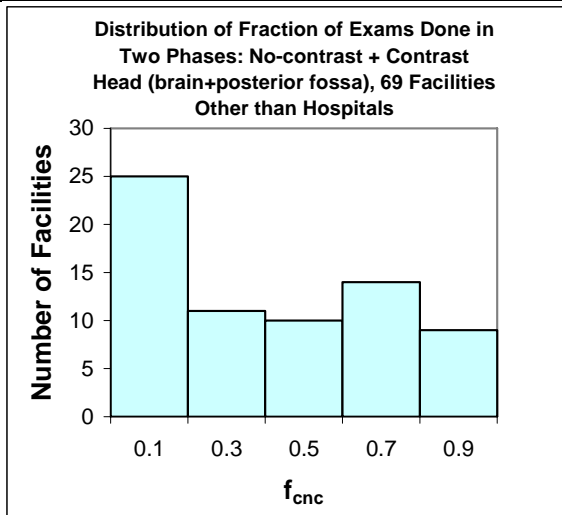
Table 1.5. Head exam (brain+posterior fossa), helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	23.3	29.4	5.6	0.3	0.6	2.2	10.2	36.5	91.3	100.0	28
Scouts per exam	1.04	0.19	0.04	1.00	1	1	1	1	1	2	28
f_{nc}	0.54	0.35	0.06	0.00	0.00	0.25	0.59	0.82	1.00	1.00	38
f_c	0.26	0.35	0.06	0.00	0.00	0.00	0.05	0.45	1.00	1.00	38
f_{cnc}	0.20	0.23	0.04	0.00	0.00	0.00	0.11	0.38	0.55	0.80	38
Axial brain+helical p.f. exams per week	21.1	18.6	4.8	0.3	1	7	18	32	57	59	15
kVp, mA											
Time (s) per rotation											
mAs per rotation											
Reconstruct. increm. (mm)			For technique statistics, see Table 1.11 for the brain and Table 1.17 for the posterior fossa.								
Slices per rotation (n)											
Slice width (T, mm)											
Table feed per rotation ($I_{helical}$, mm)											
Pitch [$I_{helical}/(nT)$]											
L (mm)	148	28	9	120	120	130	135	165	192	200	9
$CTDI_{free\ air}$ (mGy)	77	31	6	24	41	53	74	96	132	138	24
$CTDI_{vol}$ (mGy)	55	35	10	9	12	29	49	75	112	114	12
DLP (mGy-cm)	808	524	151	134	178	436	730	1113	1658	1689	12
E (mSv)	2.2	1.3	0.4	0.8	0.8	1.2	2.4	2.9	4.2	4.7	10

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Head (brain+posterior fossa)
38 Hospitals and Other Facilities

Distribution of $CTDI_{free\ air}$
Head (brain+posterior fossa)
24 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Head (brain+posterior fossa)
10 Hospitals and Other Facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.6. Head exam (brain+posterior fossa), helical scanning, hospitals only										
Exams per week	21.4	30.3	6.2	0.3	0.5	2.0	10.0	25.8	96.2	100.0	24
Scouts per exam	1.04	0.20	0.04	1.00	1	1	1	1	1	2	25
f_{nc}	0.55	0.36	0.06	0.00	0.00	0.25	0.63	0.84	1.00	1.00	34
f_c	0.27	0.36	0.06	0.00	0.00	0.00	0.05	0.45	1.00	1.00	34
f_{cnc}	0.18	0.23	0.04	0.00	0.00	0.00	0.08	0.27	0.60	0.80	34
Axial brain+helical p.f. exams per week	21.1	18.6	4.8	0.3	1	7	18	32	57	59	15
kVp, mA											
Time (s) per rotation											
***mAs* per rotation**											
Reconstruct. increm. (mm)					For technique statistics, see Table 1.12 for the brain and Table 1.18 for the posterior fossa.						
Slices per rotation (n)											
Slice width (T, mm)											
Table feed per rotation ($I_{helical}$, mm)											
Pitch [$I_{helical}/(nT)$]											
L (mm)	142	23	9	120	120	125	135	156	176	180	7
$CTDI_{free\,air}$ (mGy)	74	29	6	24	41	53	74	92	123	138	23
$CTDI_{vol}$ (mGy)	54	37	11	9	12	28	36	75	112	114	11
DLP (mGy-cm)	797	548	165	134	174	411	528	1116	1661	1689	11
E (mSv)	2.2	1.4	0.5	0.8	0.8	1.2	2.4	3.0	4.3	4.7	9

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Head (brain+posterior fossa)
34 Hospitals

Distribution of CTDI$_{free\,air}$
Head (brain+posterior fossa)
23 Hospitals

Distribution of Effective Dose (E)
Head (brain+posterior fossa)
9 Hospitals
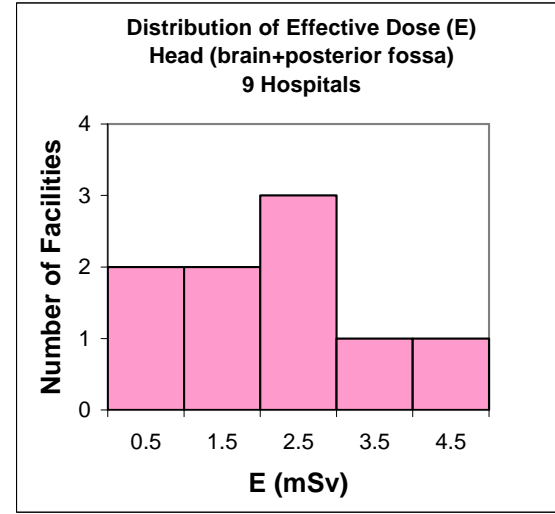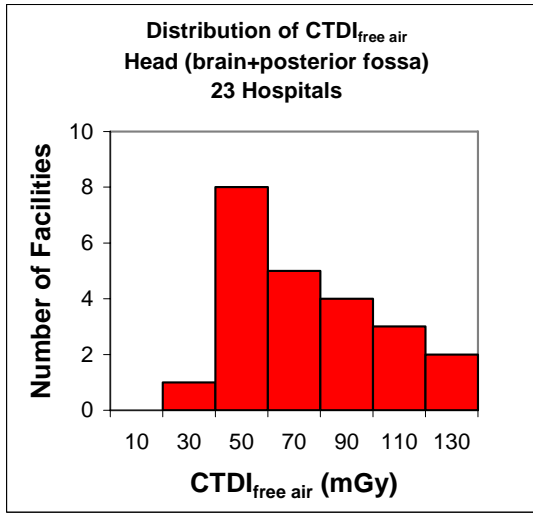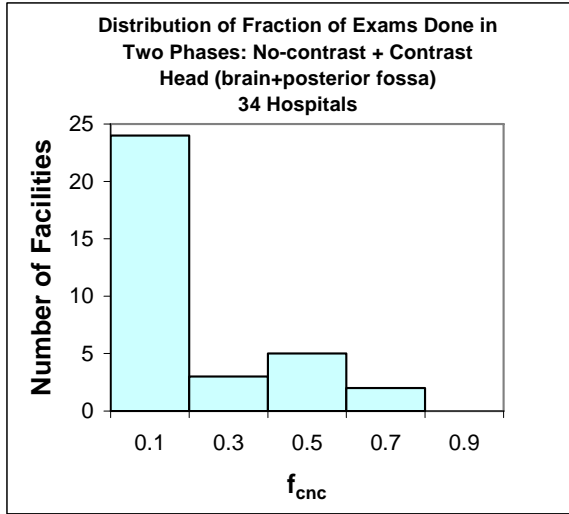
Table 1.7. Head exam (brain+posterior fossa), helical scanning, facilities other than hospitals												
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	35.3	22.8	11.4	5.0	9.5	27.5	38.0	45.8	57.2	60.0	4
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	3
f_{nc}	0.45	0.31	0.16	0.00	0.08	0.38	0.53	0.60	0.70	0.73	4
f_c	0.16	0.24	0.12	0.00	0.00	0.00	0.08	0.24	0.45	0.50	4
f_{cnc}	0.39	0.13	0.06	0.27	0.27	0.29	0.40	0.50	0.50	0.50	4
Axial brain+helical p.f. exams per week											0
kVp, mA											
Time (s) per rotation											
mAs per rotation		For technique statistics, see Table 1.13 for the brain and Table 1.19 for the posterior fossa.									
Reconstruct. increm. (mm)											
Slices per rotation (n)											
Slice width (T, mm)											
Table feed per rotation ($I_{helical}$, mm)											
Pitch [$I_{helical}/(nT)$]											
L (mm)	168	46	33	135	138	151	168	184	197	200	2
$CTDI_{free\ air}$ (mGy)	133										1
$CTDI_{vol}$ (mGy)	63										1
DLP (mGy-cm)	932										1
E (mSv)	2.5										1

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Head (brain+posterior fossa) 4 Facilities Other than Hospitals

Distribution of Scanning Length (L) Head (brain+posterior fossa) 2 Facilities Other than Hospitals

Distribution of Fraction of Exams Done in One Phase: No-contrast Head (brain+posterior fossa) 4 Facilities Other than Hospitals

23

Table 1.8. Brain region of the head exam, axial scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	For workload statistics, see Table 1.2 for the head exam as a whole.										
Scouts per exam											
f_{nc}											
f_c											
f_{cnc}											
kVp	126.6	8.4	0.5	110.0	120	120	120	130	140	140	256
mA	191	62	4	70	100	148	185	225	300	440	251
Time (s) per rotation	1.97	0.67	0.04	0.67	1.00	1.50	2.00	2.00	3.00	4.50	250
mAs per rotation	347	93	6	100	203	280	340	400	500	630	236
Slices per contrast phase	10.7	2.7	0.3	6.0	8	9	10	12	16	20	64
Slices per rotation (n)	1.15	0.61	0.04	1.00	1.0	1.0	1.0	1.0	2.0	5.0	236
Slice width (T, mm)	8.38	2.14	0.14	2.00	5.0	7.0	10.0	10.0	10.0	10.0	251
Table increment (I_{axial}, mm)	8.95	2.85	0.18	5.00	5.0	7.0	10.0	10.0	10.0	32.0	249
$I_{axial}/(nT)$	0.992	0.054	0.004	0.50	1.00	1.00	1.00	1.00	1.00	1.00	232
L (mm)	94	15	2	56	75	80	96	100	125	130	61
$CTDI_{free\ air}$ (mGy)	89	39	3	21	37	57	83	115	157	253	186
$CTDI_{vol}$ (mGy)	62	32	2	12	27	43	58	74	108	326	172
DLP (mGy-cm)	479	246	36	120	190	315	427	555	922	1271	48
E (mSv)	1.2	0.7	0.1	0.4	0.5	0.7	1.0	1.6	2.5	3.0	45

Distribution of Slice Width
Brain Region
251 Hospitals and Other Facilities

Distribution of mAs per rotation
Brain Region
236 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Brain Region
45 Hospitals and Other Facilities
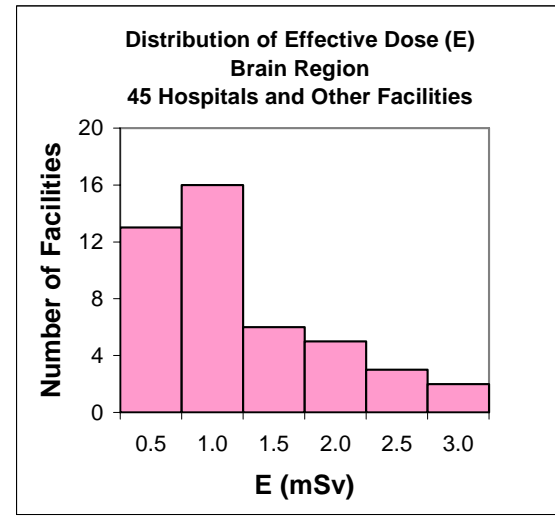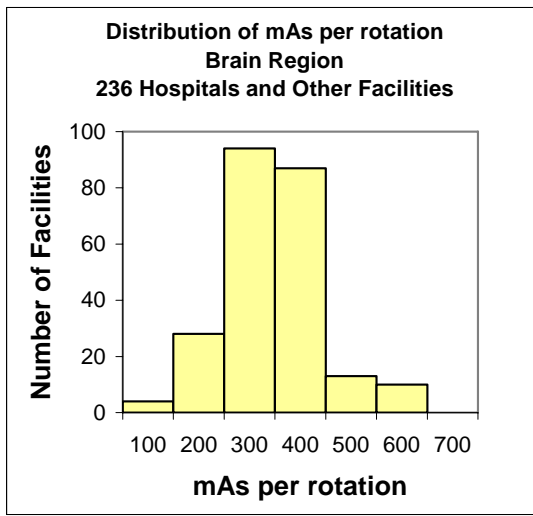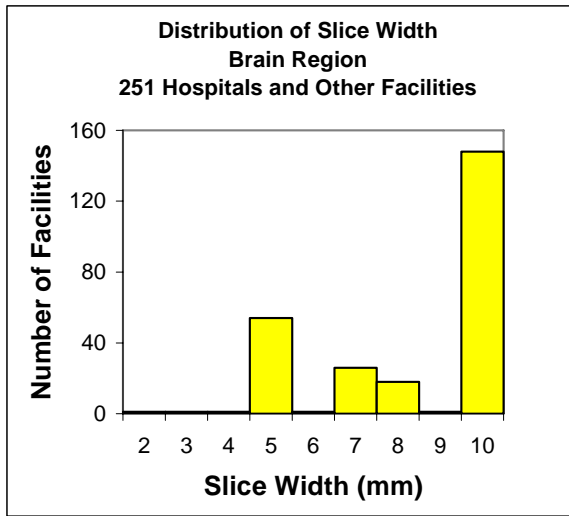
Table 1.9. Brain region of the head exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week											
Scouts per exam											
f_{nc}				For workload statistics, see Table 1.3 for the head exam as a whole.							
f_c											
f_{cnc}											
kVp	126.6	8.5	0.6	110.0	120	120	120	134	140	140	184
mA	200	61	4	80	105	160	200	250	300	400	182
Time (s) per rotation	1.87	0.62	0.05	0.67	1.00	1.50	2.00	2.00	3.00	4.50	180
mAs per rotation	344	84	6	140	206	281	340	400	500	600	169
Slices per contrast phase	10.6	2.7	0.4	6.0	8	9	10	12	16	20	50
Slices per rotation (n)	1.18	0.64	0.05	1.00	1.0	1.0	1.0	1.0	2.0	4.0	168
Slice width (T, mm)	8.27	2.15	0.16	3.00	5.0	7.0	10.0	10.0	10.0	10.0	180
Table increment (I_{axial}, mm)	9.00	3.17	0.24	5.00	5.0	7.0	10.0	10.0	12.1	32.0	178
$I_{axial}/(nT)$	0.99	0.05	0.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	164
L (mm)	92	15	2	56	74	80	90	100	121	130	47
$CTDI_{free\ air}$ (mGy)	86	35	3	29	40	57	79	110	145	186	136
$CTDI_{vol}$ (mGy)	58	22	2	12	29	42	55	71	99	116	126
DLP (mGy-cm)	466	212	34	167	211	322	423	542	832	1112	38
E (mSv)	1.2	0.6	0.1	0.4	0.5	0.7	1.0	1.6	2.4	2.8	35

Distribution of Slice Width
Brain Region
180 Hospitals

Distribution of mAs per rotation
Brain Region
169 Hospitals

Distribution of Effective Dose (E)
Brain Region
35 Hospitals
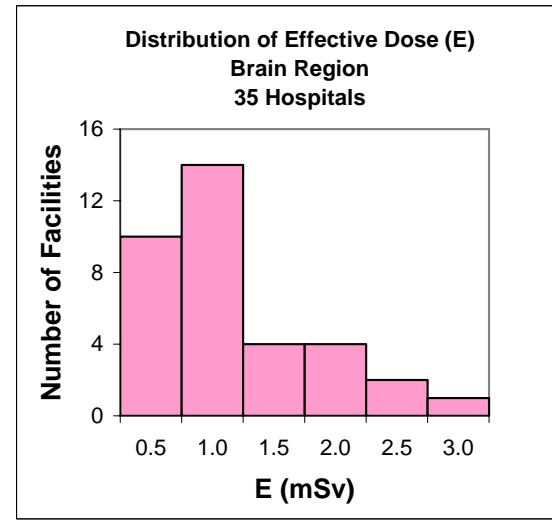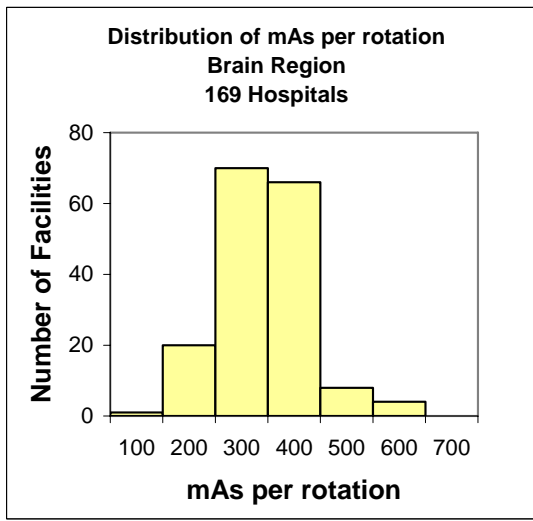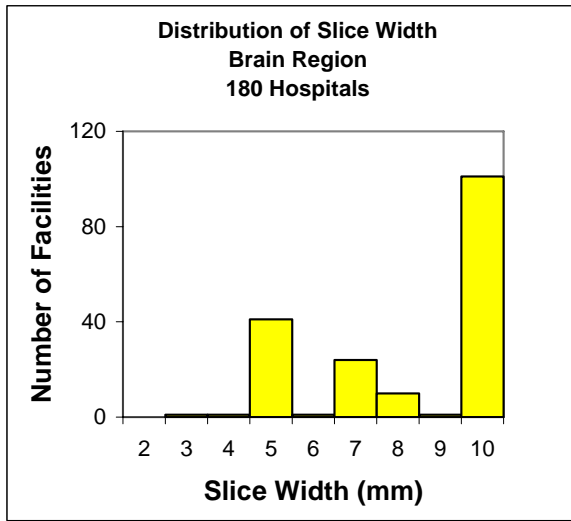
Table 1.10. Brain region of the head exam, axial scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week											
Scouts per exam											
f_{nc}		For workload statistics, see Table 1.4 for the head exam as a whole.									
f_c											
f_{cnc}											
kVp	126.5	8.0	0.9	120.0	120	120	120	130	140	140	72
mA	166	59	7	70	84	130	160	200	256	440	69
Time (s) per rotation	2.24	0.74	0.09	1.00	1.00	2.00	2.00	2.98	3.44	4.10	70
mAs per rotation	354	112	14	100	200	280	340	400	574	630	67
Slices per contrast phase	10.8	3.0	0.8	8.0	8	9	10	11	15	20	14
Slices per rotation (n)	1.09	0.51	0.06	1.00	1.0	1.0	1.0	1.0	1.0	5.0	68
Slice width (T, mm)	8.68	2.10	0.25	2.00	5.0	8.0	10.0	10.0	10.0	10.0	71
Table increment (I_{axial}, mm)	8.85	1.85	0.22	5.00	5.0	8.0	10.0	10.0	10.0	10.0	71
$I_{axial}/(nT)$	0.99	0.07	0.01	0.50	1.00	1.00	1.00	1.00	1.00	1.00	68
L (mm)	99	14	4	80	80	92	100	108	117	130	14
$CTDI_{free\ air}$ (mGy)	99	50	7	21	31	64	89	135	171	253	50
$CTDI_{vol}$ (mGy)	73	49	7	15	23	48	67	85	134	326	46
DLP (mGy-cm)	528	358	113	120	167	276	441	655	1130	1271	10
E (mSv)	1.4	0.9	0.3	0.4	0.5	0.8	1.2	2.0	2.8	3.0	10

Distribution of Slice Width
Brain Region
71 Facilities Other than Hospitals

Distribution of mAs per rotation
Brain Region
67 Facilities Other than Hospitals

Distribution of Effective Dose (E)
Brain Region
10 Facilities Other than Hospitals
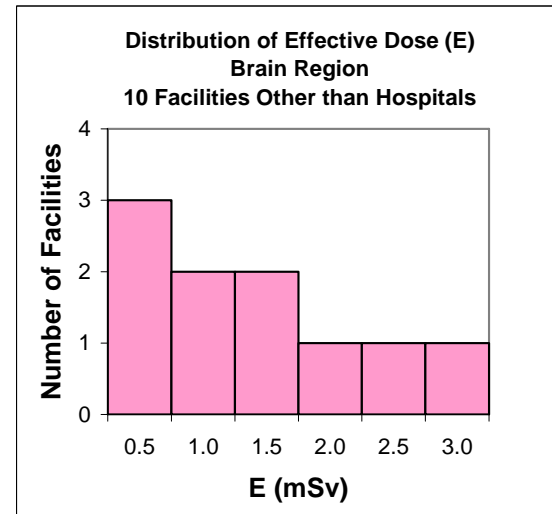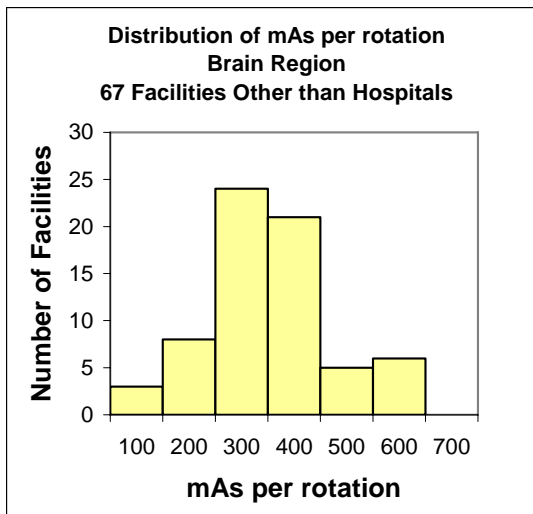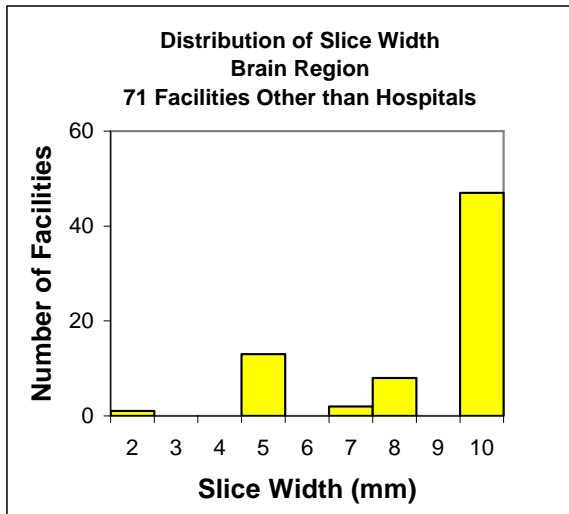
Table 1.11. Brain region of the head exam, helical scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week											
Scouts per exam											
f_{nc}	For workload statistics, see Table 1.5. for the head exam as a whole.										
f_c											
f_{cnc}											
kVp	129.6	9.0	1.5	120.0	120	120	130	140	140	140	37
mA	204	62	10	63	128	170	200	250	275	400	36
Time (s) per rotation	1.40	0.38	0.07	0.75	1.00	1.00	1.50	1.50	2.00	2.00	33
mAs per rotation	278	75	14	120	143	250	275	315	400	400	31
Reconstruct. increm. (mm)	6.4	2.3	0.6	4.0	4	5	5	8	10	10	17
Slices per rotation (n)	1.32	0.94	0.18	1.00	1.0	1.0	1.0	1.0	4.0	4.0	28
Slice width (T, mm)	4.92	2.57	0.45	2.00	2.0	2.0	5.0	5.0	10.0	10.0	33
Table feed per rotation ($I_{helical}$, mm)	6.15	3.80	0.71	2.00	2.5	3.0	5.0	8.0	14.1	16.8	29
Pitch [$I_{helical}/(nT)$]	1.11	0.44	0.11	0.65	0.76	0.95	1.00	1.00	1.80	2.50	15
L (mm)	125										1
$CTDI_{free\ air}$ (mGy)	77	31	6	24	41	52	74	102	132	138	24
$CTDI_{vol}$ (mGy)	55	35	10	12	13	29	49	75	112	114	12
DLP (mGy-cm)	575	368	106	122	139	309	517	790	1175	1197	12
E (mSv)	1.6	0.9	0.3	0.6	0.6	0.8	1.7	2.1	3.1	3.4	10

Distribution of Slice Width
Brain Region
33 Hospitals and Other Facilities

Distribution of mAs per rotation
Brain Region
31 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Brain Region
10 Hospitals and Other Facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.12. Brain region of the head exam, helical scanning, hospitals only											
Exams per week											
Scouts per exam											
f_{nc}	For workload statistics, see Table 1.6 for the head exam as a whole.										
f_c											
f_{cnc}											
kVp	129.9	9.3	1.6	120.0	120	120	130	140	140	140	34
mA	210	58	10	90	144	171	200	250	275	400	33
Time (s) per rotation	1.36	0.37	0.07	0.75	1.00	1.00	1.50	1.50	2.00	2.00	31
mAs per rotation	279	68	13	135	158	250	275	309	390	400	29
Reconstruct. increm. (mm)	6.3	2.3	0.6	4.0	4	5	5	8	10	10	15
Slices per rotation (n)	1.35	0.98	0.19	1.00	1.0	1.0	1.0	1.0	4.0	4.0	26
Slice width (T, mm)	4.82	2.50	0.46	2.00	2.0	2.0	5.0	5.0	10.0	10.0	30
Table feed per rotation ($I_{helical}$, mm)	6.31	3.88	0.75	2.00	2.5	3.5	5.0	8.4	14.6	16.8	27
Pitch [$I_{helical}/(nT)$]	1.12	0.46	0.12	0.65	0.75	0.93	1.00	1.00	1.85	2.50	14
L (mm)	125										1
$CTDI_{free\ air}$ (mGy)	75	30	6	24	41	52	74	98	123	138	23
$CTDI_{vol}$ (mGy)	54	37	11	12	13	28	36	75	112	114	11
DLP (mGy-cm)	567	385	116	122	137	291	374	791	1177	1197	11
E (mSv)	1.6	1.0	0.3	0.6	0.6	0.8	1.7	2.2	3.1	3.4	9

Distribution of Slice Width
Brain Region
30 Hospitals

Distribution of mAs per rotation
Brain Region
29 Hospitals

Distribution of Effective Dose (E)
Brain Region
9 Hospitals
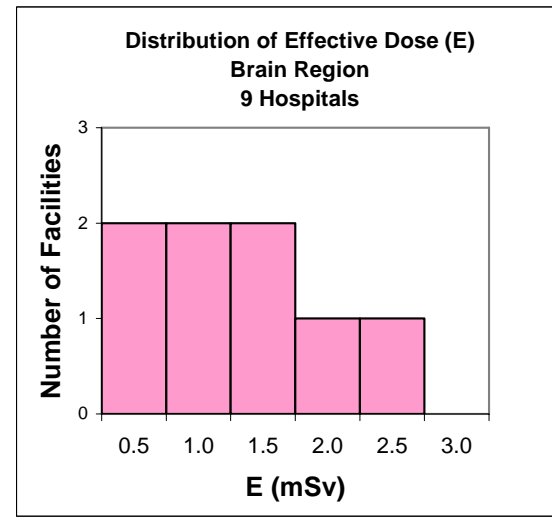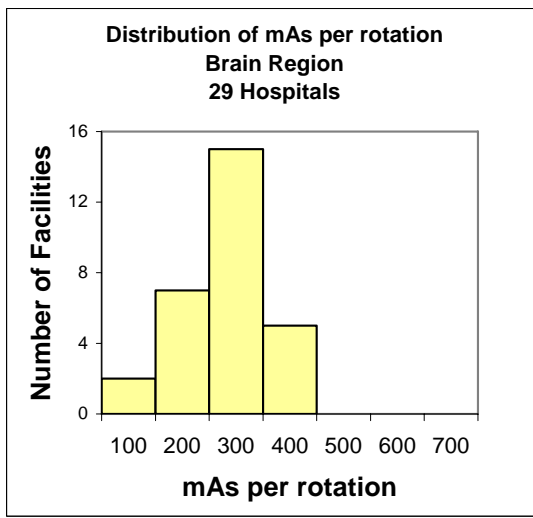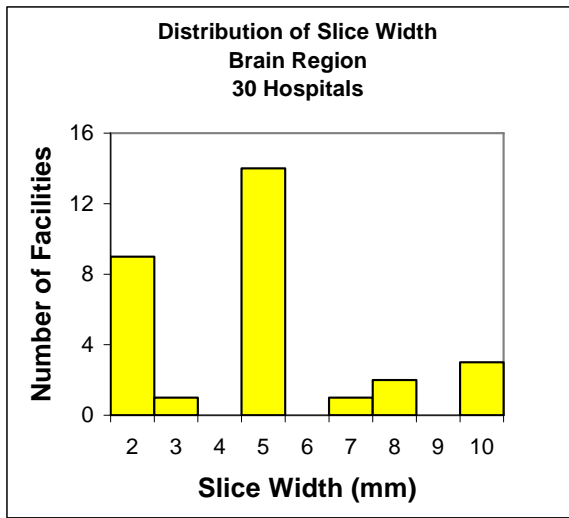
Table 1.13. Brain region of the head exam, helical scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week											
Scouts per exam	For workload statistics, see Table 1.7 for the head exam as a whole.										
f_{nc}											
f_c											
f_{cnc}											
kVp	126.7	5.8	3.3	120.0	121	125	130	130	130	130	3
mA	134	69	40	63	71	102	140	170	194	200	3
Time (s) per rotation	1.95	0.07	0.05	1.90	1.91	1.93	1.95	1.98	2.00	2.00	2
mAs per rotation	260	198	140	120	134	190	260	330	386	400	2
Reconstruct. increm. (mm)	7.5	3.5	2.5	5.0	5	6	8	9	10	10	2
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	2
Slice width (T, mm)	6.00	3.61	2.08	3.00	3.2	4.0	5.0	7.5	9.5	10.0	3
Table feed per rotation ($I_{helical}$, mm)	4.00	1.41	1.00	3.00	3.1	3.5	4.0	4.5	4.9	5.0	2
Pitch [$I_{helical}/(nT)$]	1.00										1
L (mm)											0
$CTDI_{free\ air}$ (mGy)	133										1
$CTDI_{vol}$ (mGy)	63										1
DLP (mGy-cm)	661										1
E (mSv)	1.8										1

Distribution of Slice Width
Brain Region
3 Facilities Other than Hospitals

Distribution of mAs per rotation
Brain Region
2 Facilities Other than Hospitals

Distribution of mA
Brain Region
3 Facilities Other than Hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.14. Posterior fossa region of the head exam, axial scanning, hospitals and other facilities											
Exams per week											
Scouts per exam											
f_{nc}			For workload statistics, see Table 1.2 for the head exam as a whole.								
f_c											
f_{cnc}											
kVp	127.6	8.7	0.5	110.0	120	120	120	140	140	140	255
mA	193	64	4	70	102	150	197	225	300	475	250
Time (s) per rotation	1.98	0.70	0.04	0.67	1.00	1.50	2.00	2.00	3.00	5.00	249
mAs per rotation	353	112	7	100	208	282	340	400	552	1283	235
Slices per contrast phase	11.4	4.9	0.6	5.0	6	8	10	13	24	27	63
Slices per rotation (n)	1.17	0.64	0.04	1.00	1.0	1.0	1.0	1.0	2.0	5.0	235
Slice width (T, mm)	5.58	2.07	0.13	2.00	3.0	5.0	5.0	5.0	10.0	10.0	251
Table increment (I_{axial}, mm)	6.14	3.23	0.21	1.00	3.0	5.0	5.0	7.0	10.0	32.0	244
$I_{axial}/(nT)$	1.00	0.10	0.01	0.50	1.00	1.00	1.00	1.00	1.00	2.00	225
L (mm)	46	10	1	25	30	40	45	54	60	70	59
$CTDI_{free\ air}$ (mGy)	92	42	3	21	37	61	86	118	170	253	185
$CTDI_{vol}$ (mGy)	64	34	3	12	25	43	58	75	112	326	167
DLP (mGy-cm)	268	145	21	59	81	153	274	335	510	769	46
E (mSv)	0.7	0.7	0.1	0.1	0.2	0.3	0.6	0.7	1.6	3.7	36

Distribution of Slice Width
Posterior Fossa Region
251 Hospitals and Other Facilities

Distribution of mAs per rotation
Posterior Fossa Region
235 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Posterior Fossa Region
36 Hospitals and Other Facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.15. Posterior fossa region of the head exam, axial scanning, hospitals only											
Exams per week											
Scouts per exam											
f_{nc}				For workload statistics, see Table 1.3 for the head exam as a whole.							
f_c											
f_{cnc}											
kVp	127.8	8.9	0.7	110.0	120	120	120	140	140	140	183
mA	201	60	4	80	105	170	200	250	300	400	181
Time (s) per rotation	1.88	0.66	0.05	0.67	1.00	1.50	2.00	2.00	3.00	5.00	179
mAs per rotation	348	86	7	165	213	296	340	400	500	650	168
Slices per contrast phase	12.2	5.1	0.7	5.0	6	9	11	14	24	27	49
Slices per rotation (n)	1.20	0.69	0.05	1.00	1.0	1.0	1.0	1.0	3.0	4.0	167
Slice width (T, mm)	5.59	2.12	0.16	2.00	3.0	5.0	5.0	5.0	10.0	10.0	180
Table increment (I_{axial}, mm)	6.35	3.65	0.28	1.00	3.0	5.0	5.0	7.5	10.6	32.0	175
$I_{axial}/(nT)$	1.01	0.11	0.01	0.63	1.00	1.00	1.00	1.00	1.00	2.00	160
L (mm)	47	11	2	25	30	40	45	55	60	70	45
CTDI$_{free\ air}$ (mGy)	88	36	3	29	39	58	80	112	154	186	135
CTDI$_{vol}$ (mGy)	59	23	2	12	28	42	55	73	105	116	122
DLP (mGy-cm)	265	122	20	74	97	155	274	323	485	558	36
E (mSv)	0.7	0.7	0.1	0.2	0.2	0.3	0.6	0.8	1.1	3.7	27

Distribution of Slice Width
Posterior Fossa Region
180 Hospitals

Distribution of mAs per rotation
Posterior Fossa Region
168 Hospitals

Distribution of Effective Dose (E)
Posterior Fossa Region
27 Hospitals
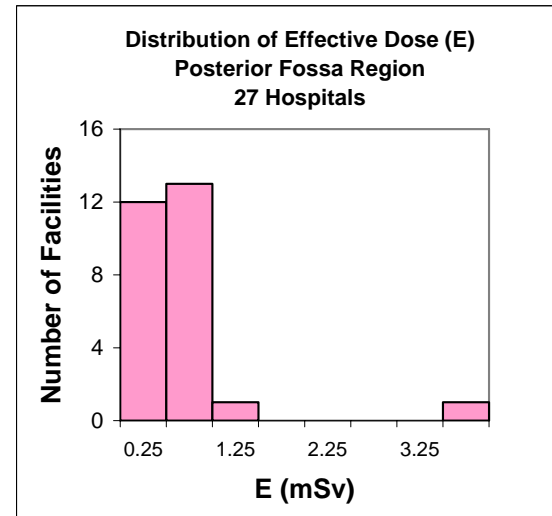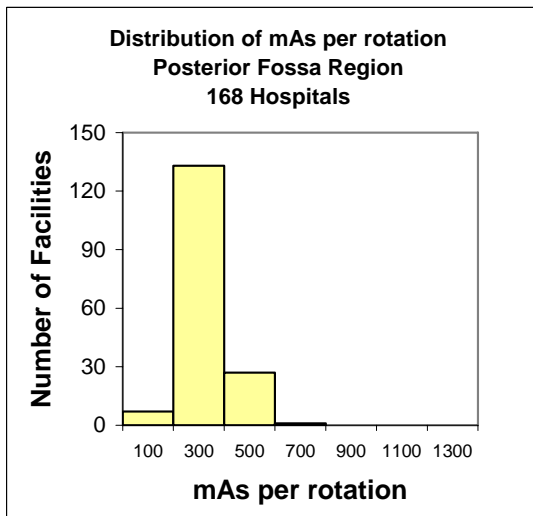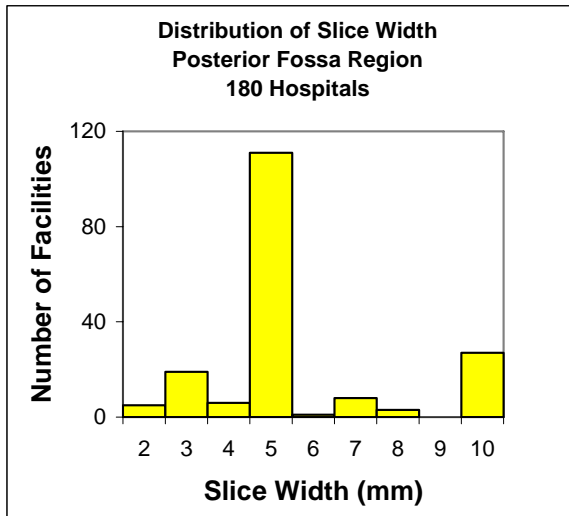
Table 1.16. Posterior fossa region of the head exam, axial scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week											
Scouts per exam											
f_{nc}	For workload statistics, see Table 1.4 for the head exam as a whole.										
f_c											
f_{cnc}											
kVp	127.1	8.2	1.0	120.0	120	120	120	131	140	140	72
mA	172	70	8	70	84	130	163	200	282	475	69
Time (s) per rotation	2.24	0.75	0.09	1.00	1.00	2.00	2.00	2.98	3.44	4.10	70
mAs per rotation	368	160	20	100	200	280	340	410	600	1283	67
Slices per contrast phase	8.9	2.7	0.7	5.0	6	8	8	10	13	16	14
Slices per rotation (n)	1.09	0.51	0.06	1.00	1.0	1.0	1.0	1.0	1.0	5.0	68
Slice width (T, mm)	5.57	1.94	0.23	2.00	3.0	5.0	5.0	5.0	10.0	10.0	71
Table increment (I_{axial}, mm)	5.59	1.70	0.20	3.00	3.0	5.0	5.0	5.0	10.0	10.0	69
$I_{axial}/(nT)$	0.99	0.07	0.01	0.50	1.00	1.00	1.00	1.00	1.00	1.00	65
L (mm)	41	9	2	25	28	40	40	45	54	60	14
$CTDI_{free\ air}$ (mGy)	104	54	8	21	31	65	91	137	190	253	50
$CTDI_{vol}$ (mGy)	77	52	8	15	23	51	69	87	147	326	45
DLP (mGy-cm)	282	217	69	59	73	117	243	347	631	769	10
E (mSv)	0.7	0.8	0.3	0.1	0.2	0.3	0.5	0.7	1.9	2.8	9

Distribution of Slice Width
Posterior Fossa Region
71 Facilities Other than Hospitals

Distribution of mAs per rotation
Posterior Fossa Region
67 Facilities Other than Hospitals

Distribution of Effective Dose (E)
Posterior Fossa Region
9 Facilities Other than Hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.17. Posterior fossa region of the head exam, helical scanning, hospitals and other facilities											
Exams per week											
Scouts per exam											
f_{nc}	For workload statistics, see Table 1.5 for the head exam as a whole.										
f_c											
f_{cnc}											
kVp	129.2	8.9	1.4	120.0	120	120	130	140	140	140	39
mA	206	63	10	63	130	170	200	250	275	400	37
Time (s) per rotation	1.38	0.39	0.07	0.75	1.00	1.00	1.50	1.50	2.00	2.00	34
mAs per rotation	274	73	13	120	143	250	275	302	400	400	32
Reconstruct. increm. (mm)	5.3	2.0	0.4	2.0	3	4	5	5	10	10	25
Slices per rotation (n)	1.33	0.92	0.17	1.00	1.0	1.0	1.0	1.0	4.0	4.0	30
Slice width (T, mm)	4.25	2.01	0.33	2.00	2.0	2.0	5.0	5.0	7.5	10.0	38
Table feed per rotation ($I_{helical}$, mm)	5.64	4.02	0.70	2.00	2.0	3.0	5.0	5.0	16.0	16.8	33
Pitch [$I_{helical}/(nT)$]	1.15	0.49	0.10	0.40	0.69	1.00	1.00	1.00	2.34	2.50	26
L (mm)	43	11	4	24	29	36	40	48	58	60	9
$CTDI_{free\,air}$ (mGy)	76	31	6	24	41	53	74	94	131	138	25
$CTDI_{vol}$ (mGy)	52	31	7	3	14	31	43	69	110	114	21
DLP (mGy-cm)	223	135	29	12	63	136	187	299	476	492	21
E (mSv)	0.6	0.3	0.1	0.2	0.2	0.2	0.7	0.8	1.1	1.3	17

Distribution of Slice Width
Posterior Fossa Region
38 Hospitals and Other Facilities

Distribution of mAs per rotation
Posterior Fossa Region
32 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Posterior Fossa Region
17 Hospitals and Other Facilities
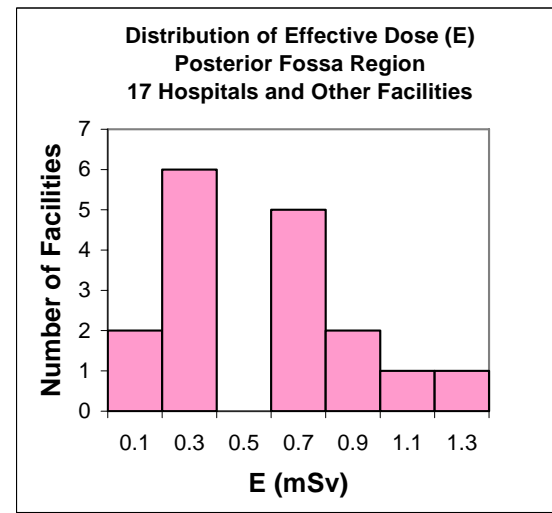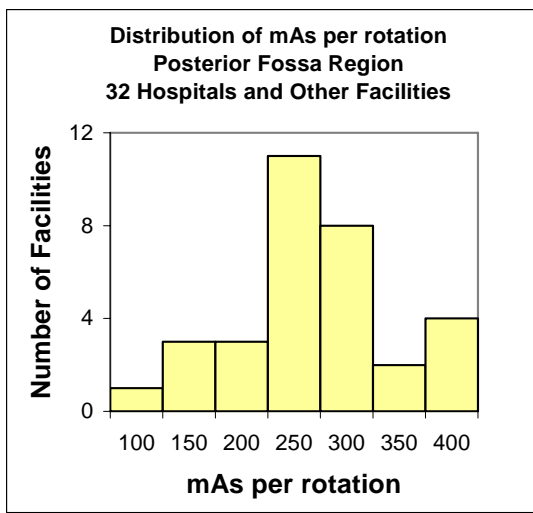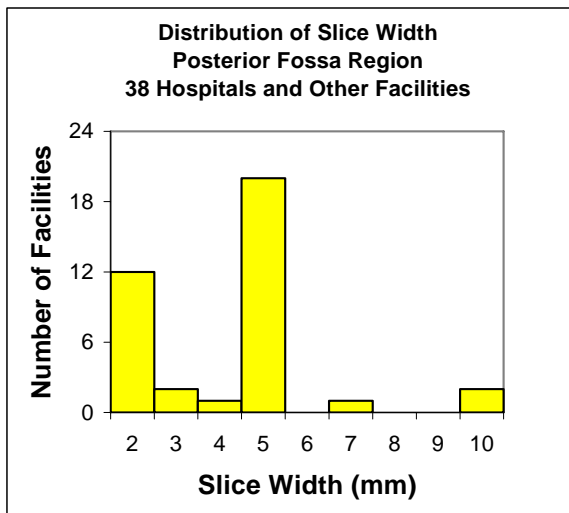
Table 1.18. Posterior fossa region of the head exam, helical scanning, hospitals only											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week											
Scouts per exam			For workload statistics, see Table 1.6 for the head exam as a whole.								
f_{nc}											
f_c											
f_{cnc}											
kVp	129.4	9.2	1.5	120.0	120	120	129	140	140	140	36
mA	212	59	10	90	140	171	200	250	275	400	34
Time (s) per rotation	1.34	0.38	0.07	0.75	1.00	1.00	1.50	1.50	2.00	2.00	32
mAs per rotation	275	66	12	135	159	250	275	300	397	400	30
Reconstruct. increm. (mm)	5.1	1.9	0.4	2.0	3	4	5	5	10	10	23
Slices per rotation (n)	1.36	0.95	0.18	1.00	1.0	1.0	1.0	1.0	4.0	4.0	28
Slice width (T, mm)	4.24	2.08	0.35	2.00	2.0	2.0	5.0	5.0	7.9	10.0	35
Table feed per rotation ($I_{helical}$, mm)	5.74	4.13	0.74	2.00	2.0	3.0	5.0	5.0	16.0	16.8	31
Pitch [$I_{helical}/(nT)$]	1.16	0.50	0.10	0.40	0.68	1.00	1.00	1.00	2.38	2.50	25
L (mm)	43	11	4	24	29	36	40	48	58	60	9
$CTDI_{free\ air}$ (mGy)	74	29	6	24	41	53	68	90	123	138	24
$CTDI_{vol}$ (mGy)	51	32	7	3	14	31	39	71	110	114	20
DLP (mGy-cm)	220	138	31	12	60	135	171	305	477	492	20
E (mSv)	0.6	0.3	0.1	0.2	0.2	0.2	0.5	0.8	1.1	1.3	16

Distribution of Slice Width
Posterior Fossa Region
35 Hospitals

Distribution of mAs per rotation
Posterior Fossa Region
30 Hospitals

Distribution of Effective Dose (E)
Posterior Fossa Region
16 Hospitals
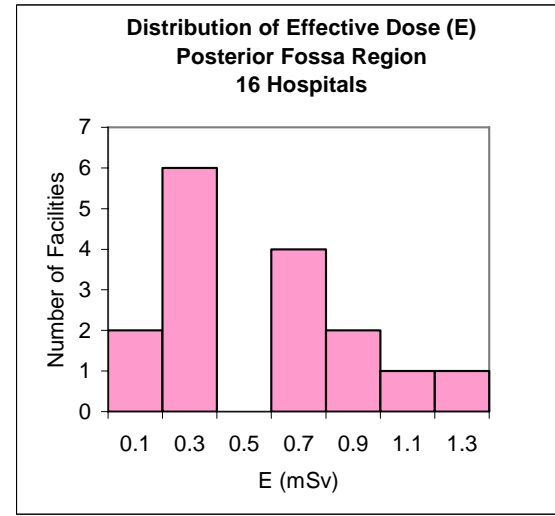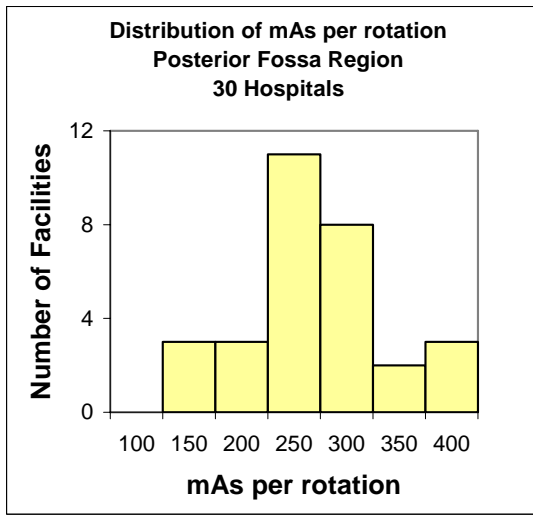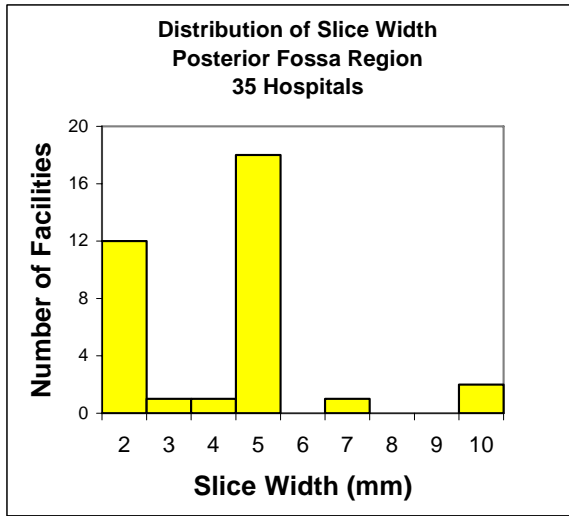
Table 1.19. Posterior fossa region of the head exam, helical scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	For workload statistics, see Table 1.7 for the head exam as a whole.										
Scouts per exam											
f_{nc}											
f_c											
f_{cnc}											
kVp	126.7	5.8	3.3	120.0	121	125	130	130	130	130	3
mA	134	69	40	63	71	102	140	170	194	200	3
Time (s) per rotation	1.95	0.07	0.05	1.90	1.91	1.93	1.95	1.98	2.00	2.00	2
mAs per rotation	260	198	140	120	134	190	260	330	386	400	2
Reconstruct. increm. (mm)	7.5	3.5	2.5	5.0	5	6	8	9	10	10	2
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	2
Slice width (T, mm)	4.33	1.15	0.67	3.00	3.2	4.0	5.0	5.0	5.0	5.0	3
Table feed per rotation ($I_{helical}$, mm)	4.00	1.41	1.00	3.00	3.1	3.5	4.0	4.5	4.9	5.0	2
Pitch [$I_{helical}/(nT)$]	1.00										1
L (mm)											0
$CTDI_{free\,air}$ (mGy)	133										1
$CTDI_{vol}$ (mGy)	63										1
DLP (mGy-cm)	272										1
E (mSv)	0.7										1

Distribution of Slice Width
Posterior Fossa Region
3 Facilities Other than Hospitals

Distribution of mAs per rotation
Posterior Fossa Region
2 Facilities Other than Hospitals

Distribution of mA
Posterior Fossa Region
3 Facilities Other than Hospitals

35

Table 1.20. Abdomen+pelvis exam, axial scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	13.1	16.4	2.0	0.5	1.0	4.0	7.5	18.0	46.4	90.0	69
Scouts per exam	1.09	0.29	0.03	1.00	1	1	1	1	2	2	90
f_{nc}	0.17	0.25	0.03	0.00	0.00	0.01	0.05	0.20	0.73	1.00	66
f_c	0.49	0.40	0.05	0.00	0.00	0.01	0.50	0.90	1.00	1.00	66
f_{cnc}	0.35	0.39	0.05	0.00	0.00	0.00	0.13	0.74	1.00	1.00	66
kVp	123.1	6.0	0.7	120.0	120	120	120	120	140	140	80
mA	187	64	7	70	110	140	170	225	281	400	80
Time (s) per rotation	1.96	0.81	0.09	0.75	1.00	1.08	2.00	2.10	3.04	4.50	80
mAs per rotation	314	92	11	100	200	250	300	375	464	630	71
Slices per contrast phase	47.0	10.1	1.2	32.5	35	40	45	51	65	80	72
Slices per rotation (n)	1.04	0.34	0.04	1.00	1.0	1.0	1.0	1.0	1.0	4.0	78
Slice width (T, mm)	9.52	1.26	0.14	5.00	7.0	10.0	10.0	10.0	10.0	11.0	86
Table increment (I_{axial}, mm)	9.77	1.37	0.15	6.00	7.0	10.0	10.0	10.0	10.0	16.0	80
$I_{axial}/(nT)$	1.01	0.12	0.01	0.80	1.00	1.00	1.00	1.00	1.00	1.60	72
L (mm)	460	107	13	280	350	400	440	500	669	800	66
$CTDI_{free\ air}$ (mGy)	76	39	6	19	27	49	73	88	126	248	41
$CTDI_{vol}$ (mGy)	26	24	4	6	7	15	22	29	37	170	43
DLP (mGy-cm)	990	406	66	276	332	717	923	1341	1610	1868	38
E (mSv)	21.5	12.3	2.3	4.6	7.2	13.9	17.3	24.5	47.4	50.8	30

Distribution of Fraction of Exams Done in Two Phases: Contrast + No-contrast Abdomen+Pelvis 66 Hospitals and Other Facilities

Distribution of mAs Abdomen+Pelvis 71 Hospitals and Other Facilities

Distribution of Effective Dose (E) Abdomen+Pelvis 30 Hospitals and Other Facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.21. Abdomen+pelvis exam, axial scanning, hospitals only											
Exams per week	15.9	19.6	3.0	0.5	1.0	4.0	8.0	20.0	49.9	90.0	43
Scouts per exam	1.14	0.35	0.05	1.00	1	1	1	1	2	2	58
f_{nc}	0.17	0.24	0.04	0.00	0.00	0.01	0.05	0.25	0.53	1.00	39
f_c	0.54	0.39	0.06	0.00	0.00	0.11	0.64	0.90	1.00	1.00	39
f_{cnc}	0.29	0.35	0.06	0.00	0.00	0.00	0.10	0.50	0.96	1.00	39
kVp	122.6	6.2	0.9	120.0	120	120	120	120	140	140	50
mA	200	67	9	110	125	140	200	250	289	400	52
Time (s) per rotation	1.90	0.86	0.12	0.75	1.00	1.00	2.00	2.00	3.44	4.50	50
mAs per rotation	312	80	12	165	200	258	280	383	440	480	44
Slices per contrast phase	48.8	11.4	1.7	35.0	36	40	45	60	67	80	43
Slices per rotation (n)	1.06	0.43	0.06	1.00	1.0	1.0	1.0	1.0	1.0	4.0	49
Slice width (T, mm)	9.38	1.38	0.19	5.00	6.7	10.0	10.0	10.0	10.0	11.0	55
Table increment (I_{axial}, mm)	9.65	1.49	0.21	6.00	7.0	10.0	10.0	10.0	10.0	16.0	49
$I_{axial}/(nT)$	1.00	0.09	0.01	0.80	1.00	1.00	1.00	1.00	1.00	1.50	44
L (mm)	478	119	19	280	350	400	450	570	678	800	39
$CTDI_{free\ air}$ (mGy)	70	28	6	19	29	48	73	86	111	126	23
$CTDI_{vol}$ (mGy)	22	10	2	6	7	15	21	29	37	42	26
DLP (mGy-cm)	1024	434	92	276	456	747	873	1405	1663	1868	22
E (mSv)	20.7	11.7	2.9	9.9	10.1	14.5	17.3	21.0	47.6	50.8	16

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Abdomen+Pelvis
39 Hospitals

Distribution of mAs
Abdomen+Pelvis
44 Hospitals

Distribution of Effective Dose (E)
Abdomen+Pelvis
16 Hospitals

Table 1.22. Abdomen+pelvis exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	8.5	7.1	1.4	1.0	1.0	3.3	7.3	10.8	19.5	30.0	26
Scouts per exam	1.02	0.09	0.02	1.00	1	1	1	1	1	2	32
f_{nc}	0.16	0.27	0.05	0.00	0.00	0.01	0.05	0.18	0.85	1.00	27
f_c	0.41	0.42	0.08	0.00	0.00	0.00	0.33	0.85	0.99	1.00	27
f_{cnc}	0.43	0.44	0.09	0.00	0.00	0.00	0.25	0.92	1.00	1.00	27
kVp	124.1	5.8	1.1	120.0	120	120	120	130	132	140	30
mA	162	51	10	70	90	130	165	178	250	300	28
Time (s) per rotation	2.06	0.71	0.13	1.00	1.00	1.90	2.00	2.10	3.00	4.20	30
mAs per rotation	317	110	21	100	179	250	312	354	510	630	27
Slices per contrast phase	44.2	7.0	1.3	32.5	35	40	44	47	58	60	29
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	29
Slice width (T, mm)	9.76	0.99	0.18	5.00	8.8	10.0	10.0	10.0	10.0	10.0	31
Table increment (I_{axial}, mm)	9.95	1.14	0.21	7.50	8.0	10.0	10.0	10.0	10.0	15.0	31
$I_{axial}/(nT)$	1.03	0.15	0.03	0.80	1.00	1.00	1.00	1.00	1.33	1.60	28
L (mm)	434	82	16	319	333	388	440	450	570	700	27
$CTDI_{free\ air}$ (mGy)	83	50	12	22	26	58	75	97	147	248	18
$CTDI_{vol}$ (mGy)	31	37	9	7	7	17	27	29	62	170	17
DLP (mGy-cm)	942	374	94	296	328	664	1042	1216	1406	1568	16
E (mSv)	22.3	13.4	3.6	4.6	4.9	14.3	17.2	34.5	41.8	48.1	14

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen+Pelvis, 27 Facilities Other than Hospitals

Distribution of mAs Abdomen+Pelvis, 27 Facilities Other than Hospitals

Distribution of Effective Dose (E) Abdomen+Pelvis, 14 Facilities Other than Hospitals

Table 1.23. Abdomen+pelvis exam, helical scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	29.3	26.2	2.2	0.7	5.0	10.0	21.0	39.0	82.8	145.0	137
Scouts per exam	1.29	0.46	0.04	1.00	1	1	1	2	2	2	167
f_{nc}	0.20	0.21	0.02	0.00	0.00	0.05	0.15	0.30	0.60	1.00	142
f_c	0.52	0.36	0.03	0.00	0.00	0.11	0.60	0.85	0.99	1.00	142
f_{cnc}	0.28	0.34	0.03	0.00	0.00	0.01	0.10	0.50	0.97	1.00	142
kVp	122.9	6.2	0.5	120.0	120	120	120	120	140	140	162
mA	225	60	5	80	125	200	240	260	300	400	159
Time (s) per rotation	1.09	0.33	0.03	0.50	0.75	1.00	1.00	1.00	1.90	2.00	143
mAs per rotation	235	71	6	65	124	200	240	269	328	600	138
Reconstruct. increm. (mm)	7.6	1.8	0.2	2.0	5	7	8	9	10	10	122
Slices per rotation (n)	1.12	0.58	0.05	1.00	1.0	1.0	1.0	1.0	1.0	4.0	132
Slice width (T, mm)	7.90	1.67	0.13	5.00	5.0	7.0	8.0	10.0	10.0	11.0	159
Table feed per rotation ($I_{helical}$, mm)	10.04	4.03	0.34	1.75	6.9	7.0	10.0	12.0	15.0	42.0	139
Pitch [$I_{helical}/(nT)$]	1.21	0.35	0.03	0.63	0.90	1.00	1.00	1.50	1.63	3.00	115
L (mm)	457	83	10	301	349	400	449	500	611	700	74
$CTDI_{free air}$ (mGy)	59	28	3	8	20	39	52	74	111	136	98
$CTDI_{vol}$ (mGy)	17	9	1	2	6	12	16	19	35	46	83
DLP (mGy-cm)	777	373	60	90	372	504	760	952	1513	1981	39
E (mSv)	13.7	7.1	1.2	1.3	4.4	8.7	13.0	17.7	28.2	29.7	37

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen+Pelvis, 142 Hospitals and Other Facilities

Distribution of mAs per rotation Abdomen+Pelvis, 138 Hospitals and Other Facilities

Distribution of Effective Dose (E) Abdomen+Pelvis, 37 Hospitals and Other Facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	31.6	26.7	2.5	0.7	5.5	14.0	25.0	40.0	85.5	145.0	111
Scouts per exam	1.33	0.47	0.04	1.00	1	1	1	2	2	2	135
f_{nc}	0.21	0.21	0.02	0.00	0.00	0.05	0.15	0.30	0.60	1.00	113
f_c	0.54	0.36	0.03	0.00	0.00	0.17	0.64	0.85	0.97	1.00	113
f_{cnc}	0.25	0.32	0.03	0.00	0.00	0.01	0.07	0.40	0.94	1.00	113
kVp	123.0	6.3	0.6	120.0	120	120	120	120	140	140	131
mA	228	58	5	80	125	200	240	260	300	400	130
Time (s) per rotation	1.09	0.34	0.03	0.50	0.75	1.00	1.00	1.00	2.00	2.00	114
mAs per rotation	237	73	7	65	128	200	240	275	348	600	111
Reconstruct. increm. (mm)	7.5	1.8	0.2	2.0	5	7	7	8	10	10	101
Slices per rotation (n)	1.15	0.64	0.06	1.00	1.0	1.0	1.0	1.0	1.8	4.0	106
Slice width (T, mm)	7.72	1.67	0.15	5.00	5.0	7.0	7.0	10.0	10.0	11.0	129
Table feed per rotation ($I_{helical}$, mm)	10.01	4.30	0.40	1.75	5.6	7.0	10.0	12.0	15.0	42.0	113
Pitch [$I_{helical}/(nT)$]	1.22	0.37	0.04	0.63	0.90	1.00	1.00	1.50	1.83	3.00	93
L (mm)	461	86	11	301	350	400	450	513	603	700	59
$CTDI_{free\ air}$ (mGy)	58	28	3	8	21	39	51	72	111	136	77
$CTDI_{vol}$ (mGy)	16	9	1	2	5	11	15	19	31	46	67
DLP (mGy-cm)	718	342	61	90	296	485	711	910	1033	1981	31
E (mSv)	12.1	5.7	1.1	1.3	4.9	7.6	11.2	15.5	19.5	28.4	29

Table 1.24. Abdomen+pelvis exam, helical scanning, hospitals only

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen+Pelvis, 113 Hospitals

Distribution of mAs per rotation Abdomen+Pelvis, 111 Hospitals

Distribution of Effective Dose (E) Abdomen+Pelvis, 29 Hospitals

Table 1.25. Abdomen+pelvis exam, helical scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	19.5	21.8	4.3	2.0	4.3	7.0	10.5	20.0	72.5	90.0	26
Scouts per exam	1.16	0.37	0.07	1.00	1	1	1	1	2	2	32
f_{nc}	0.16	0.20	0.04	0.00	0.00	0.02	0.10	0.20	0.41	1.00	29
f_c	0.44	0.38	0.07	0.00	0.00	0.00	0.50	0.75	0.99	1.00	29
f_{cnc}	0.40	0.37	0.07	0.00	0.00	0.01	0.25	0.75	0.98	1.00	29
kVp	122.6	5.8	1.0	120.0	120	120	120	120	135	140	31
mA	214	72	13	83	113	159	240	250	312	400	29
Time (s) per rotation	1.10	0.31	0.06	0.75	0.75	1.00	1.00	1.50	1.50	1.90	29
mAs per rotation	228	62	12	112	114	197	250	253	300	375	27
Reconstruct. increm. (mm)	8.1	1.7	0.4	5.0	5	7	8	10	10	10	21
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	26
Slice width (T, mm)	8.70	1.47	0.27	5.00	6.7	7.6	9.3	10.0	10.0	10.0	30
Table feed per rotation ($I_{helical}$, mm)	10.13	2.54	0.50	7.00	7.0	8.1	10.0	10.0	15.0	15.0	26
Pitch [$I_{helical}/(nT)$]	1.16	0.24	0.05	0.80	1.00	1.00	1.00	1.43	1.50	1.59	22
L (mm)	440	68	18	348	348	400	440	460	539	630	15
$CTDI_{free air}$ (mGy)	62	30	7	20	20	38	54	84	103	131	21
$CTDI_{vol}$ (mGy)	19	8	2	8	10	13	18	20	36	37	16
DLP (mGy-cm)	1007	421	149	393	514	793	880	1258	1616	1681	8
E (mSv)	19.6	8.9	3.2	4.5	6.9	15.2	19.1	28.1	29.2	29.7	8

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen+Pelvis, 29 Facilities Other than Hospitals

Distribution of mAs per rotation Abdomen+Pelvis, 27 Facilities Other than Hospitals

Distribution of Effective Dose (E) Abdomen+Pelvis, 8 Facilities Other than Hospitals
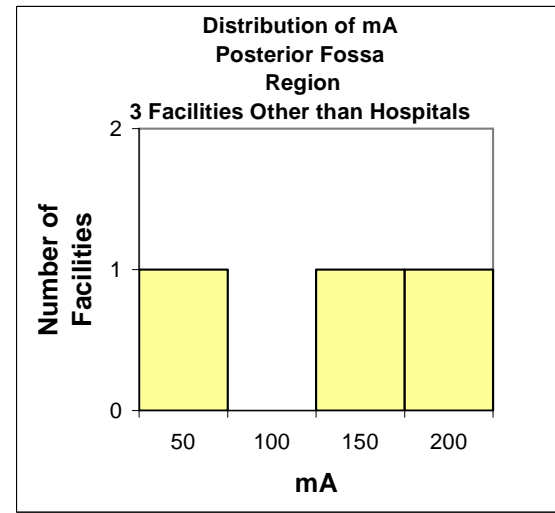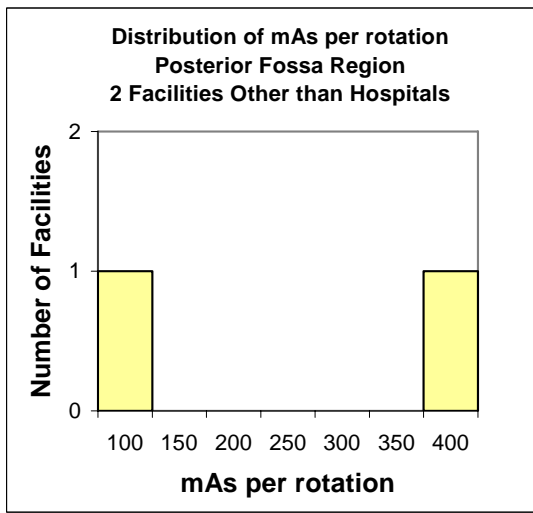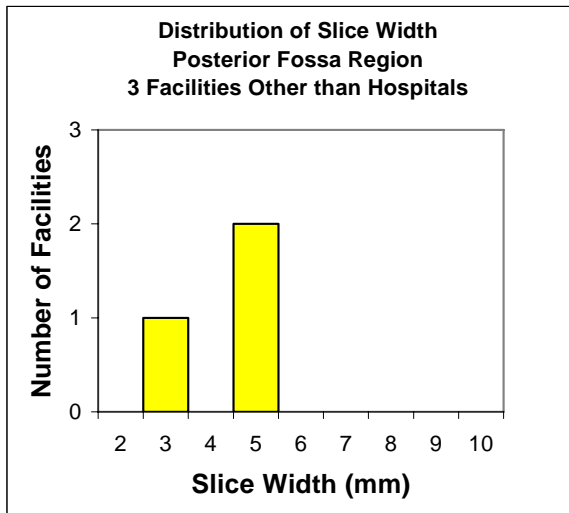
Table 1.26. Chest exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	7.4	10.6	1.3	0.1	1.0	1.5	4.5	10.0	20.0	70.0	65
Scouts per exam	1.10	0.30	0.03	1.00	1	1	1	1	2	2	89
f_{nc}	0.28	0.35	0.04	0.00	0.00	0.01	0.10	0.48	1.00	1.00	66
f_c	0.57	0.41	0.05	0.00	0.00	0.05	0.77	0.95	1.00	1.00	66
f_{cnc}	0.15	0.33	0.04	0.00	0.00	0.00	0.00	0.02	1.00	1.00	66
kVp	123.9	6.9	0.8	120.0	120	120	120	130	140	140	82
mA	176	58	6	70	110	130	160	200	280	400	82
Time (s) per rotation	1.84	0.69	0.08	0.75	1.00	1.00	2.00	2.00	3.00	4.00	81
mAs per rotation	292	102	12	100	176	234	264	351	480	630	74
Slices per contrast phase	33.4	9.4	1.1	10.0	23	28	32	38	51	65	73
Slices per rotation (n)	1.06	0.36	0.04	1.00	1.0	1.0	1.0	1.0	1.0	4.0	82
Slice width (T, mm)	9.01	1.68	0.18	2.00	5.0	8.0	10.0	10.0	10.0	10.0	86
Table increment (I_{axial}, mm)	9.58	2.57	0.28	5.00	7.0	8.0	10.0	10.0	10.0	20.0	82
$I_{axial}/(nT)$	1.00	0.07	0.01	0.80	1.00	1.00	1.00	1.00	1.00	1.50	74
L (mm)	304	66	8	210	227	260	300	343	400	600	64
$CTDI_{free\ air}$ (mGy)	71	41	6	18	23	43	67	88	127	248	46
$CTDI_{vol}$ (mGy)	24	23	3	6	7	15	20	29	38	170	48
DLP (mGy-cm)	630	314	49	163	199	401	570	778	1158	1355	41
E (mSv)	13.2	9.4	1.7	2.3	4.2	7.4	9.7	15.2	35.4	37.5	31

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest
66 Hospitals and Other Facilities

Distribution of mAs per rotation Chest
74 Hospitals and Other Facilities

Distribution of Effective Dose (E) Chest
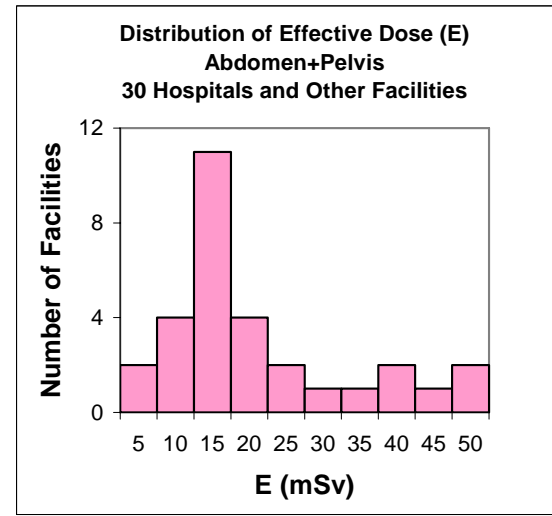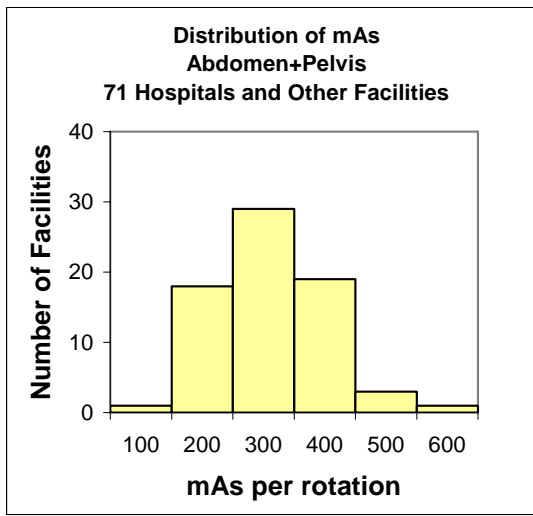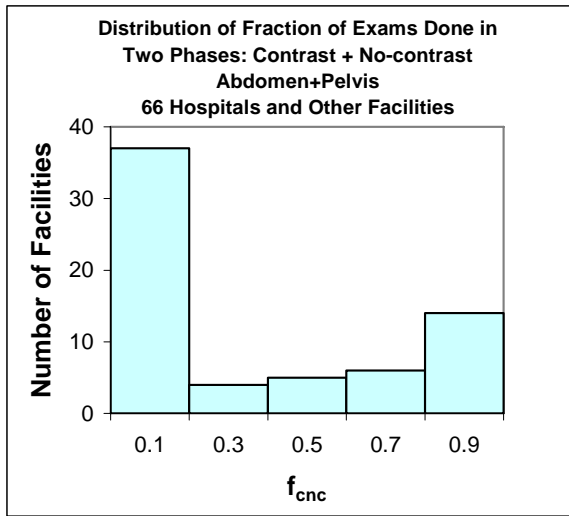31 Hospitals and Other Facilities

42

Table 1.27. Chest exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	8.6	12.9	2.0	1.0	1.0	1.2	5.0	10.0	30.5	70.0	40
Scouts per exam	1.14	0.35	0.05	1.00	1	1	1	1	2	2	57
f_{nc}	0.25	0.32	0.05	0.00	0.00	0.01	0.10	0.33	1.00	1.00	37
f_c	0.62	0.40	0.07	0.00	0.00	0.15	0.80	0.95	1.00	1.00	37
f_{cnc}	0.13	0.30	0.05	0.00	0.00	0.00	0.00	0.02	0.92	1.00	37
kVp	123.2	6.9	1.0	120.0	120	120	120	120	140	140	52
mA	184	59	8	100	117	130	183	220	280	400	54
Time (s) per rotation	1.74	0.71	0.10	0.75	1.00	1.00	2.00	2.00	3.00	4.00	51
mAs per rotation	283	95	14	119	190	210	250	336	468	560	47
Slices per contrast phase	34.1	10.1	1.5	20.0	22	26	30	38	56	65	45
Slices per rotation (n)	1.10	0.46	0.07	1.00	1.0	1.0	1.0	1.0	1.6	4.0	50
Slice width (T, mm)	9.08	1.59	0.21	5.00	5.0	8.2	10.0	10.0	10.0	10.0	55
Table increment (I_{axial}, mm)	9.85	3.04	0.42	5.00	7.0	8.0	10.0	10.0	17.8	20.0	52
$I_{axial}/(nT)$	1.01	0.09	0.01	0.80	1.00	1.00	1.00	1.00	1.00	1.50	46
L (mm)	313	73	12	220	238	260	300	348	456	600	38
$CTDI_{free\ air}$ (mGy)	61	30	6	18	22	40	56	76	111	126	27
$CTDI_{vol}$ (mGy)	19	9	2	6	7	12	18	22	36	40	30
DLP (mGy-cm)	580	306	61	184	199	321	543	718	1093	1355	25
E (mSv)	12.3	8.9	2.2	3.4	4.7	6.4	9.7	14.3	31.4	37.5	17

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Chest
37 Hospitals

Distribution of mAs per rotation
Chest
47 Hospitals

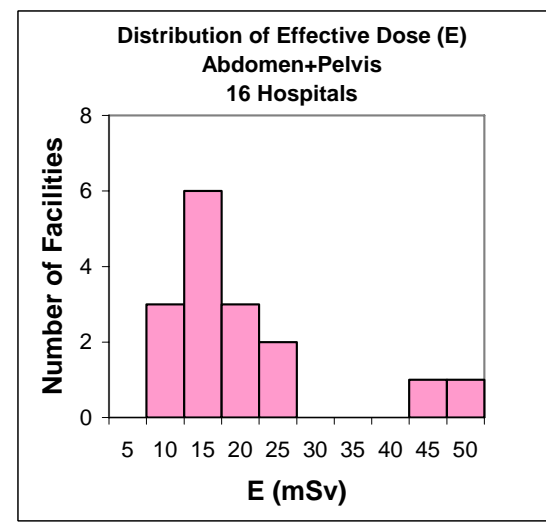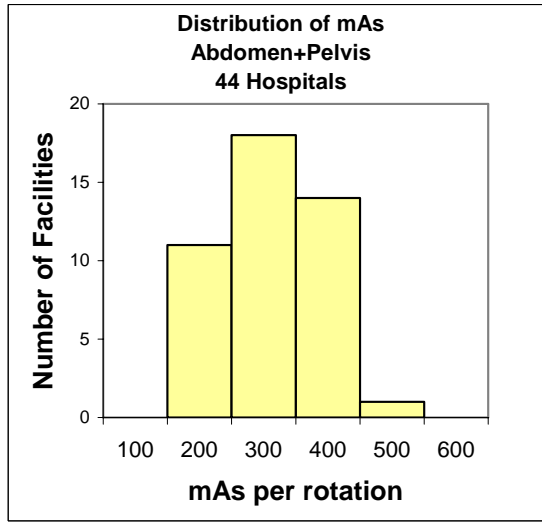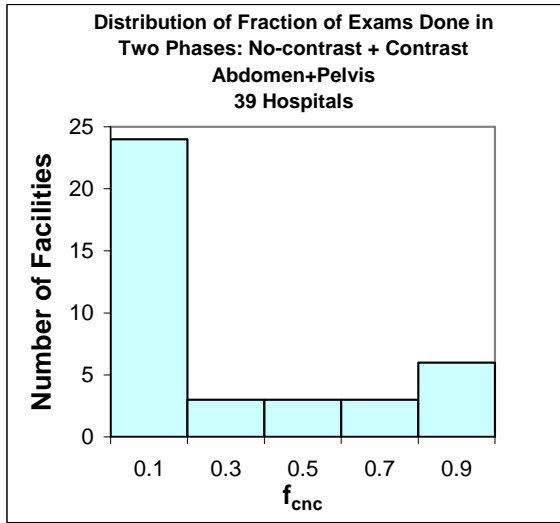Distribution of Effective Dose (E)
Chest
17 Hospitals

Table 1.28. Chest exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.5	4.9	1.0	0.1	1.0	2.0	4.0	8.0	15.0	16.5	25
Scouts per exam	1.03	0.18	0.03	1.00	1	1	1	1	1	2	32
f_{nc}	0.33	0.38	0.07	0.00	0.00	0.01	0.10	0.67	1.00	1.00	29
f_c	0.50	0.43	0.08	0.00	0.00	0.00	0.57	0.90	1.00	1.00	29
f_{cnc}	0.17	0.36	0.07	0.00	0.00	0.00	0.00	0.05	1.00	1.00	29
kVp	125.1	6.9	1.3	120.0	120	120	120	130	140	140	30
mA	161	53	10	70	100	125	145	200	263	300	28
Time (s) per rotation	2.01	0.62	0.11	1.00	1.00	1.90	2.00	2.10	3.00	3.00	30
mAs per rotation	307	114	22	100	169	245	280	356	540	630	27
Slices per contrast phase	32.4	8.3	1.6	10.0	24	28	32	36	47	52	28
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	32
Slice width (T, mm)	8.88	1.85	0.33	2.00	6.3	7.5	10.0	10.0	10.0	10.0	31
Table increment (I_{axial}, mm)	9.11	1.37	0.25	5.00	7.5	7.5	10.0	10.0	10.0	10.0	30
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	28
L (mm)	291	54	11	210	229	250	278	320	394	400	26
$CTDI_{free\ air}$ (mGy)	85	50	11	22	26	59	82	99	141	248	19
$CTDI_{vol}$ (mGy)	32	35	8	7	13	20	27	30	58	170	18
DLP (mGy-cm)	708	319	80	163	268	485	709	1019	1162	1174	16
E (mSv)	14.2	10.3	2.8	2.3	4.2	8.1	10.1	17.9	35.1	36.4	14

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest, 29 Facilities Other than Hospitals

Distribution of mAs per rotation Chest, 27 Facilities Other than Hospitals

Distribution of Effective Dose (E) Chest, 14 Facilities Other than Hospitals
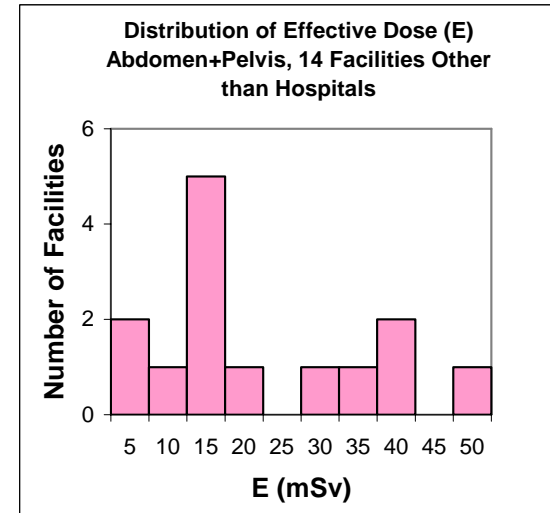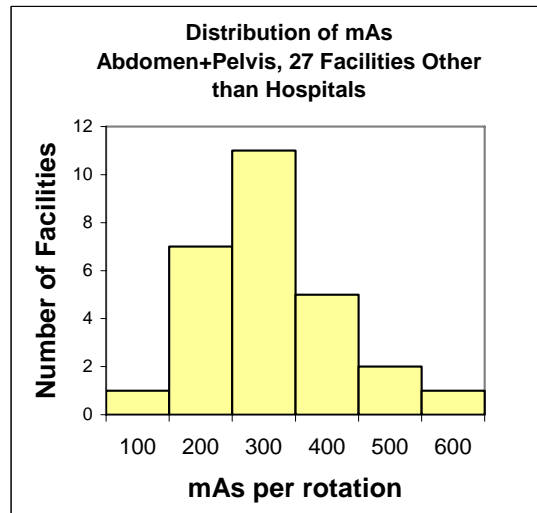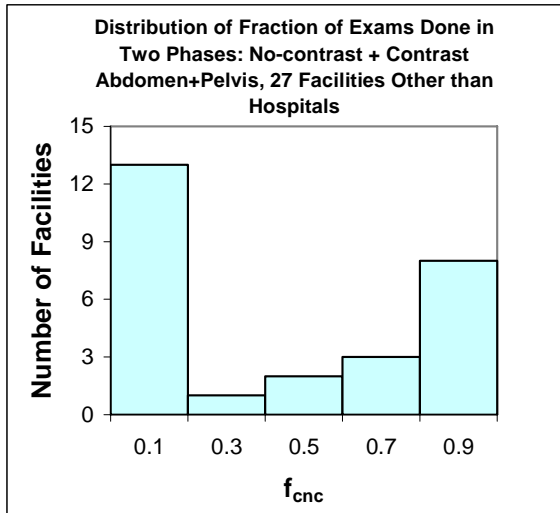
Table 1.29. Chest exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	13.4	10.9	0.9	1.0	2.0	5.0	10.0	20.0	30.0	70.0	152
Scouts per exam	1.29	0.45	0.03	1.00	1	1	1	2	2	2	174
f_{nc}	0.24	0.25	0.02	0.00	0.00	0.05	0.13	0.40	0.80	1.00	156
f_c	0.70	0.30	0.02	0.00	0.02	0.55	0.80	0.95	1.00	1.00	156
f_{cnc}	0.06	0.15	0.01	0.00	0.00	0.00	0.00	0.05	0.40	1.00	155
kVp	123.1	6.7	0.5	110.0	120	120	120	120	140	140	169
mA	204	56	4	63	100	168	200	250	280	373	168
Time (s) per rotation	1.07	0.31	0.03	0.50	0.75	1.00	1.00	1.00	1.90	2.00	147
mAs per rotation	210	66	6	60	110	174	200	250	300	480	143
Reconstruct. increm. (mm)	7.3	1.9	0.2	1.5	5	7	7	8	10	10	129
Slices per rotation (n)	1.13	0.59	0.05	1.00	1.0	1.0	1.0	1.0	1.2	4.0	137
Slice width (T, mm)	7.53	1.67	0.13	5.00	5.0	7.0	7.0	8.3	10.0	10.0	166
Table feed per rotation ($I_{helical}$, mm)	9.39	3.35	0.28	1.75	5.0	7.0	10.0	10.5	15.0	30.0	145
Pitch [$I_{helical}/(nT)$]	1.17	0.31	0.03	0.68	0.80	1.00	1.00	1.48	1.62	2.64	118
L (mm)	324	80	9	180	210	273	300	360	500	525	77
$CTDI_{free\ air}$ (mGy)	52	24	2	8	20	34	46	70	89	136	99
$CTDI_{vol}$ (mGy)	15	8	1	2	6	10	14	18	31	41	82
DLP (mGy-cm)	521	264	41	122	213	355	443	701	981	1159	41
E (mSv)	9.3	5.8	0.9	2.5	3.7	5.4	6.9	12.5	17.7	29.8	39

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest, 155 Hospitals and Other Facilities

Distribution of mAs per rotation Chest, 143 Hospitals and Other Facilities

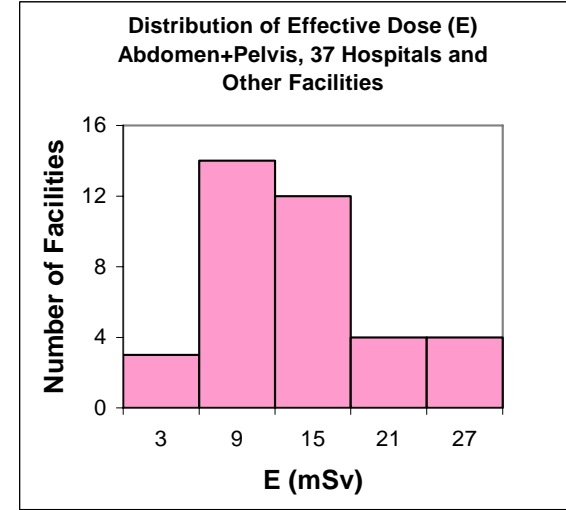Distribution of Effective Dose (E) Chest, 39 Hospitals and Other Facilities
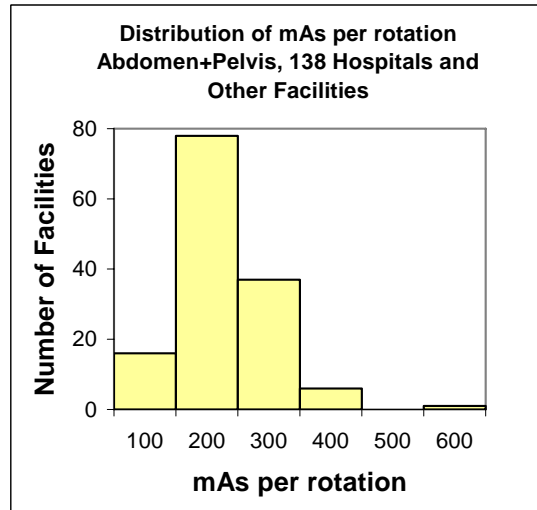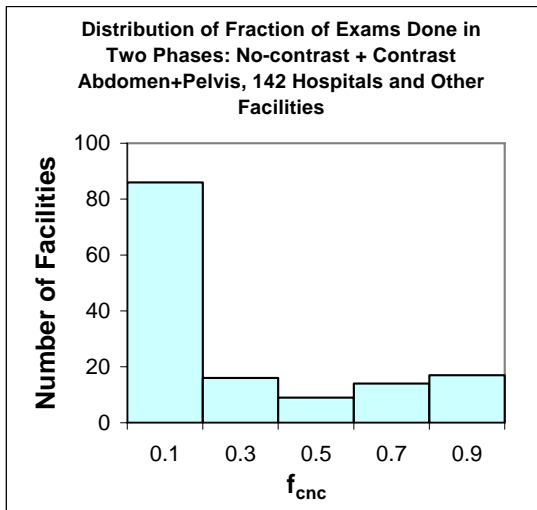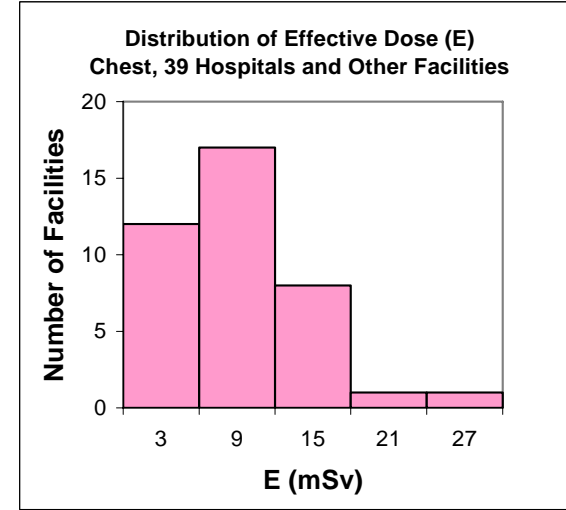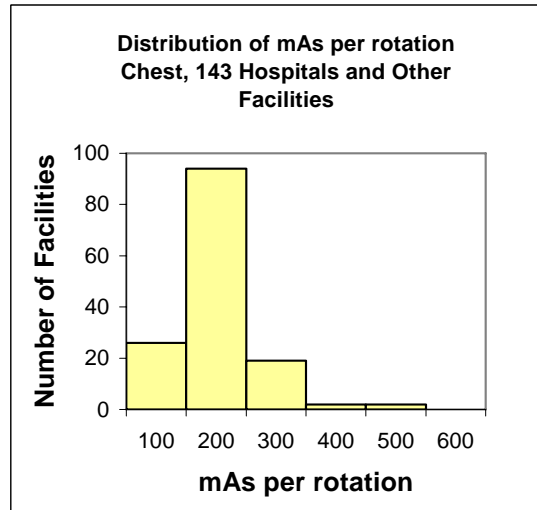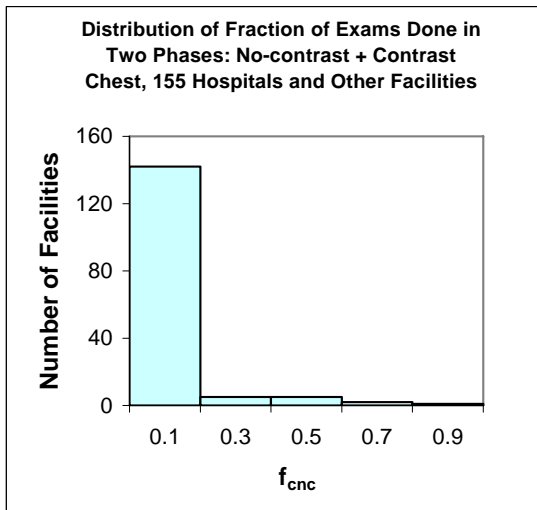
Table 1.30. Chest exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	14.0	10.9	1.0	1.0	2.0	5.0	11.0	20.0	30.0	70.0	123
Scouts per exam	1.32	0.47	0.04	1.00	1	1	1	2	2	2	141
f_{nc}	0.23	0.25	0.02	0.00	0.00	0.05	0.10	0.32	0.80	1.00	125
f_c	0.72	0.29	0.03	0.00	0.10	0.60	0.83	0.95	1.00	1.00	125
f_{cnc}	0.05	0.14	0.01	0.00	0.00	0.00	0.00	0.04	0.38	1.00	124
kVp	123.1	6.4	0.5	120.0	120	120	120	120	140	140	137
mA	207	53	5	80	116	190	200	250	280	333	137
Time (s) per rotation	1.06	0.32	0.03	0.50	0.75	1.00	1.00	1.00	1.92	2.00	118
mAs per rotation	213	68	6	60	107	180	200	250	300	480	115
Reconstruct. increm. (mm)	7.2	1.8	0.2	2.0	5	6	7	8	10	10	106
Slices per rotation (n)	1.16	0.66	0.06	1.00	1.0	1.0	1.0	1.0	2.6	4.0	110
Slice width (T, mm)	7.38	1.67	0.14	5.00	5.0	6.8	7.0	8.0	10.0	10.0	135
Table feed per rotation ($I_{helical}$, mm)	9.45	3.60	0.33	1.75	5.0	7.0	10.0	10.8	15.0	30.0	119
Pitch [$I_{helical}/(nT)$]	1.19	0.32	0.03	0.68	0.80	1.00	1.00	1.50	1.63	2.64	96
L (mm)	323	85	11	180	210	254	300	360	500	525	62
$CTDI_{free\ air}$ (mGy)	51	24	3	8	21	35	44	66	86	136	79
$CTDI_{vol}$ (mGy)	15	8	1	2	6	11	15	18	28	41	67
DLP (mGy-cm)	507	268	47	122	182	347	432	641	988	1159	32
E (mSv)	9.1	6.1	1.1	2.5	3.2	5.3	6.7	10.5	19.2	29.8	30

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest, 124 Hospitals

Distribution of mAs per rotation Chest, 115 Hospitals

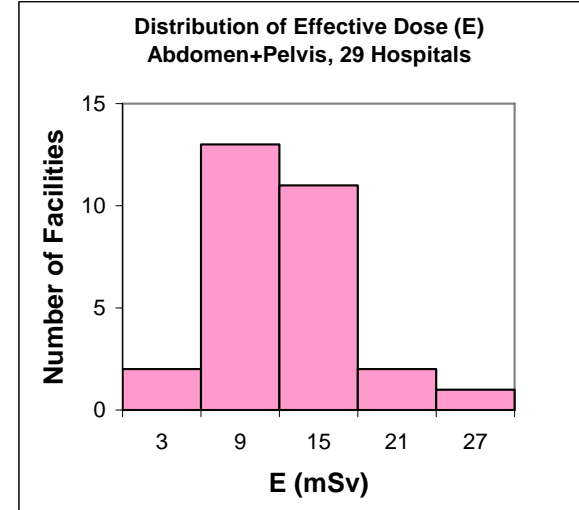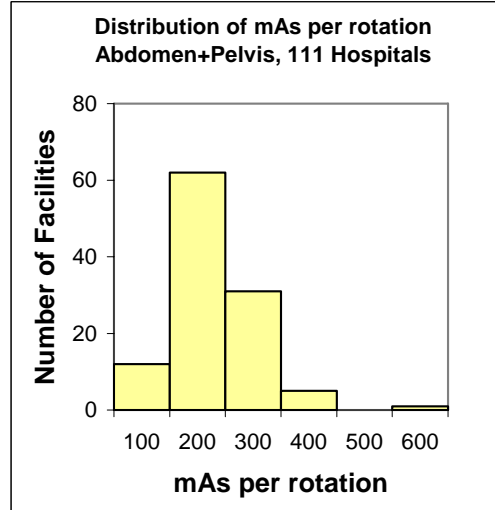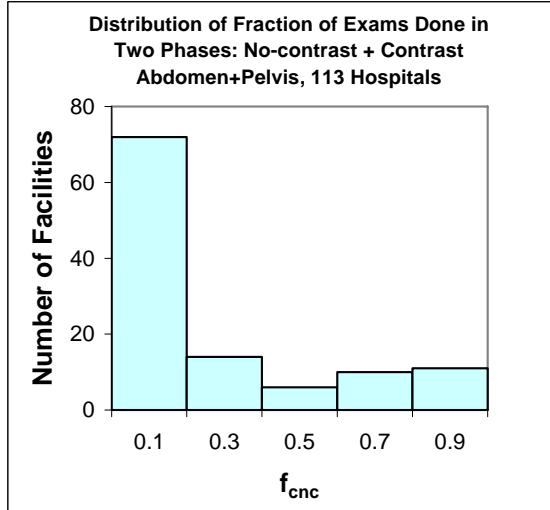Distribution of Effective Dose (E) Chest, 30 Hospitals

Table 1.31. Chest exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	11.0	10.4	1.9	2.0	2.4	5.0	8.0	10.0	34.6	45.0	29
Scouts per exam	1.15	0.36	0.06	1.00	1	1	1	1	2	2	33
f_{nc}	0.28	0.25	0.04	0.00	0.00	0.07	0.25	0.50	0.57	1.00	31
f_c	0.64	0.32	0.06	0.00	0.00	0.48	0.67	0.94	1.00	1.00	31
f_{cnc}	0.09	0.17	0.03	0.00	0.00	0.00	0.00	0.10	0.50	0.61	31
kVp	123.1	8.2	1.5	110.0	116	120	120	120	140	140	32
mA	188	66	12	63	92	135	180	245	265	373	31
Time (s) per rotation	1.08	0.30	0.06	0.75	0.75	1.00	1.00	1.00	1.50	1.90	29
mAs per rotation	196	56	11	80	115	159	198	250	270	300	28
Reconstruct. increm. (mm)	7.7	2.1	0.4	1.5	5	7	8	9	10	10	23
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	27
Slice width (T, mm)	8.19	1.49	0.27	5.00	5.8	7.0	8.0	10.0	10.0	10.0	31
Table feed per rotation ($I_{helical}$, mm)	9.11	1.84	0.36	7.00	7.0	7.6	9.3	10.0	11.6	15.0	26
Pitch [$I_{helical}/(nT)$]	1.12	0.27	0.06	0.80	0.88	1.00	1.00	1.18	1.50	2.00	22
L (mm)	327	56	15	245	266	295	300	355	415	450	15
$CTDI_{free\ air}$ (mGy)	56	26	6	15	19	32	50	79	90	100	20
$CTDI_{vol}$ (mGy)	17	9	2	8	9	11	13	19	34	40	15
DLP (mGy-cm)	567	260	87	281	310	360	479	724	962	981	9
E (mSv)	9.9	4.5	1.5	4.2	4.2	6.4	11.5	12.9	15.6	17.1	9

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest, 31 Facilities Other than Hospitals

Distribution of mAs per rotation Chest, 28 Facilities Other than Hospitals

Distribution of Effective Dose (E) Chest, 9 Facilities Other than Hospitals
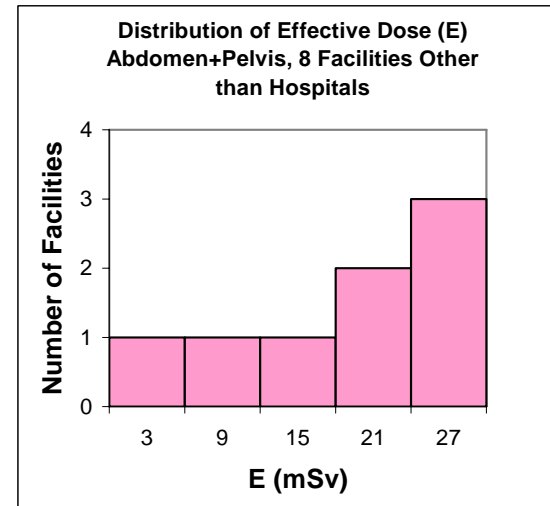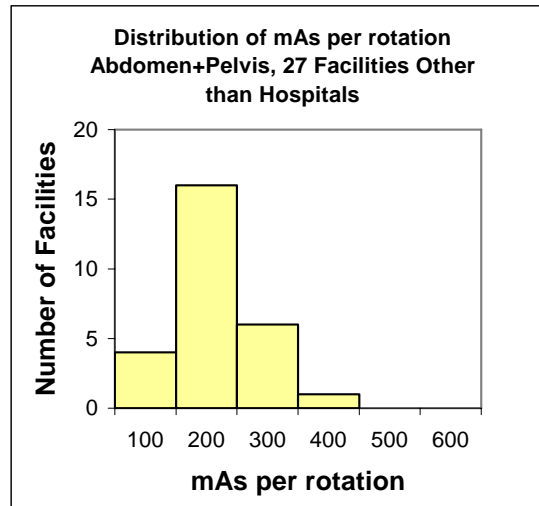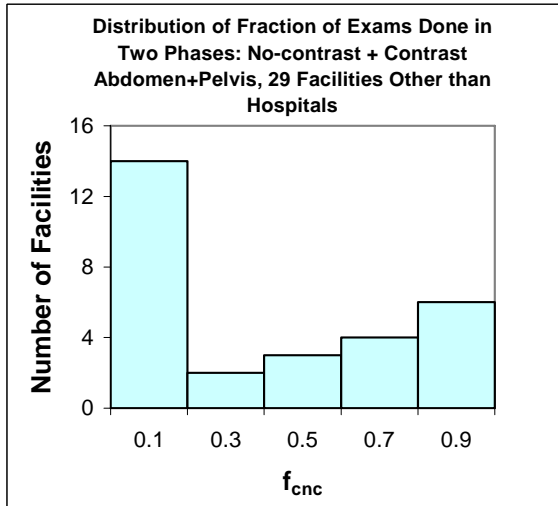
Table 1.32. Abdomen exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.3	6.5	0.9	0.1	1.0	1.9	3.0	6.5	14.3	38.3	48
Scouts per exam	1.09	0.29	0.03	1.00	1	1	1	1	2	2	74
f_{nc}	0.19	0.28	0.04	0.00	0.00	0.02	0.10	0.20	1.00	1.00	55
f_c	0.48	0.40	0.05	0.00	0.00	0.03	0.50	0.87	0.99	1.00	55
f_{cnc}	0.33	0.38	0.05	0.00	0.00	0.00	0.05	0.70	1.00	1.00	55
kVp	122.0	4.3	0.5	120.0	120	120	120	120	130	135	65
mA	185	63	8	70	112	140	175	210	279	400	65
Time (s) per rotation	2.00	0.73	0.09	0.75	1.00	1.60	2.00	2.10	3.00	4.50	66
mAs per rotation	324	98	13	100	199	250	300	400	501	630	60
Slices per contrast phase	30.1	7.8	1.0	20.0	20	25	30	33	45	50	59
Slices per rotation (n)	1.04	0.37	0.04	1.00	1.0	1.0	1.0	1.0	1.0	4.0	67
Slice width (T, mm)	9.59	1.13	0.14	5.00	7.0	10.0	10.0	10.0	10.0	10.0	66
Table increment (I_{axial}, mm)	9.75	1.08	0.14	7.00	7.6	10.0	10.0	10.0	10.0	15.0	63
$I_{axial}/(nT)$	1.02	0.10	0.01	0.80	1.00	1.00	1.00	1.00	1.00	1.60	60
L (mm)	292	81	11	168	200	239	275	320	460	500	56
$CTDI_{free air}$ (mGy)	72	42	7	19	26	44	68	88	126	248	38
$CTDI_{vol}$ (mGy)	26	25	4	6	7	15	20	30	36	170	39
DLP (mGy-cm)	608	294	49	184	209	360	595	740	1112	1488	36
E (mSv)	12.0	7.4	1.5	2.9	3.3	6.5	11.1	15.8	28.2	31.6	26

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen
55 Hospitals and Other Facilities

Distribution of mAs per rotation Abdomen
60 Hospitals and Other Facilities

Distribution of Effective Dose (E) Abdomen
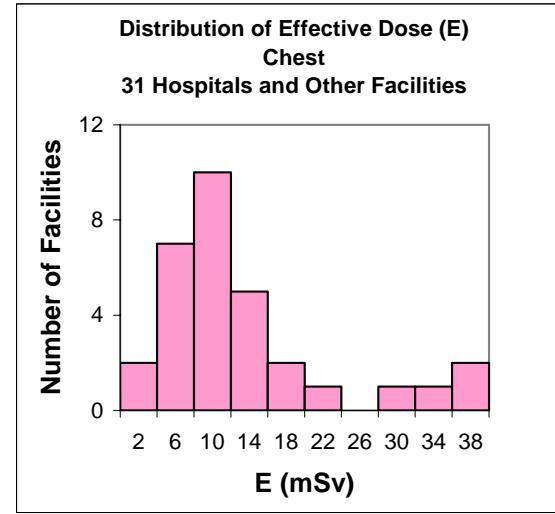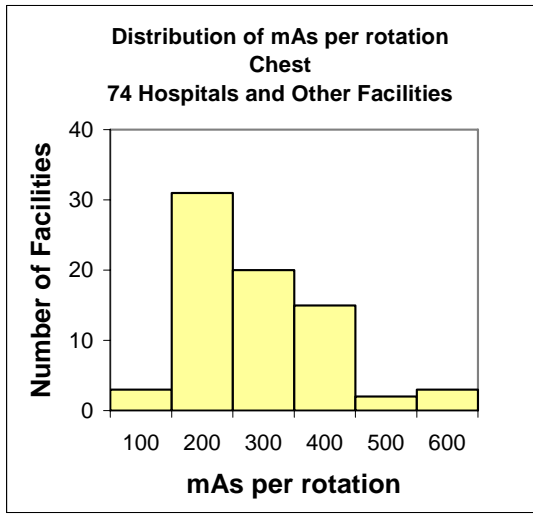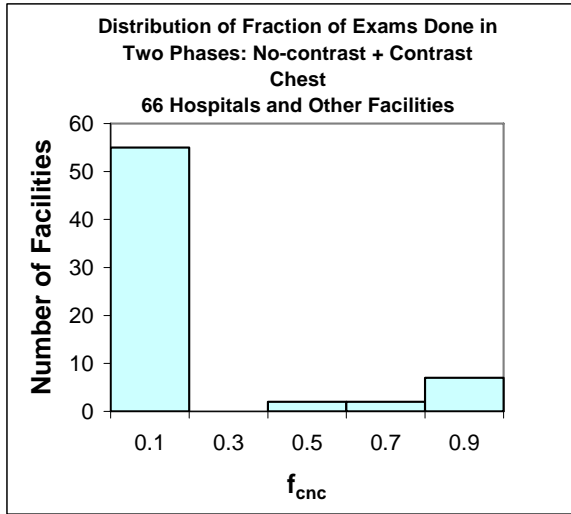26 Hospitals and Other Facilities

Table 1.33. Abdomen exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.5	7.8	1.4	0.2	1.0	2.0	4.0	10.0	18.0	38.3	29
Scouts per exam	1.15	0.36	0.05	1.00	1	1	1	1	2	2	46
f_{nc}	0.18	0.27	0.05	0.00	0.00	0.02	0.10	0.20	0.85	1.00	33
f_c	0.57	0.38	0.07	0.00	0.00	0.25	0.75	0.89	1.00	1.00	33
f_{cnc}	0.25	0.33	0.06	0.00	0.00	0.00	0.05	0.50	0.90	1.00	33
kVp	121.2	3.7	0.6	120.0	120	120	120	120	130	135	40
mA	201	68	10	110	125	140	200	240	299	400	42
Time (s) per rotation	1.98	0.82	0.13	0.75	1.00	1.38	2.00	2.10	3.05	4.50	40
mAs per rotation	329	84	14	165	240	260	300	400	454	500	37
Slices per contrast phase	32.1	8.7	1.5	20.0	20	25	30	40	47	50	35
Slices per rotation (n)	1.07	0.46	0.07	1.00	1.0	1.0	1.0	1.0	1.0	4.0	42
Slice width (T, mm)	9.52	1.15	0.18	5.00	7.0	10.0	10.0	10.0	10.0	10.0	41
Table increment (I_{axial}, mm)	9.55	0.97	0.16	7.00	7.0	10.0	10.0	10.0	10.0	10.0	37
$I_{axial}/(nT)$	0.99	0.03	0.01	0.80	1.00	1.00	1.00	1.00	1.00	1.00	36
L (mm)	307	87	15	168	200	248	300	350	470	500	33
$CTDI_{free\ air}$ (mGy)	68	30	6	19	29	44	70	86	111	126	22
$CTDI_{vol}$ (mGy)	22	9	2	6	13	15	20	29	35	37	23
DLP (mGy-cm)	655	312	67	184	321	376	600	813	1106	1488	22
E (mSv)	12.1	6.6	1.7	4.8	5.1	7.5	11.4	15.6	20.7	31.2	15

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Abdomen
33 Hospitals

Distribution of mAs per rotation
Abdomen
37 Hospitals

Distribution of Effective Dose (E)
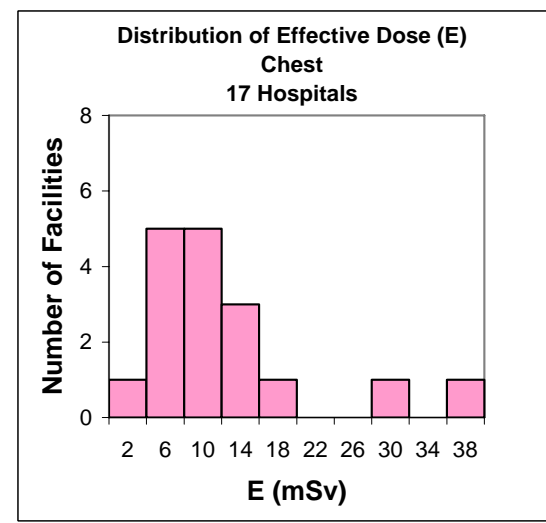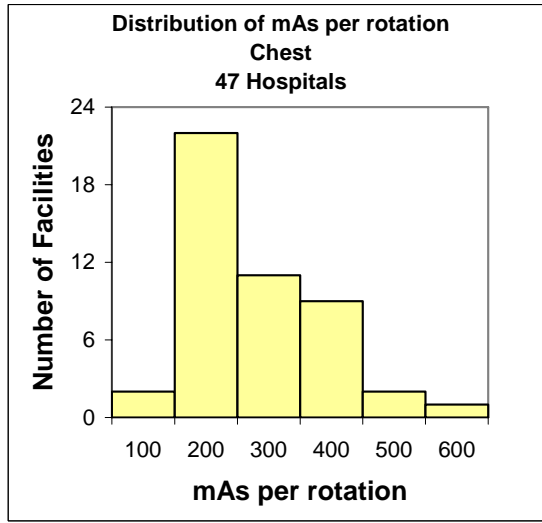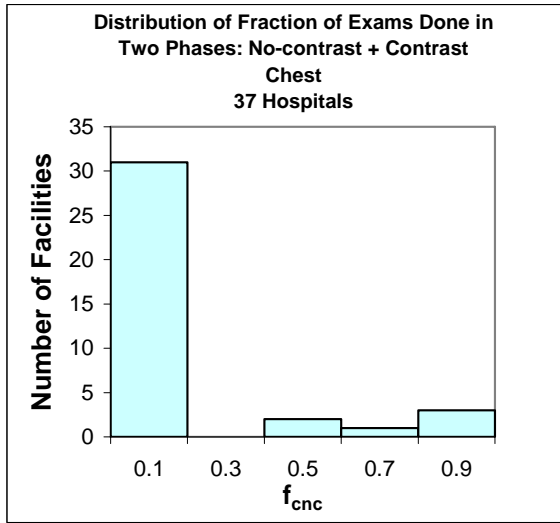Abdomen
15 Hospitals

Table 1.34. Abdomen exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.5	3.3	0.8	0.1	0.9	1.5	2.0	4.5	10.3	13.0	19
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	28
f_{nc}	0.19	0.30	0.06	0.00	0.00	0.02	0.08	0.18	0.98	1.00	22
f_c	0.35	0.41	0.09	0.00	0.00	0.00	0.10	0.84	0.95	0.99	22
f_{cnc}	0.45	0.43	0.09	0.00	0.00	0.00	0.50	0.85	1.00	1.00	22
kVp	123.3	5.0	1.0	120.0	120	120	120	130	130	133	25
mA	157	40	8	70	100	130	160	175	209	250	23
Time (s) per rotation	2.04	0.57	0.11	1.00	1.00	1.90	2.00	2.10	3.00	3.00	26
mAs per rotation	315	119	25	100	173	245	312	361	510	630	23
Slices per contrast phase	27.2	5.2	1.1	20.0	20	24	26	31	33	40	24
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	25
Slice width (T, mm)	9.70	1.10	0.22	5.00	8.0	10.0	10.0	10.0	10.0	10.0	25
Table increment (I_{axial}, mm)	10.02	1.19	0.23	7.50	8.5	10.0	10.0	10.0	10.0	15.0	26
$I_{axial}/(nT)$	1.05	0.16	0.03	1.00	1.00	1.00	1.00	1.00	1.43	1.60	24
L (mm)	271	68	14	200	200	231	250	300	392	490	23
$CTDI_{free\ air}$ (mGy)	79	54	14	22	26	44	66	91	159	248	16
$CTDI_{vol}$ (mGy)	31	38	10	7	7	15	24	30	69	170	16
DLP (mGy-cm)	535	258	69	187	206	350	535	663	935	1115	14
E (mSv)	12.0	8.7	2.6	2.9	3.0	4.9	10.7	16.6	25.3	31.6	11

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen
22 Facilities Other than Hospitals

Distribution of mAs per rotation Abdomen
23 Facilities Other than Hospitals

Distribution of Effective Dose (E) Abdomen
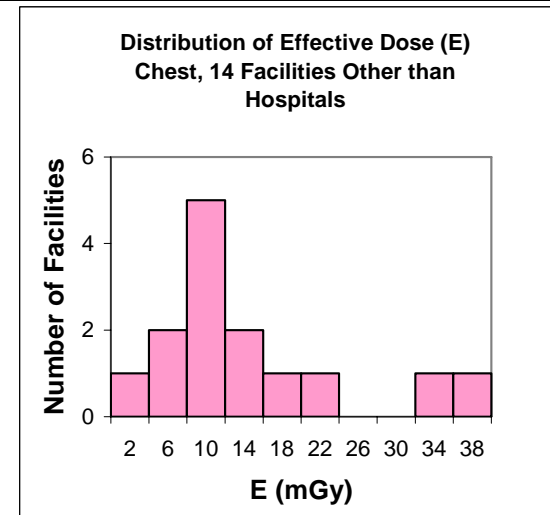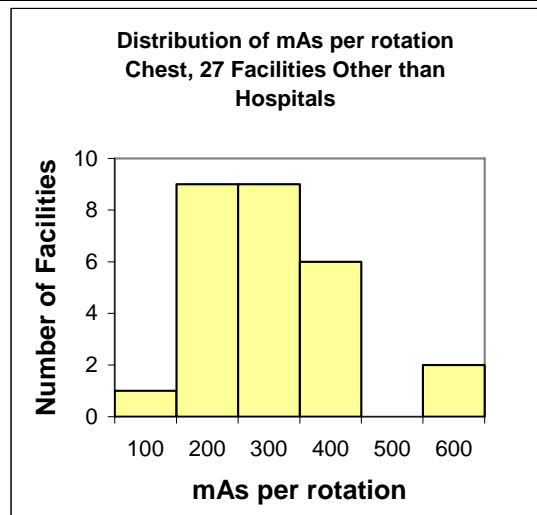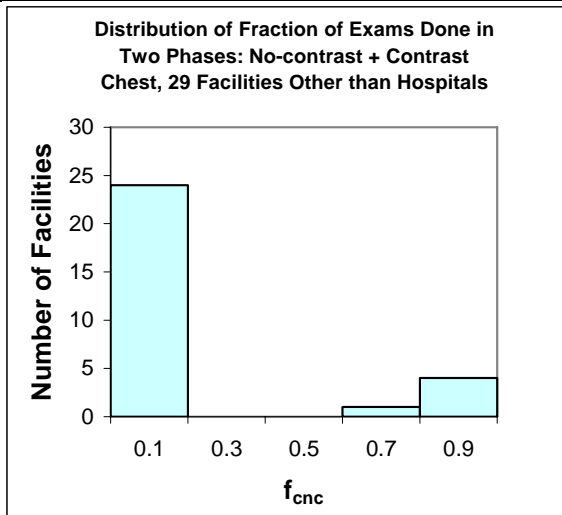11 Facilities Other than Hospitals

Table 1.35. Abdomen exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	12.3	12.1	1.1	1.0	1.0	4.8	10.0	15.0	35.8	80.0	116
Scouts per exam	1.28	0.45	0.04	1.00	1	1	1	2	2	2	145
f_{nc}	0.19	0.21	0.02	0.00	0.00	0.05	0.10	0.25	0.57	1.00	127
f_c	0.51	0.38	0.03	0.00	0.00	0.09	0.60	0.85	1.00	1.00	128
f_{cnc}	0.30	0.34	0.03	0.00	0.00	0.00	0.15	0.54	0.98	1.00	128
kVp	122.3	5.4	0.5	120.0	120	120	120	120	136	140	139
mA	224	60	5	80	125	200	240	250	300	400	138
Time (s) per rotation	1.09	0.33	0.03	0.50	0.75	1.00	1.00	1.00	1.90	2.00	121
mAs per rotation	233	71	7	65	128	200	240	256	304	600	117
Reconstruct. increm. (mm)	7.5	1.9	0.2	2.0	5	7	8	10	10	10	103
Slices per rotation (n)	1.13	0.58	0.05	1.00	1.0	1.0	1.0	1.0	1.3	4.0	116
Slice width (T, mm)	7.85	1.66	0.14	3.00	5.0	7.0	7.8	10.0	10.0	10.0	134
Table feed per rotation ($I_{helical}$, mm)	10.02	4.17	0.39	1.75	5.0	7.0	10.0	12.0	15.0	42.0	117
Pitch [$I_{helical}/(nT)$]	1.21	0.37	0.04	0.63	0.97	1.00	1.00	1.50	1.79	3.00	96
L (mm)	296	91	12	150	180	230	288	350	480	580	61
$CTDI_{free\,air}$ (mGy)	61	29	3	19	21	39	54	80	113	136	88
$CTDI_{vol}$ (mGy)	16	7	1	2	6	12	15	21	30	39	73
DLP (mGy-cm)	458	213	36	52	180	310	456	585	850	943	35
E (mSv)	9.1	6.6	1.1	0.8	2.3	4.9	7.1	11.5	23.6	28.0	34

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen, 128 Hospitals and Other Facilities

Distribution of mAs per rotation Abdomen, 117 Hospitals and Other Facilities

Distribution of Effective Dose (E) Abdomen, 34 Hospitals and Other Facilities

Table 1.36. Abdomen exam, helical scanning, hospitals only											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	12.9	12.8	1.3	1.0	1.0	4.4	10.0	15.0	38.5	80.0	98
Scouts per exam	1.32	0.47	0.04	1.00	1	1	1	2	2	2	120
f_{nc}	0.19	0.22	0.02	0.00	0.00	0.05	0.10	0.25	0.57	1.00	103
f_c	0.54	0.38	0.04	0.00	0.00	0.14	0.63	0.88	1.00	1.00	104
f_{cnc}	0.27	0.33	0.03	0.00	0.00	0.00	0.10	0.50	0.90	1.00	104
kVp	122.1	5.1	0.5	120.0	120	120	120	120	132	140	115
mA	225	58	5	80	125	200	240	255	300	400	115
Time (s) per rotation	1.09	0.33	0.03	0.50	0.75	1.00	1.00	1.00	2.00	2.00	99
mAs per rotation	235	74	8	65	130	200	230	264	305	600	96
Reconstruct. increm. (mm)	7.5	1.9	0.2	2.0	5	7	7	8	10	10	86
Slices per rotation (n)	1.16	0.64	0.07	1.00	1.0	1.0	1.0	1.0	2.3	4.0	94
Slice width (T, mm)	7.67	1.66	0.16	3.00	5.0	7.0	7.0	9.0	10.0	10.0	111
Table feed per rotation ($I_{helical}$, mm)	10.01	4.48	0.46	1.75	5.0	7.0	10.0	12.0	15.0	42.0	96
Pitch [$I_{helical}/(nT)$]	1.23	0.39	0.04	0.63	0.88	1.00	1.00	1.50	2.01	3.00	78
L (mm)	302	95	14	150	200	240	290	350	492	580	49
$CTDI_{free\ air}$ (mGy)	60	29	3	19	23	39	52	75	112	136	71
$CTDI_{vol}$ (mGy)	16	7	1	2	6	12	14	20	29	39	60
DLP (mGy-cm)	423	185	35	52	155	302	412	534	699	838	28
E (mSv)	8.3	6.3	1.2	0.8	2.7	4.8	6.2	9.4	22.0	28.0	27

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen, 104 Hospitals

Distribution of mAs per rotation Abdomen, 96 Hospitals

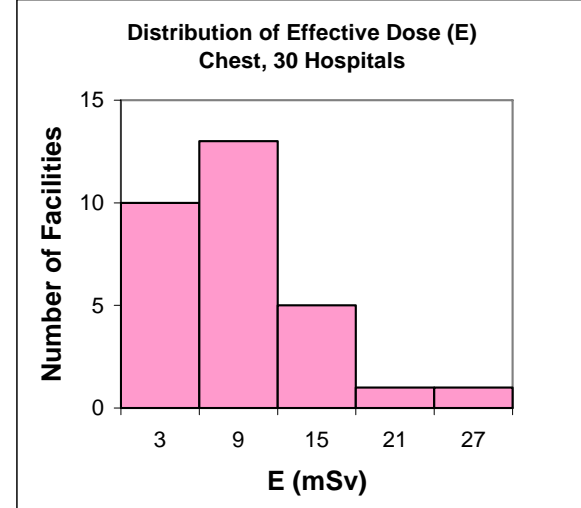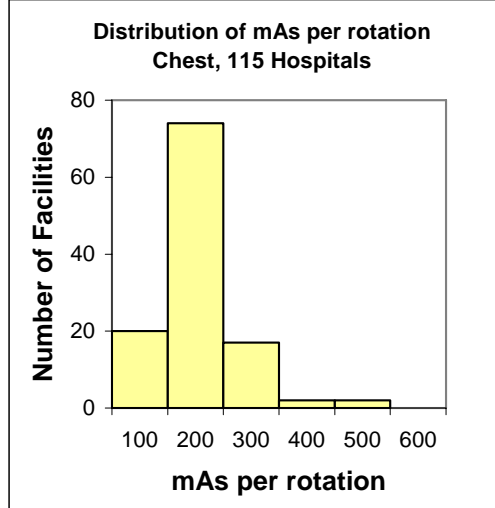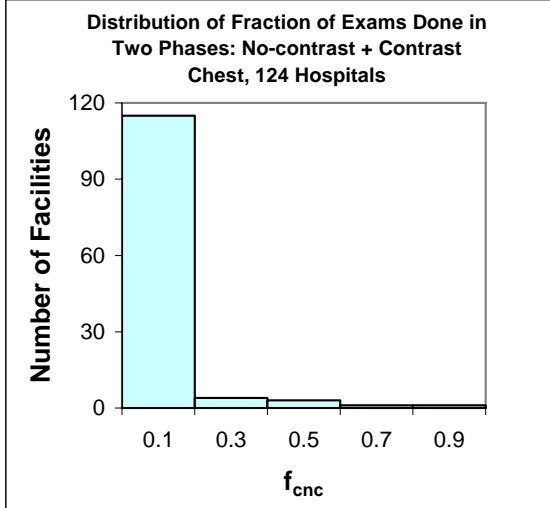Distribution of Effective Dose (E) Abdomen, 27 Hospitals

Table 1.37. Abdomen exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	8.8	6.5	1.5	1.0	1.0	5.0	7.0	11.8	20.6	24.0	18
Scouts per exam	1.08	0.28	0.06	1.00	1	1	1	1	2	2	25
f_{nc}	0.17	0.18	0.04	0.00	0.00	0.04	0.12	0.26	0.46	0.70	24
f_c	0.38	0.37	0.07	0.00	0.00	0.00	0.29	0.68	0.99	1.00	24
f_{cnc}	0.45	0.37	0.07	0.00	0.00	0.07	0.45	0.76	1.00	1.00	24
kVp	123.3	6.4	1.3	120.0	120	120	120	123	139	140	24
mA	215	74	15	83	87	155	250	250	313	400	23
Time (s) per rotation	1.10	0.31	0.07	0.75	0.75	1.00	1.00	1.38	1.50	1.90	22
mAs per rotation	228	59	13	112	112	200	250	250	300	375	21
Reconstruct. increm. (mm)	7.9	2.1	0.5	3.0	5	7	8	10	10	10	17
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	22
Slice width (T, mm)	8.76	1.39	0.29	6.50	7.0	7.3	10.0	10.0	10.0	10.0	23
Table feed per rotation ($I_{helical}$, mm)	10.05	2.37	0.52	7.00	7.0	9.0	10.0	10.0	15.0	15.0	21
Pitch [$I_{helical}/(nT)$]	1.13	0.21	0.05	1.00	1.00	1.00	1.00	1.18	1.50	1.50	18
L (mm)	269	67	19	180	180	223	265	305	367	400	12
$CTDI_{free\,air}$ (mGy)	65	32	8	20	20	45	71	84	113	131	17
$CTDI_{vol}$ (mGy)	19	8	2	10	10	13	19	25	32	35	13
DLP (mGy-cm)	601	270	102	203	239	448	591	787	923	943	7
E (mSv)	12.4	7.4	2.8	1.9	3.0	8.4	11.5	16.3	22.0	24.0	7

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Abdomen, 24 Facilities Other than Hospitals

Distribution of mAs per rotation Abdomen, 21 Facilities Other than Hospitals

Distribution of Effective Dose (E) Abdomen, 7 Facilities Other than Hospitals
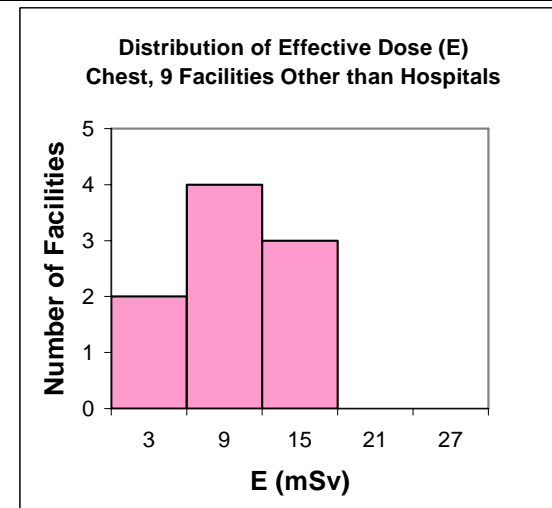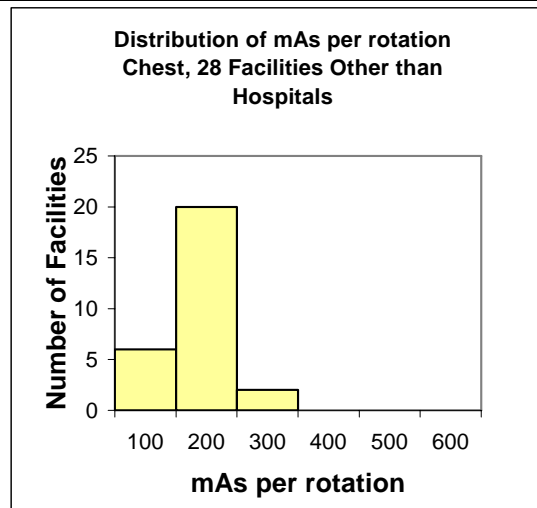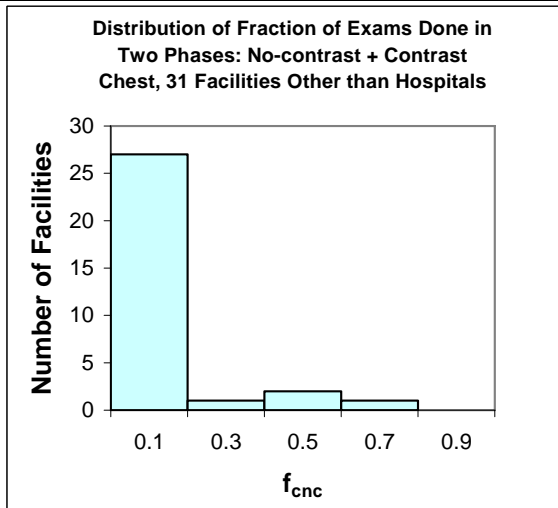
Table 1.38. Simple sinus exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.4	6.7	0.5	0.5	1.0	2.0	5.0	10.0	22.5	40.0	151
Scouts per exam	1.15	0.36	0.03	1.00	1	1	1	1	2	2	175
f_{nc}	0.98	0.11	0.01	0.00	0.90	1.00	1.00	1.00	1.00	1.00	148
f_c	0.01	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.60	148
f_{cnc}	0.01	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.50	147
kVp	123.8	7.8	0.6	110.0	120	120	120	130	140	140	165
mA	167	66	5	20	70	111	160	200	280	350	166
Time (s) per rotation	1.68	0.79	0.06	0.50	1.00	1.00	1.50	2.00	3.00	5.00	163
mAs per rotation	260	122	10	40	100	188	250	325	483	800	155
Slices per contrast phase	24.7	9.6	0.8	4.0	8	18	25	32	37	48	150
Slices per rotation (n)	1.18	0.71	0.06	1.00	1.0	1.0	1.0	1.0	2.6	5.0	155
Slice width (T, mm)	3.68	1.15	0.09	1.00	2.0	3.0	3.0	5.0	5.0	10.0	169
Table increment (I_{axial}, mm)	4.68	2.64	0.21	2.00	2.5	3.0	3.5	5.0	10.0	16.0	163
$I_{axial}/(nT)$	1.14	0.52	0.04	0.60	0.80	1.00	1.00	1.00	2.00	4.00	142
L (mm)	91	25	2	24	50	75	90	105	123	160	124
$CTDI_{free\ air}$ (mGy)	66	37	3	13	25	41	58	83	130	253	114
$CTDI_{vol}$ (mGy)	46	38	4	3	13	25	41	54	86	326	94
DLP (mGy-cm)	414	250	28	69	109	241	370	536	876	1292	79
E (mSv)	0.9	0.5	0.1	0.1	0.3	0.6	0.9	1.2	1.7	2.8	72

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Simple Sinus
147 Hospitals and Other Facilities

Distribution of mAs per rotation
Simple Sinus
155 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Simple Sinus
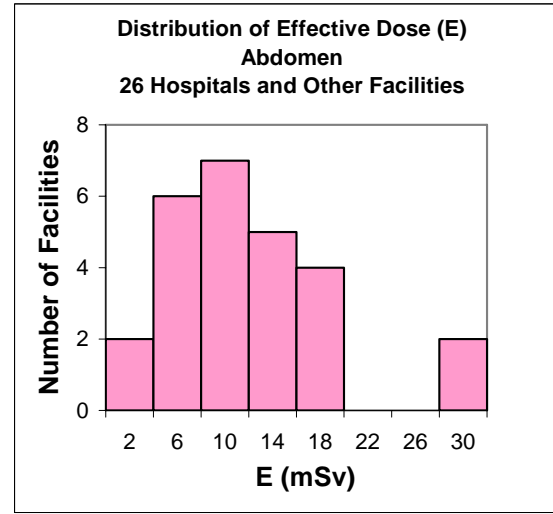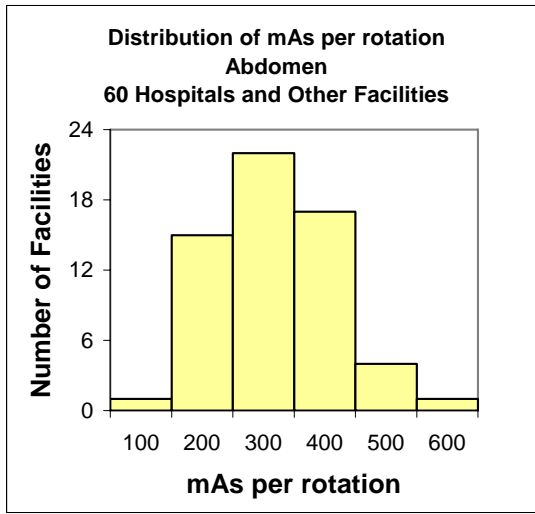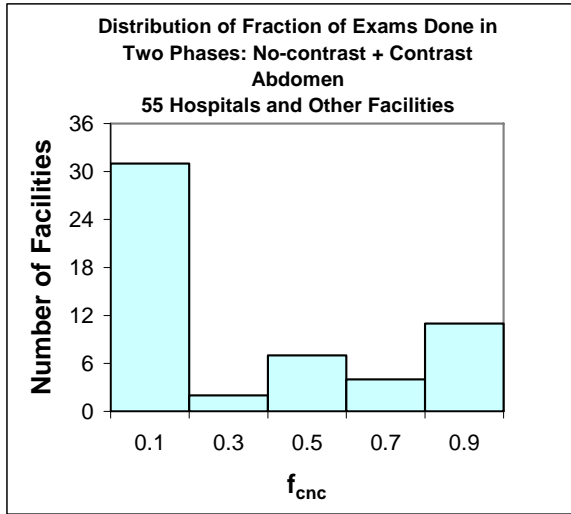72 Hospitals and Other Facilities

Table 1.39. Simple sinus exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.9	6.2	0.6	0.5	1.0	2.0	4.0	7.0	19.4	30.0	107
Scouts per exam	1.13	0.34	0.03	1.00	1	1	1	1	2	2	126
f_{nc}	0.97	0.13	0.01	0.00	0.90	1.00	1.00	1.00	1.00	1.00	104
f_c	0.01	0.08	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.60	104
f_{cnc}	0.01	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.50	103
kVp	123.6	8.0	0.7	110.0	120	120	120	130	140	140	121
mA	177	67	6	20	83	125	170	240	280	350	121
Time (s) per rotation	1.56	0.73	0.07	0.50	1.00	1.00	1.50	2.00	2.82	5.00	119
mAs per rotation	258	113	11	40	100	188	250	320	428	800	113
Slices per contrast phase	25.6	9.6	0.9	4.0	8	20	28	32	39	48	107
Slices per rotation (n)	1.21	0.74	0.07	1.00	1.0	1.0	1.0	1.0	4.0	4.0	110
Slice width (T, mm)	3.65	1.23	0.11	1.00	2.0	3.0	3.0	5.0	5.0	10.0	121
Table increment (I_{axial}, mm)	4.68	2.85	0.26	2.00	2.4	3.0	3.0	5.0	10.0	16.0	116
$I_{axial}/(nT)$	1.12	0.53	0.05	0.60	0.78	1.00	1.00	1.00	2.03	4.00	99
L (mm)	91	24	3	24	47	82	90	105	120	160	87
$CTDI_{free\ air}$ (mGy)	61	30	3	17	26	40	57	75	123	180	86
$CTDI_{vol}$ (mGy)	41	21	3	3	15	26	40	50	83	140	70
DLP (mGy-cm)	396	215	28	110	124	245	365	509	789	1292	58
E (mSv)	0.9	0.4	0.1	0.2	0.3	0.6	0.9	1.1	1.6	1.8	53

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Simple Sinus
103 Hospitals

Distribution of mAs per rotation
Simple Sinus
113 Hospitals

Distribution of Effective Dose (E)
Simple Sinus
53 Hospitals
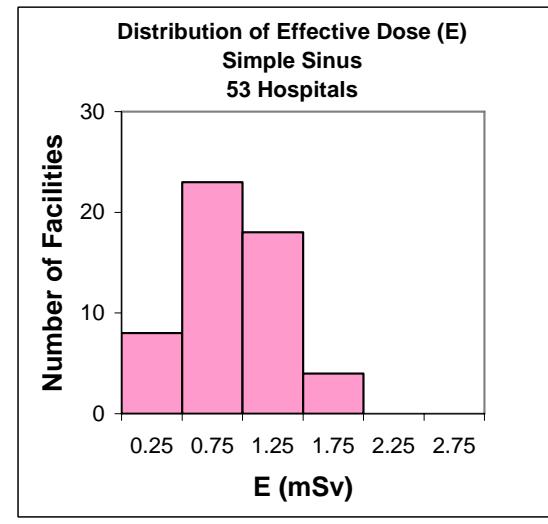
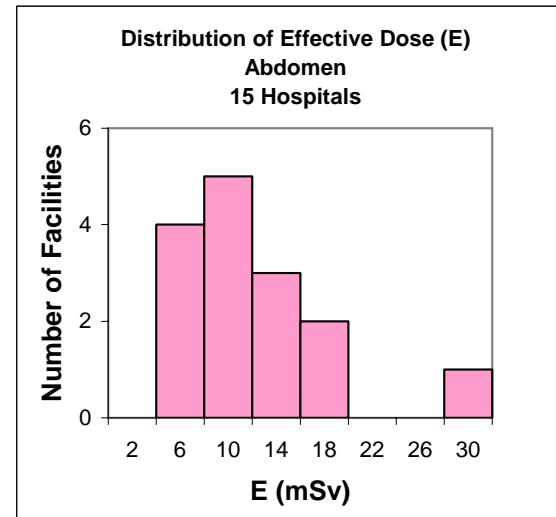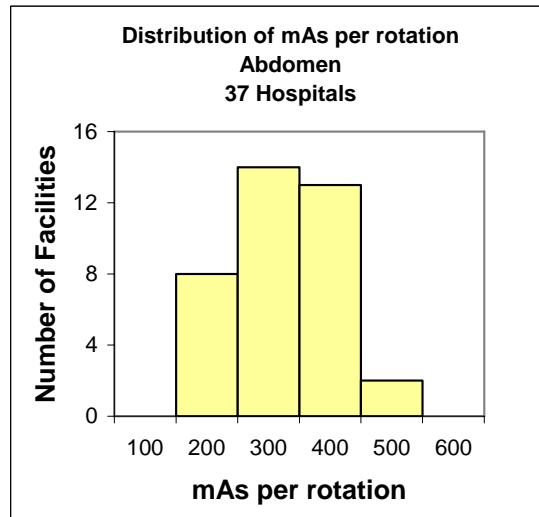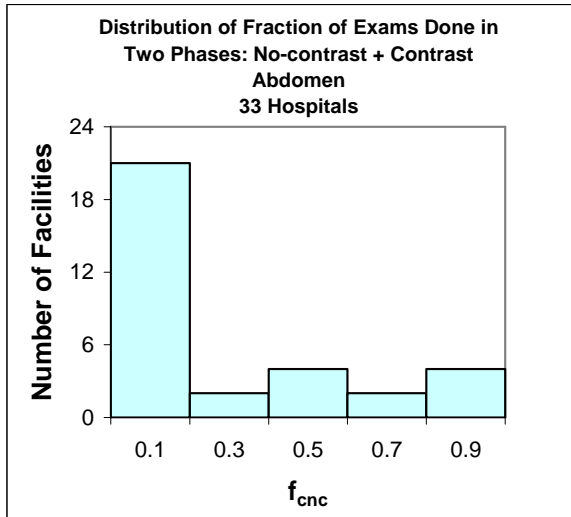## Table 1.40. Simple sinus exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	7.8	7.8	1.2	1.0	1.0	3.0	5.0	10.3	23.7	40.0	44
Scouts per exam	1.18	0.39	0.06	1.00	1	1	1	1	2	2	49
f_{nc}	0.99	0.04	0.01	0.79	0.91	1.00	1.00	1.00	1.00	1.00	44
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	44
f_{cnc}	0.01	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.20	44
kVp	124.4	7.3	1.1	110.0	120	120	120	130	140	140	44
mA	141	57	8	40	63	100	130	185	225	300	45
Time (s) per rotation	2.01	0.85	0.13	0.75	1.00	1.50	2.00	2.70	3.68	4.00	44
mAs per rotation	268	144	22	75	94	189	240	343	576	630	42
Slices per contrast phase	22.7	9.3	1.4	5.0	9	16	22	30	36	40	43
Slices per rotation (n)	1.11	0.61	0.09	1.00	1.0	1.0	1.0	1.0	1.0	5.0	45
Slice width (T, mm)	3.76	0.96	0.14	2.00	2.7	3.0	3.5	5.0	5.0	5.0	48
Table increment (I_{axial}, mm)	4.68	2.08	0.30	3.00	3.0	3.0	4.0	5.0	10.0	11.0	47
$I_{axial}/(nT)$	1.17	0.51	0.08	0.60	1.00	1.00	1.00	1.00	2.00	3.67	43
L (mm)	91	27	4	47	51	69	90	106	131	160	37
$CTDI_{free\ air}$ (mGy)	82	51	10	13	19	48	83	100	158	253	28
$CTDI_{vol}$ (mGy)	62	64	13	7	9	25	48	72	123	326	24
DLP (mGy-cm)	463	329	72	69	88	210	401	641	1060	1184	21
E (mSv)	1.1	0.7	0.2	0.1	0.2	0.6	1.0	1.5	2.2	2.8	19

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Simple Sinus, 44 Facilities Other than Hospitals

Distribution of mAs per rotation Simple Sinus, 42 Facilities Other than Hospitals

Distribution of Effective Dose (E) Simple Sinus, 19 Facilities Other than Hospitals
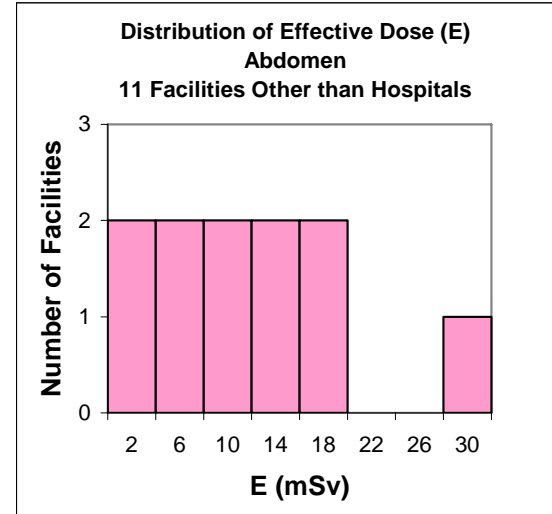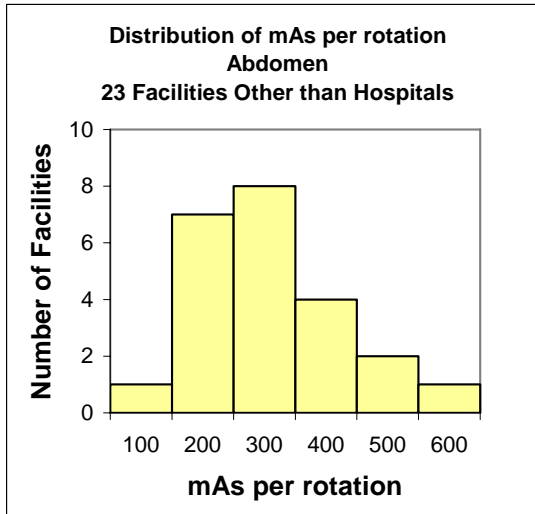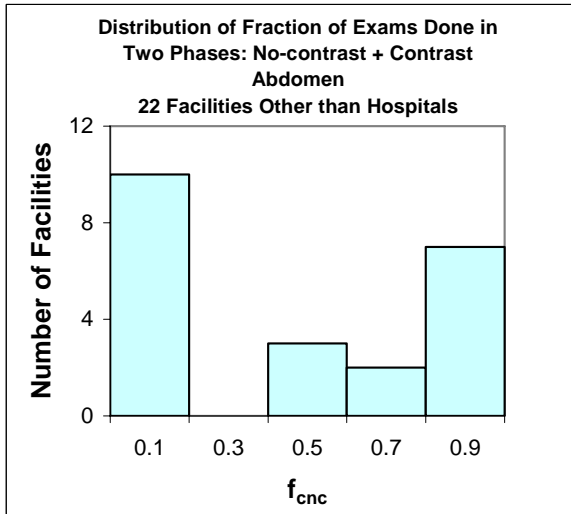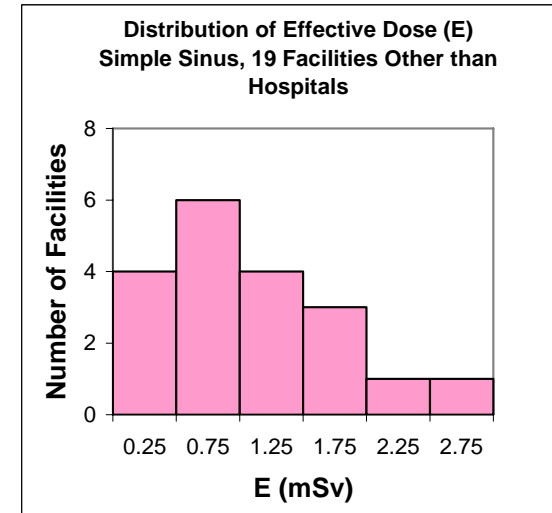
Table 1.41. Simple sinus exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.5	8.0	1.1	0.8	1.0	2.0	3.0	10.0	15.0	51.0	49
Scouts per exam	1.22	0.45	0.05	1.00	1	1	1	1	2	3	69
f_{nc}	0.93	0.23	0.03	0.00	0.37	1.00	1.00	1.00	1.00	1.00	59
f_c	0.07	0.23	0.03	0.00	0.00	0.00	0.00	0.00	0.65	1.00	58
f_{cnc}	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	58
kVp	123.0	7.8	1.0	100.0	120	120	120	120	140	140	65
mA	186	54	7	83	101	150	180	220	280	307	63
Time (s) per rotation	1.16	0.34	0.05	0.75	0.79	1.00	1.00	1.25	1.93	2.00	55
mAs per rotation	211	80	11	100	116	158	200	250	368	458	51
Reconstruct. increm. (mm)	3.1	1.0	0.1	0.6	2	3	3	3	5	5	47
Slices per rotation (n)	1.11	0.58	0.08	1.00	1.0	1.0	1.0	1.0	1.0	4.0	53
Slice width (T, mm)	3.30	0.82	0.10	1.30	3.0	3.0	3.0	3.0	5.0	5.5	62
Table feed per rotation ($I_{helical}$, mm)	3.94	2.07	0.29	1.14	3.0	3.0	3.0	4.5	6.7	16.0	52
Pitch [$I_{helical}/(nT)$]	1.08	0.26	0.04	0.75	0.80	1.00	1.00	1.00	1.50	2.00	42
L (mm)	102	28	5	25	66	90	100	110	150	170	29
$CTDI_{free\ air}$ (mGy)	53	27	4	16	18	36	46	63	104	132	39
$CTDI_{vol}$ (mGy)	34	16	3	10	17	24	31	37	66	79	30
DLP (mGy-cm)	301	139	35	79	132	222	263	370	537	633	16
E (mSv)	0.7	0.4	0.1	0.2	0.2	0.4	0.6	1.0	1.3	1.7	16

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Simple Sinus, 58 Hospitals and Other Facilities

Distribution of mAs per rotation Simple Sinus, 51 Hospitals and Other Facilities

Distribution of Effective Dose (E) Simple Sinus, 16 Hospitals and Other Facilities
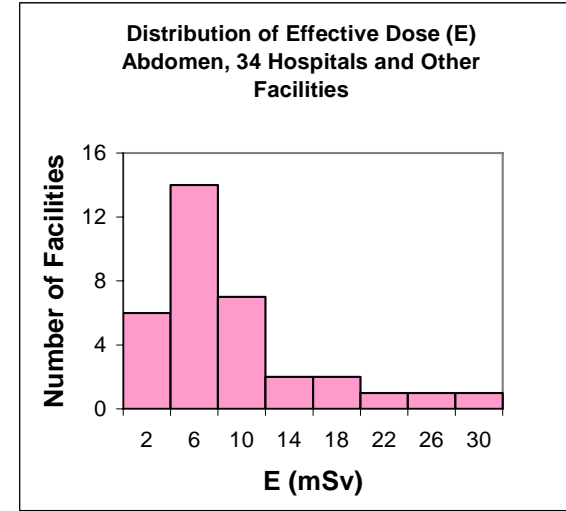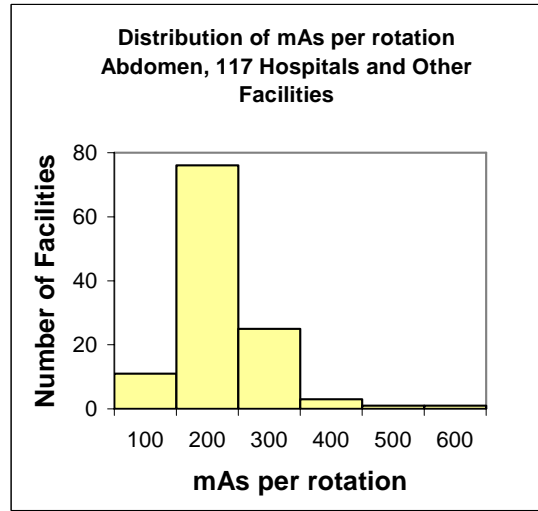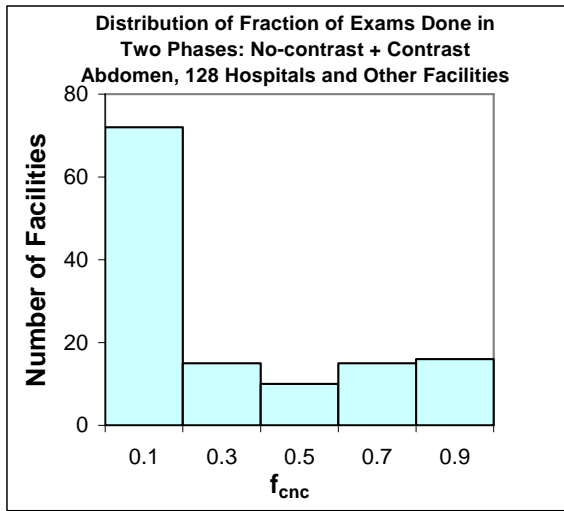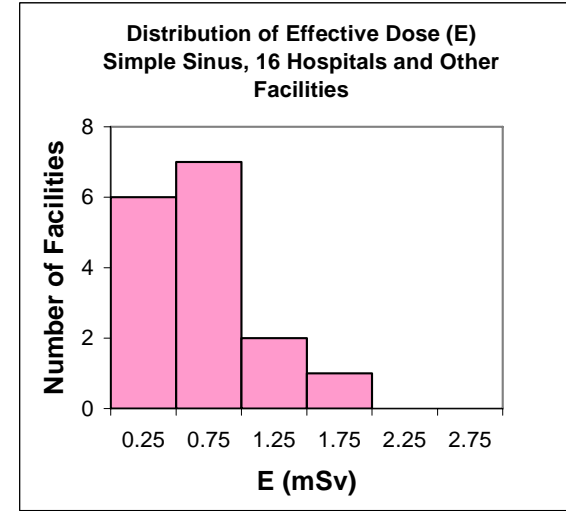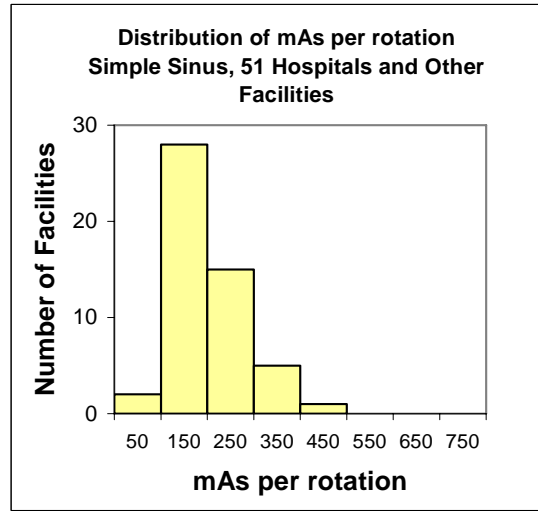
Table 1.42. Simple sinus exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.1	4.4	0.7	0.8	1.0	2.0	3.0	10.0	15.0	15.0	40
Scouts per exam	1.22	0.46	0.06	1.00	1	1	1	1	2	3	58
f_{nc}	0.91	0.25	0.04	0.00	0.21	1.00	1.00	1.00	1.00	1.00	48
f_c	0.09	0.25	0.04	0.00	0.00	0.00	0.00	0.00	0.81	1.00	47
f_{cnc}	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	47
kVp	123.2	8.4	1.1	100.0	120	120	120	120	140	140	55
mA	188	57	8	83	100	150	189	220	280	307	53
Time (s) per rotation	1.15	0.34	0.05	0.75	0.76	1.00	1.00	1.00	1.98	2.00	46
mAs per rotation	207	76	12	100	111	155	200	250	358	400	42
Reconstruct. increm. (mm)	3.1	1.0	0.2	0.6	2	3	3	3	5	5	39
Slices per rotation (n)	1.14	0.64	0.10	1.00	1.0	1.0	1.0	1.0	1.0	4.0	43
Slice width (T, mm)	3.32	0.85	0.12	1.30	2.8	3.0	3.0	3.0	5.0	5.5	53
Table feed per rotation ($I_{helical}$, mm)	3.98	2.24	0.34	1.14	3.0	3.0	3.0	4.5	7.4	16.0	43
Pitch [$I_{helical}/(nT)$]	1.08	0.27	0.05	0.75	0.80	1.00	1.00	1.00	1.55	2.00	35
L (mm)	102	30	7	25	60	96	100	114	150	170	21
$CTDI_{free\ air}$ (mGy)	53	28	5	16	18	36	44	64	108	132	32
$CTDI_{vol}$ (mGy)	36	17	3	10	17	24	31	42	67	79	25
DLP (mGy-cm)	309	155	45	79	118	227	263	388	563	633	12
E (mSv)	0.7	0.4	0.1	0.2	0.3	0.4	0.6	1.0	1.4	1.7	12

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Simple Sinus, 47 Hospitals

Distribution of mAs per rotation Simple Sinus, 42 Hospitals

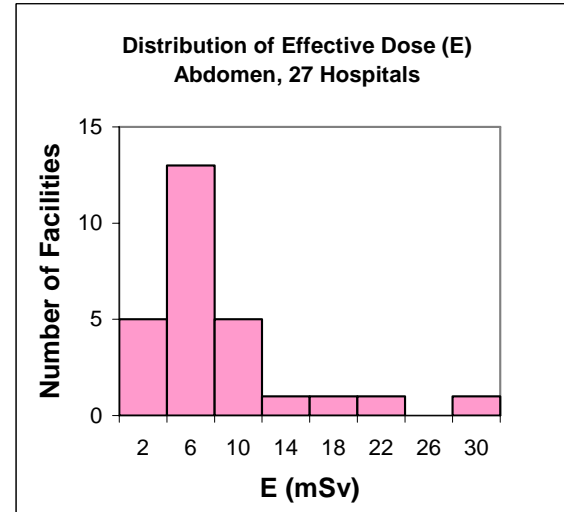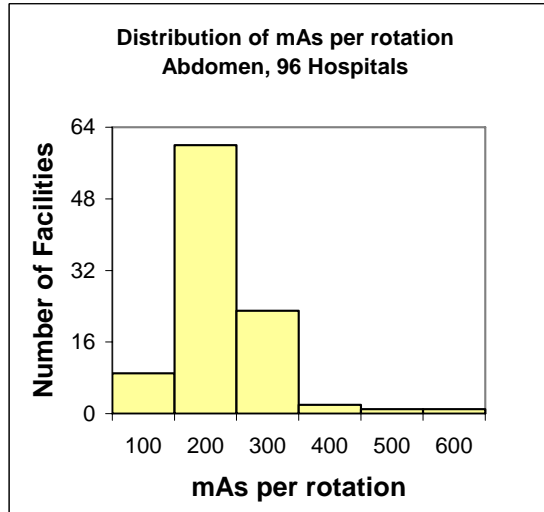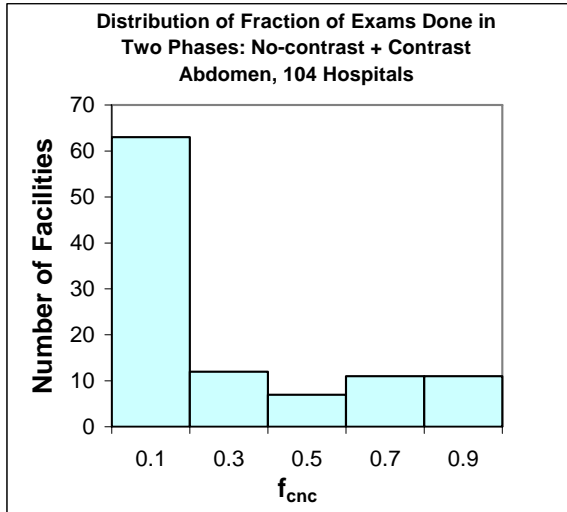Distribution of Effective Dose (E) Simple Sinus, 12 Hospitals
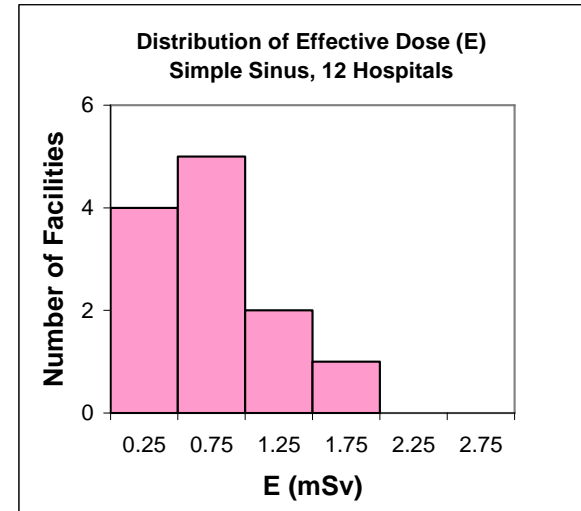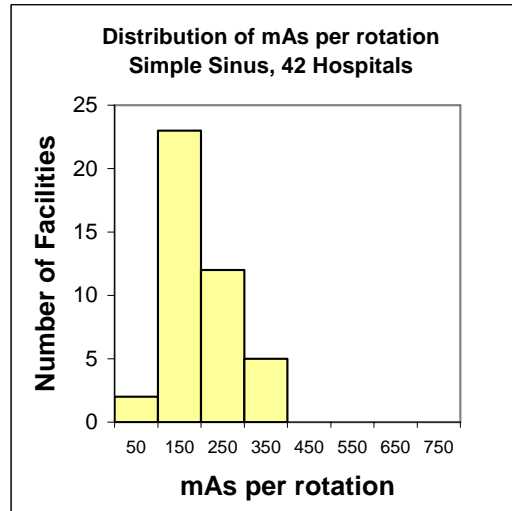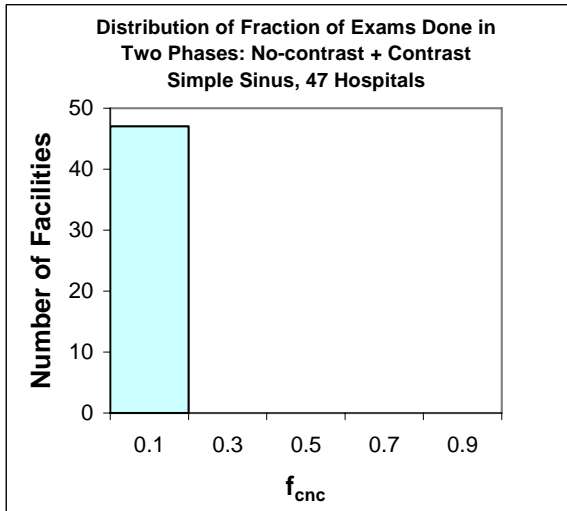
Table 1.43. Simple sinus exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	12.3	15.5	5.2	1.0	1.2	2.0	8.0	12.0	37.8	51.0	9
Scouts per exam	1.18	0.40	0.12	1.00	1	1	1	1	2	2	11
f_{nc}	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	11
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11
kVp	122.0	4.2	1.3	120.0	120	120	120	120	130	130	10
mA	177	42	13	120	134	153	160	195	246	250	10
Time (s) per rotation	1.21	0.34	0.11	1.00	1.00	1.00	1.00	1.50	1.74	1.90	9
mAs per rotation	227	100	33	150	154	160	180	250	395	458	9
Reconstruct. increm. (mm)	3.0	1.1	0.4	1.0	2	3	3	3	4	5	8
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	10
Slice width (T, mm)	3.22	0.67	0.22	3.00	3.0	3.0	3.0	3.0	4.2	5.0	9
Table feed per rotation ($I_{helical}$, mm)	3.74	0.92	0.31	3.00	3.0	3.0	3.0	4.5	5.0	5.0	9
Pitch [$I_{helical}/(nT)$]	1.13	0.22	0.08	1.00	1.00	1.00	1.00	1.20	1.47	1.50	7
L (mm)	103	24	8	75	76	87	104	110	136	150	8
$CTDI_{free\ air}$ (mGy)	54	19	7	18	26	47	59	62	75	80	7
$CTDI_{vol}$ (mGy)	28	7	3	17	18	24	30	34	34	34	5
DLP (mGy-cm)	277	90	45	189	193	206	276	347	363	367	4
E (mSv)	0.6	0.4	0.2	0.2	0.3	0.4	0.7	0.9	0.9	1.0	4

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Simple Sinus, 11 Facilities Other than Hospitals

Distribution of mAs per rotation Simple Sinus, 9 Facilities Other than Hospitals

Distribution of Effective Dose (E) Simple Sinus, 4 Facilities Other than Hospitals
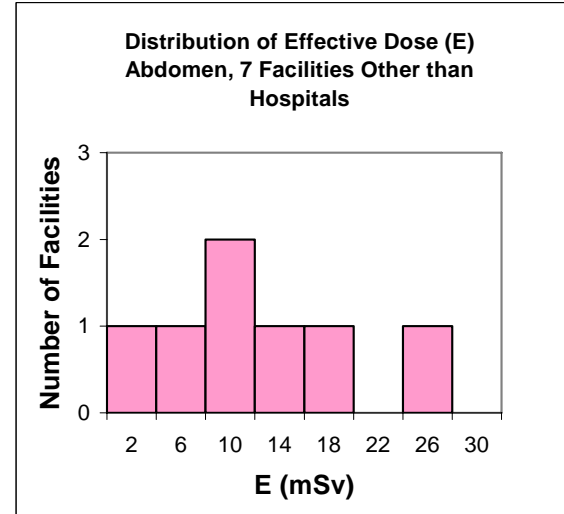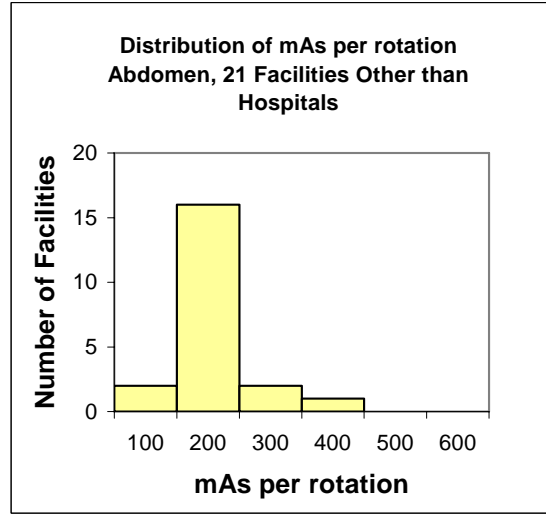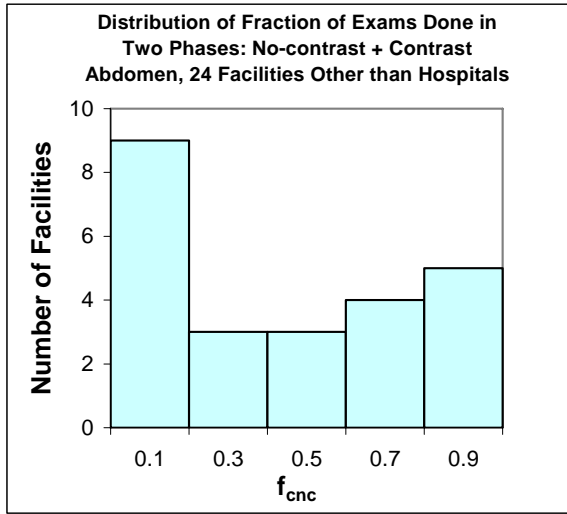
Table 1.44. Pelvis exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.9	5.3	0.8	0.1	0.5	1.0	2.0	5.0	8.0	30.0	44
Scouts per exam	1.13	0.33	0.04	1.00	1	1	1	1	2	2	79
f_{nc}	0.27	0.33	0.04	0.00	0.00	0.05	0.10	0.50	1.00	1.00	55
f_c	0.62	0.38	0.05	0.00	0.00	0.33	0.80	0.90	1.00	1.00	55
f_{cnc}	0.11	0.25	0.03	0.00	0.00	0.00	0.00	0.05	0.76	1.00	55
kVp	123.2	6.2	0.7	120.0	120	120	120	120	140	140	72
mA	186	57	7	70	120	140	178	220	280	400	72
Time (s) per rotation	1.87	0.70	0.08	0.75	1.00	1.00	2.00	2.00	3.00	4.50	72
mAs per rotation	314	116	14	100	162	250	280	385	470	900	67
Slices per contrast phase	22.7	5.5	0.7	10.0	15	20	22	25	30	45	61
Slices per rotation (n)	1.06	0.38	0.05	1.00	1.0	1.0	1.0	1.0	1.0	4.0	68
Slice width (T, mm)	9.31	1.50	0.18	5.00	5.0	10.0	10.0	10.0	10.0	10.0	71
Table increment (I_{axial}, mm)	9.53	1.60	0.19	2.50	7.0	10.0	10.0	10.0	10.0	15.0	69
$I_{axial}/(nT)$	1.01	0.12	0.02	0.50	1.00	1.00	1.00	1.00	1.00	1.60	62
L (mm)	217	60	8	65	150	180	200	250	300	445	56
$CTDI_{free air}$ (mGy)	75	52	8	19	27	45	65	88	128	355	46
$CTDI_{vol}$ (mGy)	28	35	5	6	7	15	21	31	39	243	43
DLP (mGy-cm)	491	236	38	92	125	339	493	609	848	1116	38
E (mSv)	8.8	5.3	1.0	1.8	2.2	5.2	7.6	10.7	17.0	24.0	26

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Pelvis
55 Hospitals and Other Facilities

Distribution of mAs per rotation
Pelvis
67 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Pelvis
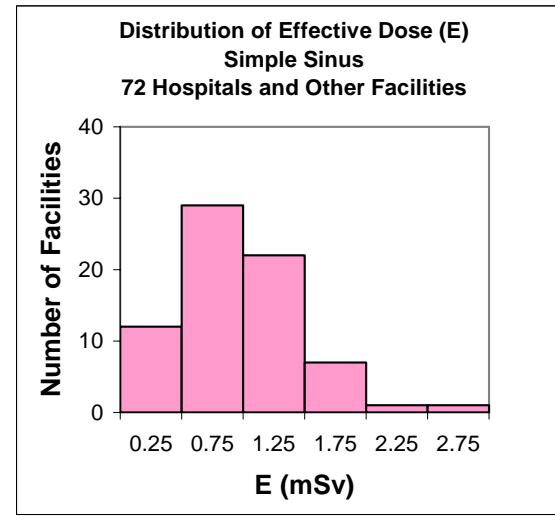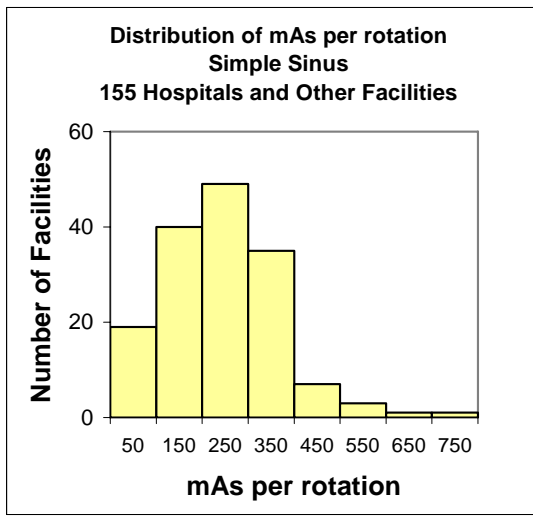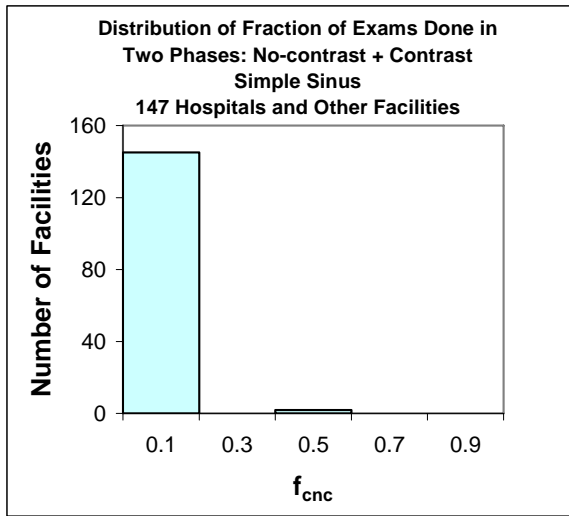26 Hospitals and Other Facilities
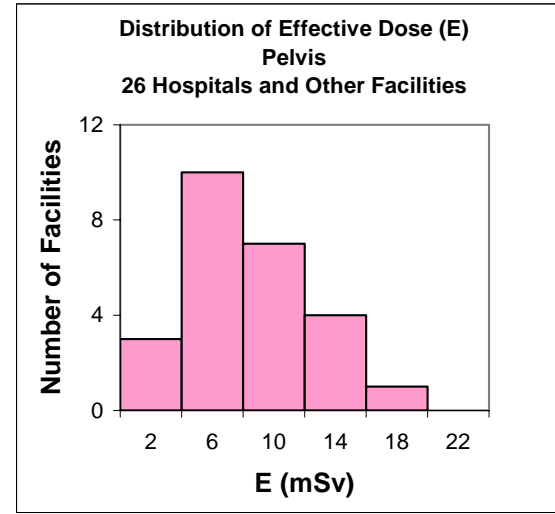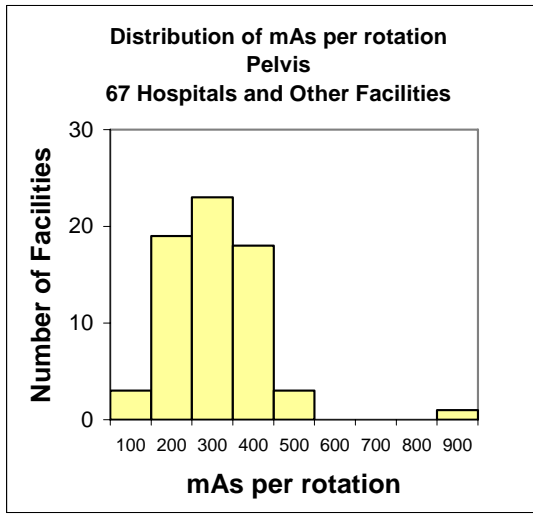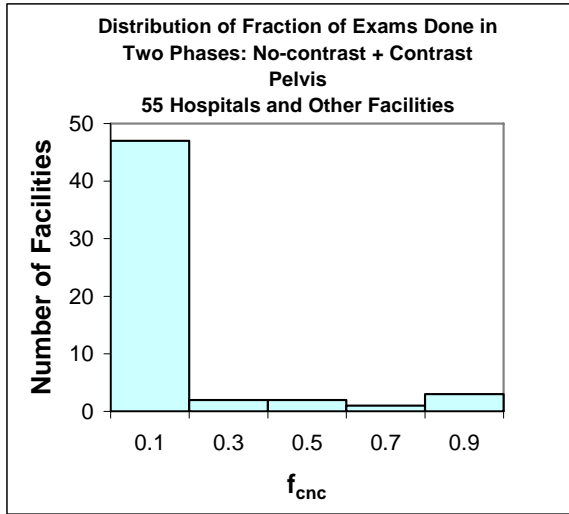
Table 1.45. Pelvis exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.2	6.3	1.2	0.2	0.7	1.9	3.5	7.0	15.8	30.0	28
Scouts per exam	1.20	0.40	0.06	1.00	1	1	1	1	2	2	51
f_{nc}	0.31	0.35	0.06	0.00	0.00	0.05	0.10	0.50	1.00	1.00	33
f_c	0.60	0.38	0.07	0.00	0.00	0.25	0.80	0.90	1.00	1.00	33
f_{cnc}	0.09	0.21	0.04	0.00	0.00	0.00	0.00	0.05	0.58	0.90	33
kVp	123.4	6.9	1.0	120.0	120	120	120	120	140	140	47
mA	197	56	8	120	127	160	200	220	280	400	49
Time (s) per rotation	1.78	0.75	0.11	0.75	1.00	1.00	2.00	2.00	2.95	4.50	46
mAs per rotation	308	86	13	140	167	250	280	400	439	480	44
Slices per contrast phase	22.9	6.2	1.0	10.0	15	20	23	25	31	45	37
Slices per rotation (n)	1.09	0.48	0.07	1.00	1.0	1.0	1.0	1.0	1.0	4.0	43
Slice width (T, mm)	9.15	1.63	0.24	5.00	5.0	10.0	10.0	10.0	10.0	10.0	46
Table increment (I_{axial}, mm)	9.34	1.72	0.26	2.50	7.0	10.0	10.0	10.0	10.0	13.0	43
$I_{axial}/(nT)$	0.99	0.10	0.02	0.50	1.00	1.00	1.00	1.00	1.00	1.30	38
L (mm)	212	59	10	65	130	180	200	250	300	350	33
$CTDI_{free\,air}$ (mGy)	69	32	6	19	31	45	55	87	126	135	29
$CTDI_{vol}$ (mGy)	23	10	2	6	11	15	20	31	39	40	26
DLP (mGy-cm)	490	252	53	92	199	335	411	647	916	1116	23
E (mSv)	9.4	6.1	1.6	3.1	3.8	5.2	6.8	13.5	19.8	24.0	14

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Pelvis
33 Hospitals

Distribution of mAs per rotation
Pelvis
44 Hospitals

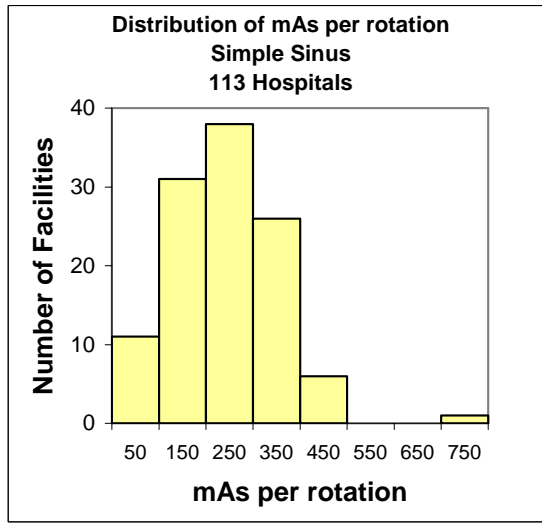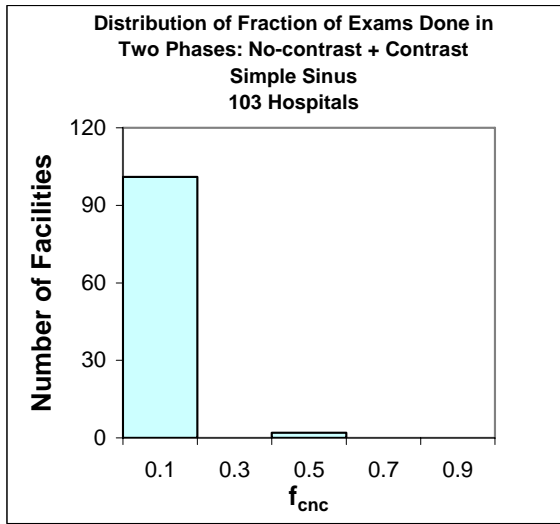Distribution of Effective Dose (E)
Pelvis
14 Hospitals
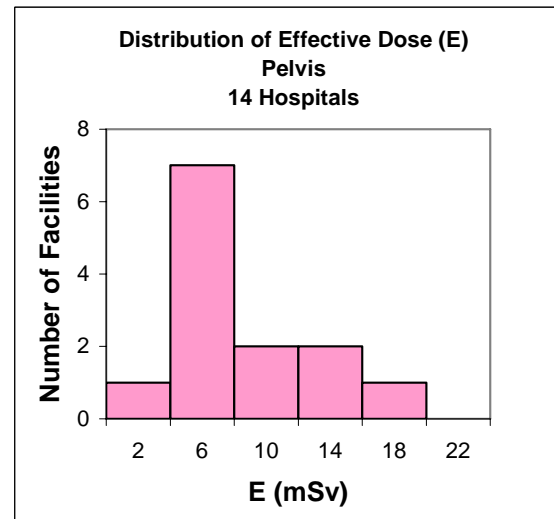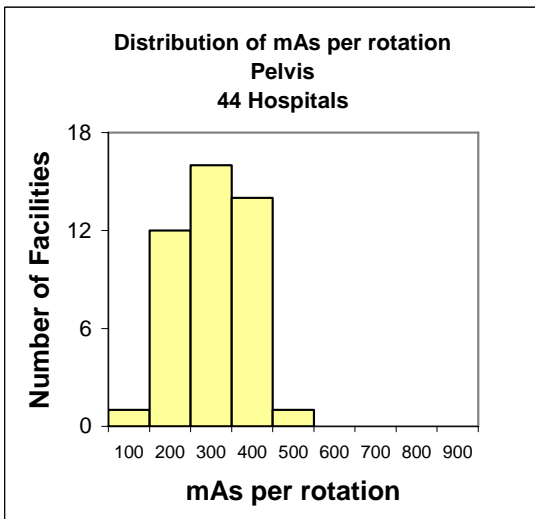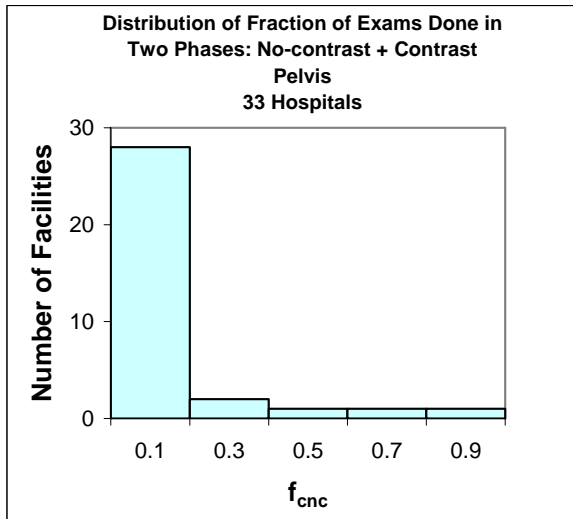
Table 1.46. Pelvis exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.5	1.1	0.3	0.1	0.4	1.0	1.0	2.0	3.1	5.0	16
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	28
f_{nc}	0.22	0.28	0.06	0.00	0.00	0.05	0.10	0.43	0.79	1.00	22
f_c	0.65	0.37	0.08	0.00	0.00	0.50	0.85	0.90	1.00	1.00	22
f_{cnc}	0.13	0.30	0.06	0.00	0.00	0.00	0.00	0.01	0.98	1.00	22
kVp	122.9	4.8	1.0	120.0	120	120	120	130	130	133	25
mA	163	53	11	70	100	128	160	180	250	300	23
Time (s) per rotation	2.02	0.60	0.12	1.00	1.00	1.90	2.00	2.10	3.00	3.00	26
mAs per rotation	324	160	33	100	146	245	300	361	510	900	23
Slices per contrast phase	22.6	4.3	0.9	15.0	16	20	22	25	30	30	24
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	25
Slice width (T, mm)	9.60	1.18	0.24	5.00	7.5	10.0	10.0	10.0	10.0	10.0	25
Table increment (I_{axial}, mm)	9.85	1.34	0.26	7.50	7.6	10.0	10.0	10.0	10.0	15.0	26
$I_{axial}/(nT)$	1.05	0.16	0.03	1.00	1.00	1.00	1.00	1.00	1.43	1.60	24
L (mm)	223	64	13	149	151	194	210	245	300	445	23
$CTDI_{free\ air}$ (mGy)	86	75	18	19	25	50	69	88	174	355	17
$CTDI_{vol}$ (mGy)	35	54	13	6	7	17	27	30	77	243	17
DLP (mGy-cm)	491	217	56	107	121	342	535	605	779	810	15
E (mSv)	8.0	4.2	1.2	1.8	1.9	5.5	8.4	10.4	14.3	15.6	12

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Pelvis
22 Facilities Other than Hospitals

Distribution of mAs per rotation
Pelvis
23 Facilities Other than Hospitals

Distribution of Effective Dose (E)
Pelvis
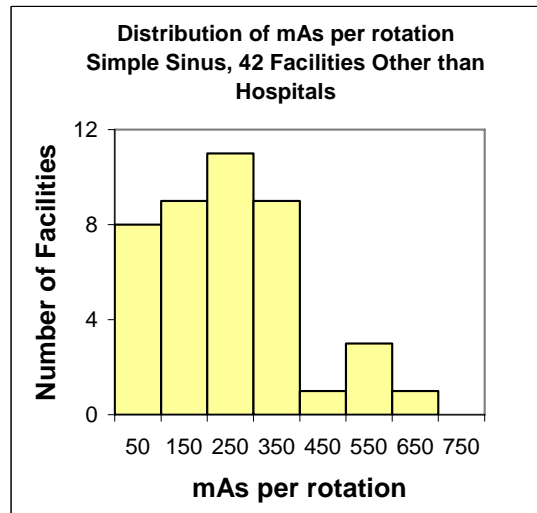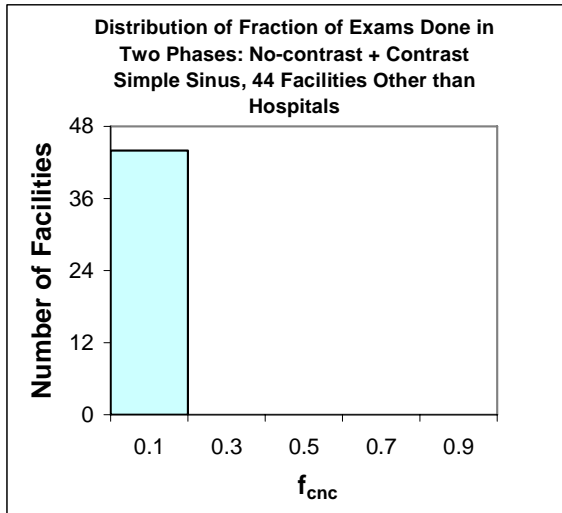12 Facilities Other than Hospitals
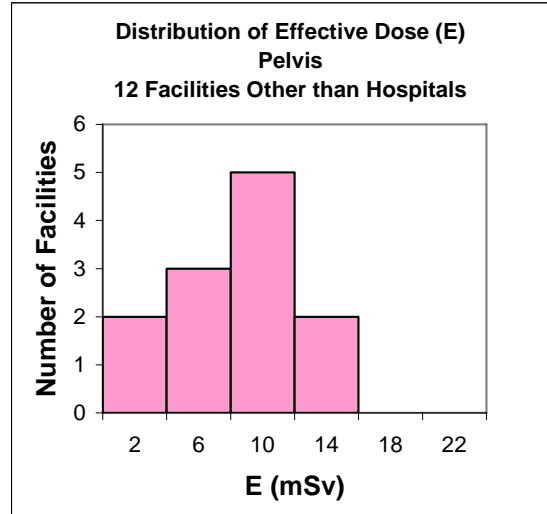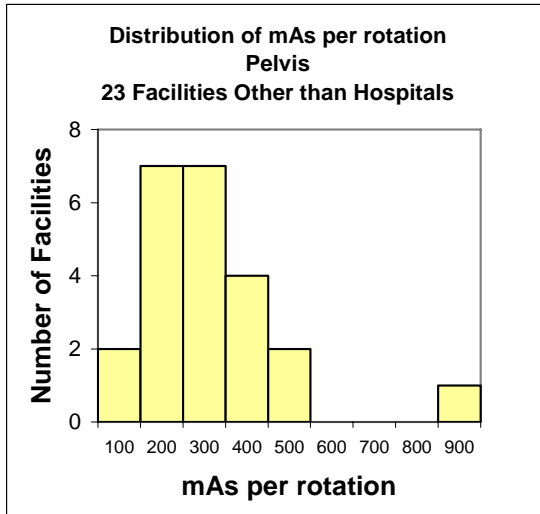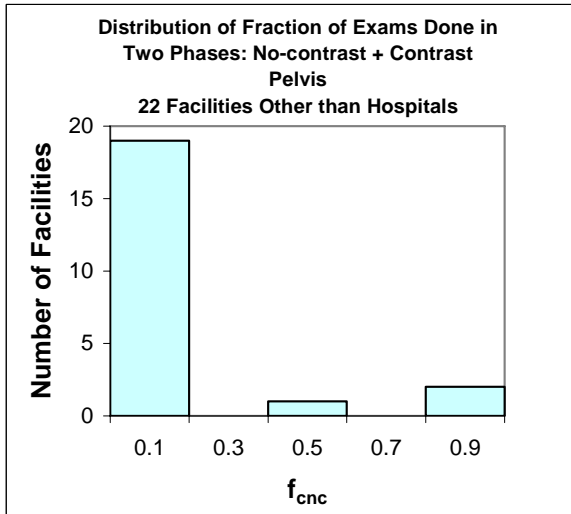
Table 1.47. Pelvis exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	7.0	11.7	1.2	1.0	1.0	1.0	2.0	8.0	29.0	90.0	101
Scouts per exam	1.28	0.45	0.04	1.00	1	1	1	2	2	2	136
f_{nc}	0.26	0.31	0.03	0.00	0.00	0.02	0.10	0.40	1.00	1.00	112
f_c	0.64	0.37	0.03	0.00	0.00	0.45	0.80	0.95	1.00	1.00	112
f_{cnc}	0.10	0.25	0.02	0.00	0.00	0.00	0.00	0.04	0.79	1.00	112
kVp	122.3	5.2	0.5	120.0	120	120	120	120	133	140	131
mA	225	64	6	80	100	200	235	260	300	400	130
Time (s) per rotation	1.15	0.40	0.04	0.50	0.75	1.00	1.00	1.06	2.00	3.00	113
mAs per rotation	245	83	8	80	134	200	250	280	390	600	109
Reconstruct. increm. (mm)	7.3	2.3	0.2	1.9	3	5	7	10	10	10	101
Slices per rotation (n)	1.15	0.62	0.06	1.00	1.0	1.0	1.0	1.0	1.9	4.0	102
Slice width (T, mm)	7.71	1.91	0.17	3.00	5.0	7.0	7.5	10.0	10.0	10.0	127
Table feed per rotation ($I_{helical}$, mm)	9.71	4.23	0.41	1.75	5.0	7.0	10.0	10.5	15.0	42.0	109
Pitch [$I_{helical}/(nT)$]	1.17	0.29	0.03	0.50	0.84	1.00	1.00	1.50	1.50	2.14	85
L (mm)	232	60	8	75	149	200	220	292	341	360	59
$CTDI_{free air}$ (mGy)	62	30	3	15	25	39	53	78	115	141	80
$CTDI_{vol}$ (mGy)	18	9	1	4	8	12	16	21	31	50	64
DLP (mGy-cm)	381	173	31	71	146	234	382	509	640	805	31
E (mSv)	6.2	3.4	0.6	1.4	2.0	3.8	5.3	8.3	11.3	16.8	29

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pelvis, 112 Hospitals and Other Facilities

Distribution of mAs per rotation Pelvis, 109 Hospitals and Other Facilities

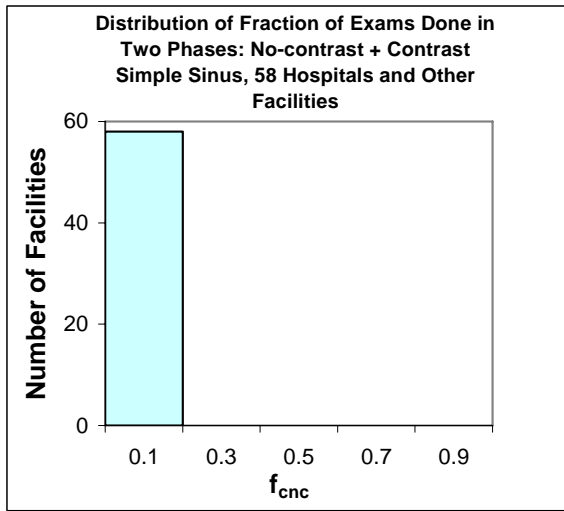Distribution of Effective Dose (E) Pelvis, 29 Hospitals and Other Facilities

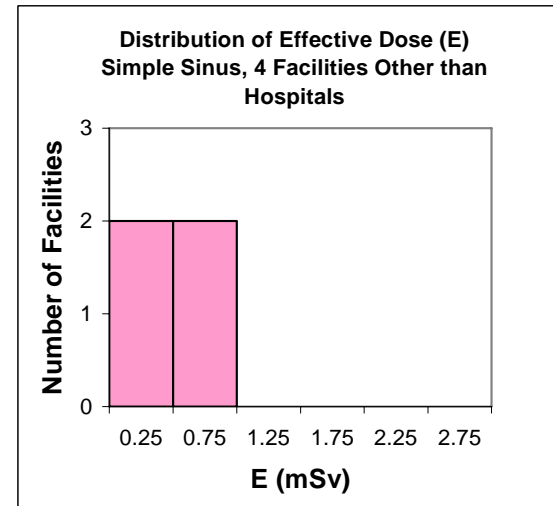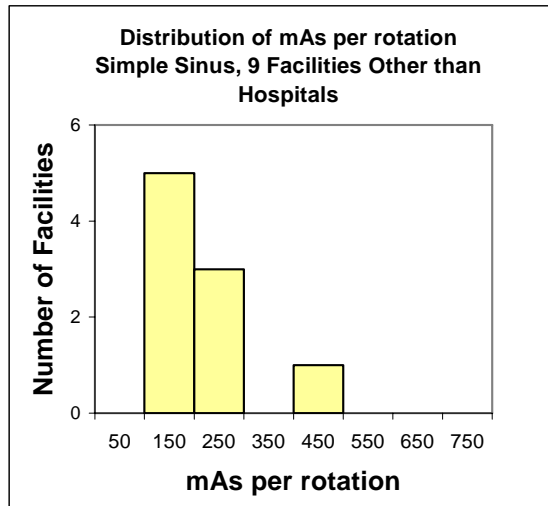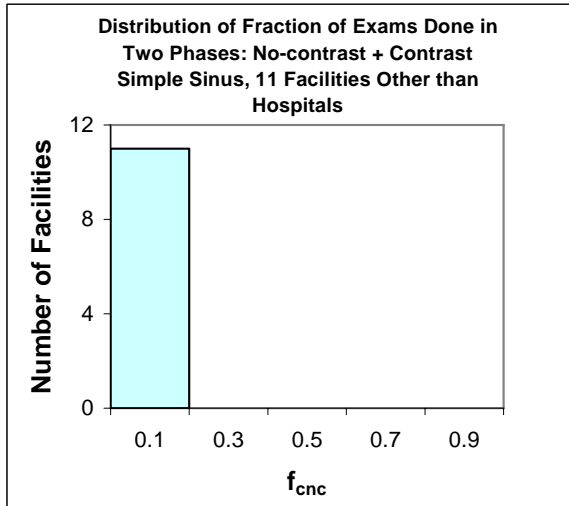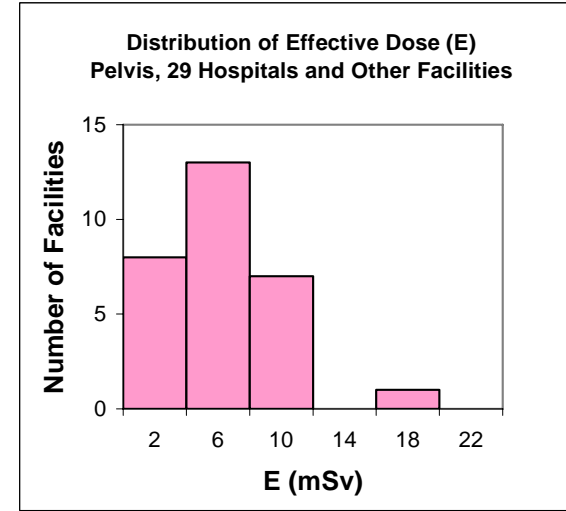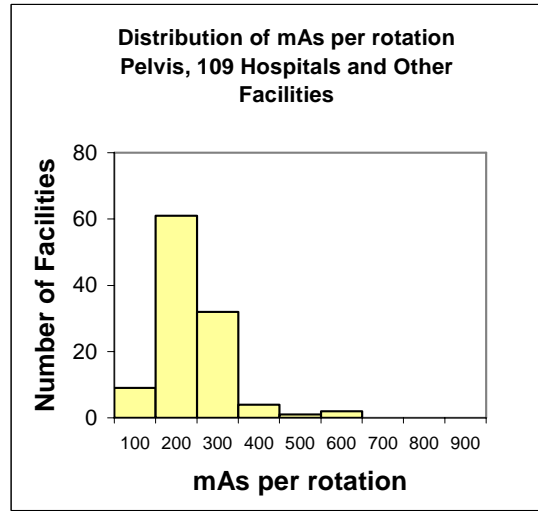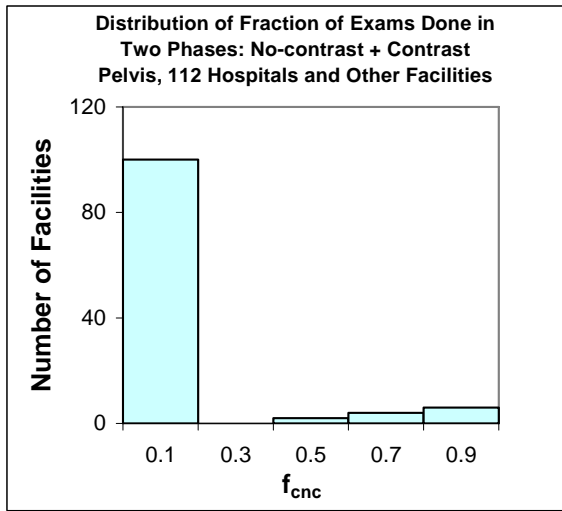## Table 1.48. Pelvis exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	7.4	12.4	1.3	1.0	1.0	1.0	2.0	7.9	29.0	90.0	87
Scouts per exam	1.32	0.47	0.04	1.00	1	1	1	2	2	2	113
f_{nc}	0.27	0.32	0.03	0.00	0.00	0.02	0.10	0.43	1.00	1.00	91
f_c	0.65	0.37	0.04	0.00	0.00	0.48	0.80	0.95	1.00	1.00	91
f_{cnc}	0.08	0.21	0.02	0.00	0.00	0.00	0.00	0.02	0.70	1.00	91
kVp	122.3	5.5	0.5	120.0	120	120	120	120	138	140	109
mA	227	61	6	80	125	200	230	260	300	400	109
Time (s) per rotation	1.14	0.37	0.04	0.50	0.75	1.00	1.00	1.00	2.00	2.00	93
mAs per rotation	243	77	8	100	144	200	241	280	378	600	90
Reconstruct. increm. (mm)	7.2	2.3	0.2	1.9	3	5	7	10	10	10	85
Slices per rotation (n)	1.18	0.68	0.08	1.00	1.0	1.0	1.0	1.0	2.9	4.0	83
Slice width (T, mm)	7.51	1.91	0.19	3.00	5.0	6.6	7.0	10.0	10.0	10.0	106
Table feed per rotation ($I_{helical}$, mm)	9.61	4.48	0.47	1.75	5.0	7.0	10.0	10.5	15.0	42.0	91
Pitch [$I_{helical}/(nT)$]	1.18	0.30	0.04	0.50	0.85	1.00	1.00	1.50	1.61	2.14	70
L (mm)	236	61	9	75	143	200	230	299	335	360	46
$CTDI_{free\ air}$ (mGy)	60	29	4	19	26	38	52	73	113	141	66
$CTDI_{vol}$ (mGy)	17	9	1	4	7	12	15	20	31	50	54
DLP (mGy-cm)	359	150	30	71	161	221	355	447	578	602	25
E (mSv)	5.4	2.2	0.5	1.6	2.6	3.7	5.1	6.9	8.8	10.0	23

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pelvis, 91 Hospitals

Distribution of mAs per rotation Pelvis, 90 Hospitals

Distribution of Effective Dose (E) Pelvis, 23 Hospitals
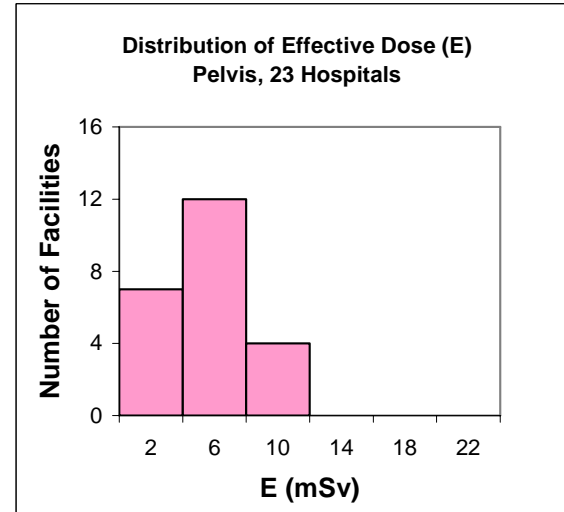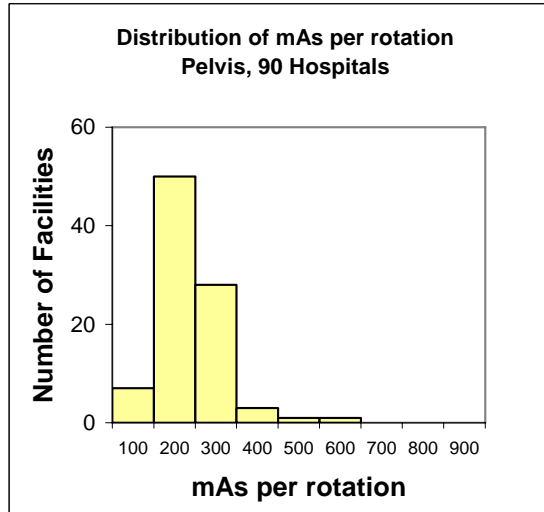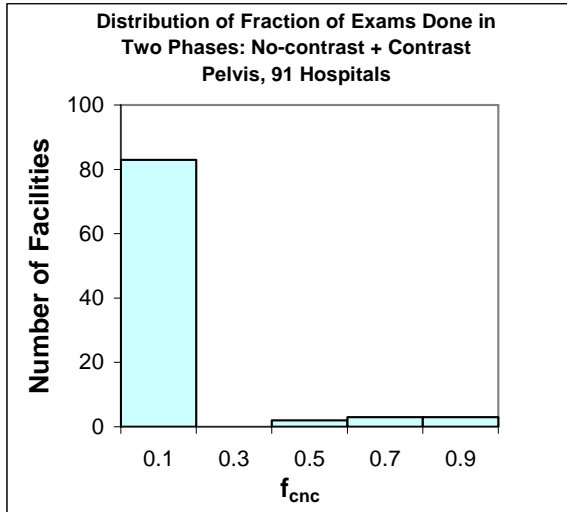
Table 1.49. Pelvis exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.7	5.1	1.4	1.0	1.0	1.0	1.0	9.0	13.1	15.0	14
Scouts per exam	1.09	0.29	0.06	1.00	1	1	1	1	2	2	23
f_{nc}	0.19	0.24	0.05	0.00	0.00	0.00	0.10	0.30	0.72	0.90	21
f_c	0.63	0.39	0.09	0.00	0.00	0.28	0.79	0.95	1.00	1.00	21
f_{cnc}	0.18	0.35	0.08	0.00	0.00	0.00	0.00	0.10	0.99	1.00	21
kVp	121.8	3.9	0.8	120.0	120	120	120	120	130	130	22
mA	216	79	17	83	83	160	240	250	300	400	21
Time (s) per rotation	1.20	0.52	0.12	0.75	0.75	1.00	1.00	1.50	1.96	3.00	20
mAs per rotation	251	109	25	80	123	194	250	290	398	600	19
Reconstruct. increm. (mm)	7.7	2.4	0.6	2.5	4	6	8	10	10	10	16
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	19
Slice width (T, mm)	8.74	1.63	0.36	5.00	6.5	7.0	10.0	10.0	10.0	10.0	21
Table feed per rotation ($I_{helical}$, mm)	10.22	2.64	0.62	4.88	6.7	10.0	10.0	10.0	15.0	15.0	18
Pitch [$I_{helical}/(nT)$]	1.13	0.25	0.06	0.75	0.93	1.00	1.00	1.35	1.50	1.50	15
L (mm)	215	55	15	150	161	200	200	230	320	350	13
$CTDI_{free\,air}$ (mGy)	72	34	9	15	21	46	76	96	116	131	14
$CTDI_{vol}$ (mGy)	19	8	3	8	9	14	19	24	33	35	10
DLP (mGy-cm)	470	244	100	136	182	337	441	633	774	805	6
E (mSv)	9.2	5.2	2.1	1.4	2.6	6.8	9.7	11.4	15.5	16.8	6

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pelvis, 21 Facilities Other than Hospitals

Distribution of mAs per rotation Pelvis, 19 Facilities Other than Hospitals

Distribution of Effective Dose (E) Pelvis, 6 Facilities Other than Hospitals

Table 1.50. Exams of the spine (cervical, thoracic, or lumbosacral); axial scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.1	4.9	0.4	0.1	1.0	1.0	2.0	5.0	14.3	35.0	136
Scouts per exam	1.41	0.49	0.04	1.00	1	1	1	2	2	2	168
f_{nc}	0.87	0.27	0.02	0.00	0.17	0.95	1.00	1.00	1.00	1.00	141
f_c	0.11	0.25	0.02	0.00	0.00	0.00	0.00	0.01	0.80	1.00	141
f_{cnc}	0.03	0.12	0.01	0.00	0.00	0.00	0.00	0.00	0.20	1.00	141
kVp	126.6	7.8	0.6	120.0	120	120	120	130	140	140	155
mA	204	62	5	75	108	160	200	250	315	400	152
Time (s) per rotation	2.22	1.07	0.09	1.00	1.00	1.65	2.00	2.70	4.00	8.00	155
mAs per rotation	421	190	16	100	191	300	400	500	754	1750	143
Slices per contrast phase	38.3	15.8	1.4	10.5	20	30	35	45	70	103	137
Slices per rotation (n)	1.06	0.38	0.03	1.00	1.0	1.0	1.0	1.0	1.0	4.0	146
Slice width (T, mm)	3.77	1.15	0.09	1.00	2.4	3.0	3.3	5.0	5.0	10.0	155
Table increment (I_{axial}, mm)	3.55	1.12	0.09	1.00	2.1	3.0	3.0	4.0	5.0	10.0	151
$I_{axial}/(nT)$	0.93	0.14	0.01	0.50	0.62	0.84	1.00	1.00	1.00	1.67	132
L (mm)	126	44	4	42	71	96	120	150	202	300	118
$CTDI_{free\ air}$ (mGy)	109	80	8	21	37	58	90	149	204	690	94
$CTDI_{vol}$ (mGy)	45	53	6	7	12	22	35	53	93	473	85
DLP (mGy-cm)	469	294	33	61	126	257	426	583	1053	1410	77
$E_{cervical}$ (mSv)	4.7	3.0	0.4	0.6	1.3	2.9	4.2	6.1	9.4	19.0	70
$E_{thoracic}$ (mSv)	7	4	1	1	2	4	6	8	15	24	61
$E_{lumbosacral}$ (mSv)	5.9	3.6	0.5	0.7	1.7	3.5	5.3	7.3	12.7	20.4	61

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Spine
141 Hospitals and Other Facilities

Distribution of mAs per rotation
Spine
143 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Cervical Spine
70 Hospitals and Other Facilities
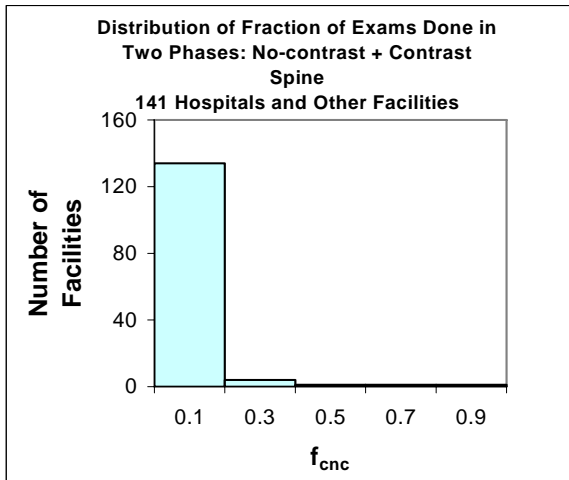
Table 1.51. Exams of the spine (cervical, thoracic, or lumbosacral); axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.6	5.3	0.5	0.2	1.0	1.5	3.0	5.0	15.0	35.0	101
Scouts per exam	1.44	0.50	0.04	1.00	1	1	1	2	2	2	125
f_{nc}	0.85	0.28	0.03	0.00	0.17	0.85	1.00	1.00	1.00	1.00	103
f_c	0.12	0.27	0.03	0.00	0.00	0.00	0.00	0.02	0.80	1.00	103
f_{cnc}	0.03	0.12	0.01	0.00	0.00	0.00	0.00	0.00	0.20	1.00	103
kVp	126.9	8.0	0.7	120.0	120	120	120	130	140	140	116
mA	210	63	6	105	118	170	200	250	335	400	117
Time (s) per rotation	2.13	0.98	0.09	1.00	1.00	1.50	2.00	2.32	4.00	6.00	115
mAs per rotation	406	149	14	150	200	300	400	500	687	840	109
Slices per contrast phase	38.4	16.2	1.6	10.5	18	29	35	45	70	103	99
Slices per rotation (n)	1.08	0.44	0.04	1.00	1.0	1.0	1.0	1.0	1.0	4.0	106
Slice width (T, mm)	3.78	1.22	0.11	1.00	2.4	3.0	3.0	5.0	5.0	10.0	115
Table increment (I_{axial}, mm)	3.60	1.21	0.12	1.00	2.0	3.0	3.0	4.0	5.0	10.0	110
$I_{axial}/(nT)$	0.93	0.11	0.01	0.60	0.72	0.88	1.00	1.00	1.00	1.00	94
L (mm)	124	42	5	45	72	98	118	149	200	255	82
$CTDI_{free\ air}$ (mGy)	101	54	7	21	41	57	87	141	204	231	70
$CTDI_{vol}$ (mGy)	38	21	3	9	12	21	35	53	75	100	62
DLP (mGy-cm)	453	262	35	83	129	244	441	574	963	1204	55
$E_{cervical}$ (mSv)	4.6	3.0	0.4	0.9	1.5	2.9	4.1	6.0	8.5	19.0	50
$E_{thoracic}$ (mSv)	7	4	1	1	2	4	6	9	13	24	42
$E_{lumbosacral}$ (mSv)	5.9	3.6	0.6	1.0	1.7	3.5	5.3	7.8	11.0	20.4	42

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Spine
103 Hospitals

Distribution of mAs per rotation
Spine
109 Hospitals

Distribution of Effective Dose (E)
Thoracic Spine
42 Hospitals

Table 1.52. Exams of the spine (cervical, thoracic, or lumbosacral); axial scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.4	2.5	0.4	0.1	0.5	1.0	1.5	3.0	6.5	12.0	35
Scouts per exam	1.33	0.47	0.07	1.00	1	1	1	2	2	2	43
f_{nc}	0.91	0.25	0.04	0.00	0.30	1.00	1.00	1.00	1.00	1.00	38
f_c	0.06	0.19	0.03	0.00	0.00	0.00	0.00	0.00	0.50	1.00	38
f_{cnc}	0.04	0.13	0.02	0.00	0.00	0.00	0.00	0.00	0.27	0.67	38
kVp	125.8	7.2	1.2	120.0	120	120	120	130	140	140	39
mA	183	58	10	75	95	140	176	212	256	350	35
Time (s) per rotation	2.49	1.26	0.20	1.00	1.00	2.00	2.00	3.00	4.05	8.00	40
mAs per rotation	470	283	48	100	154	325	448	519	778	1750	34
Slices per contrast phase	38.0	14.9	2.4	20.0	22	30	36	40	62	100	38
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	40
Slice width (T, mm)	3.75	0.93	0.15	2.00	2.5	3.0	3.8	5.0	5.0	5.0	40
Table increment (I_{axial}, mm)	3.44	0.85	0.13	2.00	2.5	3.0	3.0	4.0	5.0	5.0	41
$I_{axial}/(nT)$	0.93	0.20	0.03	0.50	0.59	0.81	1.00	1.00	1.02	1.67	38
L (mm)	131	49	8	42	70	94	135	149	195	300	36
$CTDI_{free\ air}$ (mGy)	134	128	26	22	29	85	109	166	177	690	24
$CTDI_{vol}$ (mGy)	63	94	20	7	14	28	35	56	119	473	23
DLP (mGy-cm)	509	364	78	61	129	274	408	600	1229	1410	22
$E_{cervical}$ (mSv)	5.0	3.0	0.7	0.6	1.1	3.1	4.3	6.3	10.2	11.5	20
$E_{thoracic}$ (mSv)	7	4	1	1	2	4	6	7	15	16	19
$E_{lumbosacral}$ (mSv)	5.7	3.8	0.9	0.7	1.7	3.3	5.3	6.5	12.9	13.6	19

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Spine, 38 Facilities Other than Hospitals

Distribution of mAs per rotation Spine, 34 Facilities Other than Hospitals

Distribution of Effective Dose (E) Lumbosacral Spine, 19 Facilities Other than Hospitals
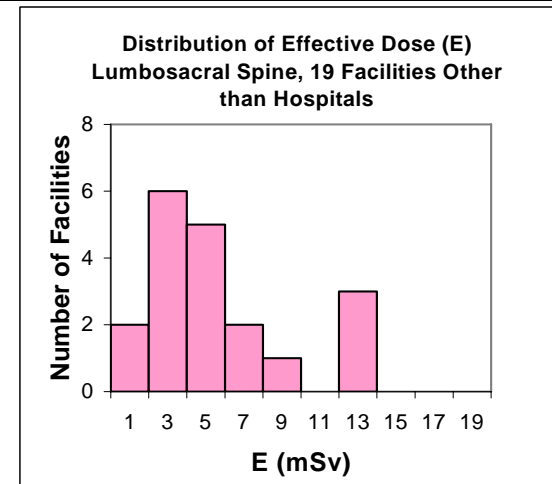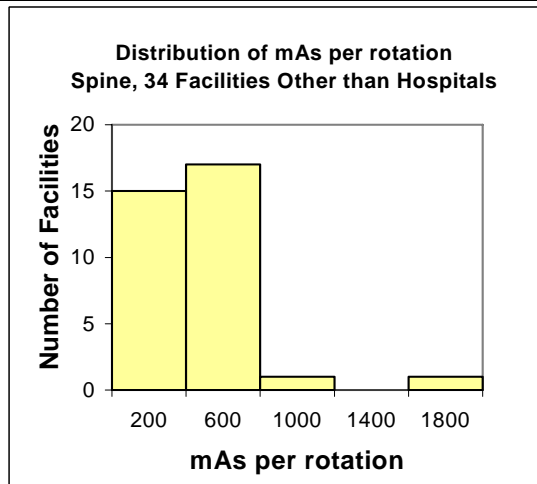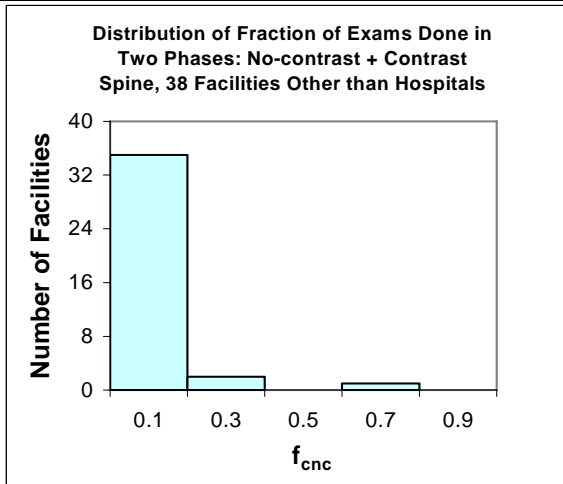
Table 1.53. Exams of the spine (cervical, thoracic, or lumbosacral); helical scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.3	3.7	0.5	0.1	1.0	1.3	3.3	5.2	12.3	16.3	66
Scouts per exam	1.53	0.50	0.05	1.00	1	1	2	2	2	2	88
f_{nc}	0.89	0.23	0.03	0.00	0.37	0.90	1.00	1.00	1.00	1.00	73
f_c	0.10	0.23	0.03	0.00	0.00	0.00	0.00	0.03	0.63	1.00	73
f_{cnc}	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.25	73
kVp	127.6	9.4	1.0	100.0	120	120	120	140	140	140	84
mA	225	69	8	40	100	190	225	250	319	467	83
Time (s) per rotation	1.45	0.65	0.08	0.75	0.77	1.00	1.00	2.00	3.00	3.00	67
mAs per rotation	308	131	16	112	161	225	280	355	590	750	63
Reconstruct. increm. (mm)	3.0	1.2	0.2	0.5	1	3	3	3	5	7	63
Slices per rotation (n)	1.18	0.71	0.09	1.00	1.0	1.0	1.0	1.0	3.0	4.0	68
Slice width (T, mm)	3.45	1.24	0.14	1.00	2.0	3.0	3.0	4.0	5.0	10.0	81
Table feed per rotation ($I_{helical}$, mm)	4.13	3.06	0.37	0.63	2.2	3.0	3.0	4.5	7.9	20.0	68
Pitch [$I_{helical}/(nT)$]	1.12	0.60	0.08	0.33	0.73	1.00	1.00	1.00	2.00	5.00	58
L (mm)	203	80	13	63	89	153	180	268	328	350	39
$CTDI_{free\,air}$ (mGy)	93	69	11	20	24	45	73	133	199	300	38
$CTDI_{vol}$ (mGy)	31	20	3	2	9	14	27	43	73	82	38
DLP (mGy-cm)	639	488	112	31	94	232	613	965	1427	1437	19
$E_{cervical}$ (mSv)	6.5	5.3	1.2	0.4	1.1	2.1	6.0	9.8	15.1	18.3	18
$E_{thoracic}$ (mSv)	9	7	2	0	1	3	8	13	21	23	18
$E_{lumbosacral}$ (mSv)	8.0	6.2	1.5	0.4	1.2	2.8	7.0	11.0	17.8	19.8	18

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Spine, 73 Hospitals and Other Facilities

Distribution of mAs per rotation Spine, 63 Hospitals and Other Facilities

Distribution of Effective Dose (E) Cervical Spine, 18 Hospitals and Other Facilities
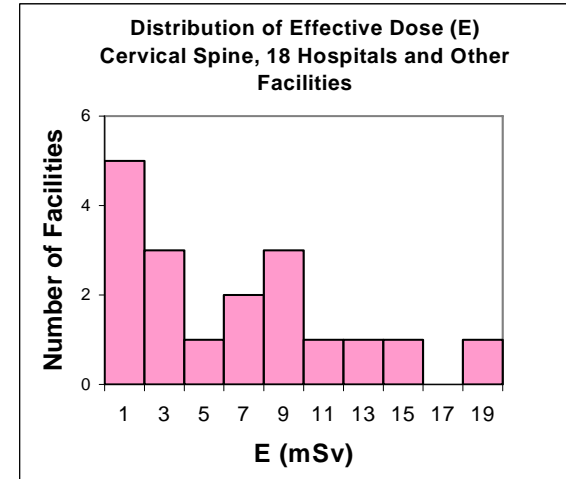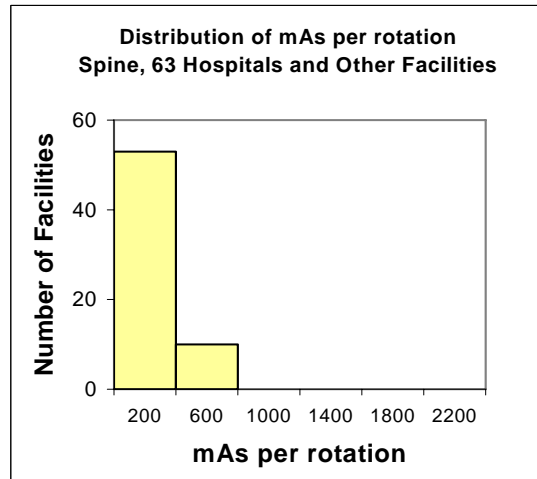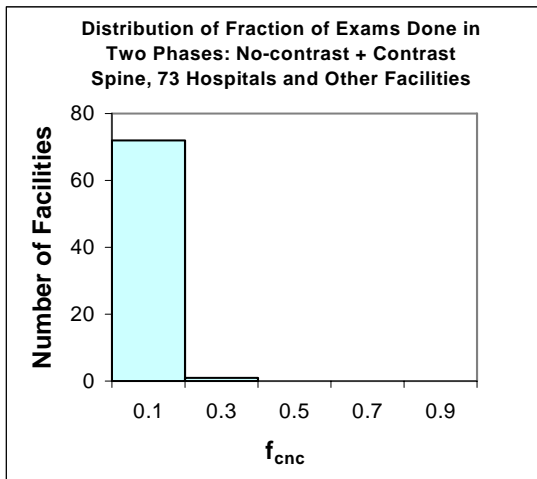
Table 1.54. Exams of the spine (cervical, thoracic, or lumbosacral); helical scanning, hospitals only
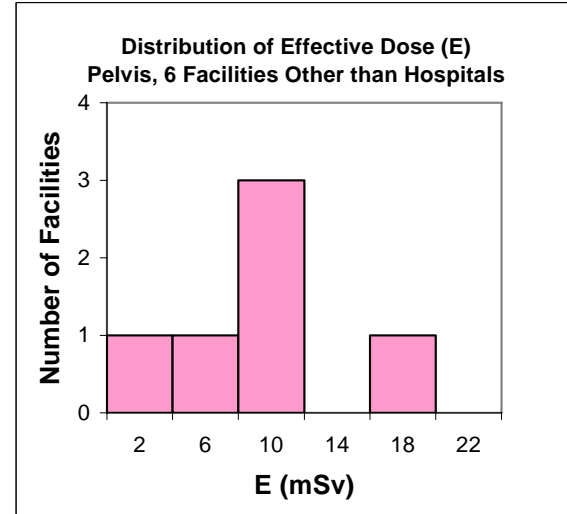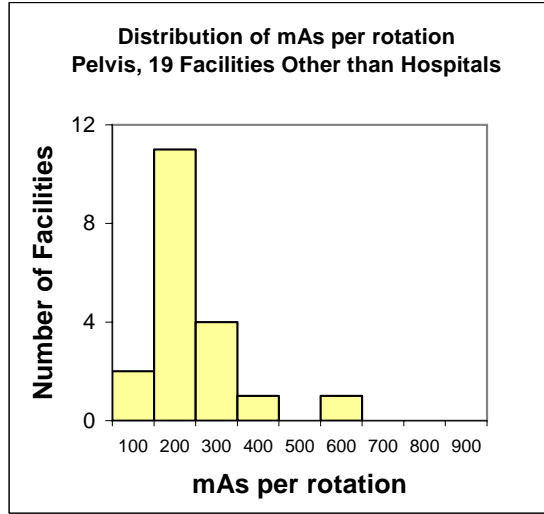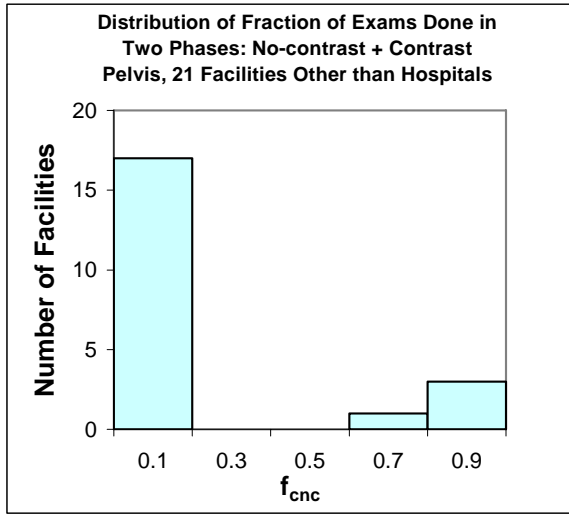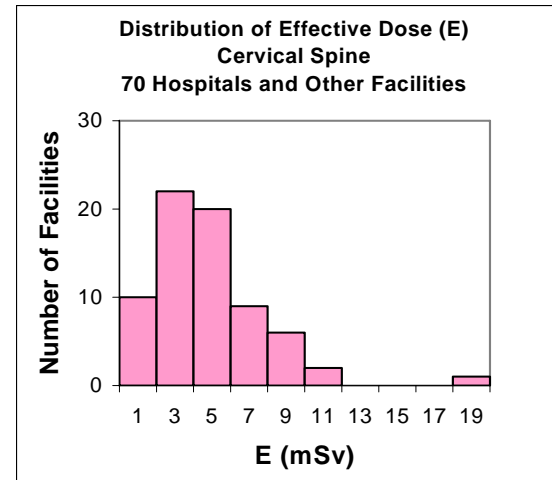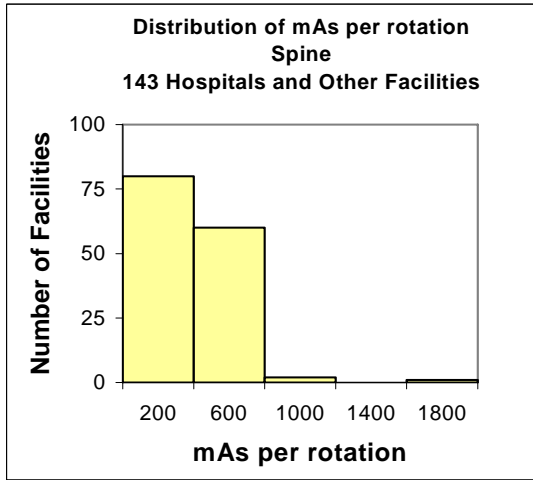
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.4	3.9	0.5	0.1	1.0	1.4	3.3	5.4	13.5	16.3	56
Scouts per exam	1.54	0.50	0.06	1.00	1	1	2	2	2	2	74
f_{nc}	0.89	0.25	0.03	0.00	0.32	0.94	1.00	1.00	1.00	1.00	60
f_c	0.11	0.25	0.03	0.00	0.00	0.00	0.00	0.04	0.68	1.00	60
f_{cnc}	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.17	60
kVp	127.5	9.6	1.1	100.0	120	120	120	140	140	140	71
mA	232	59	7	40	150	200	240	275	316	400	70
Time (s) per rotation	1.40	0.57	0.08	0.75	0.79	1.00	1.00	1.93	2.25	3.00	56
mAs per rotation	307	118	16	158	176	225	280	353	545	750	52
Reconstruct. increm. (mm)	3.0	1.3	0.2	0.5	1	3	3	3	5	7	53
Slices per rotation (n)	1.21	0.78	0.10	1.00	1.0	1.0	1.0	1.0	4.0	4.0	56
Slice width (T, mm)	3.42	1.28	0.16	1.00	2.0	3.0	3.0	4.0	5.0	10.0	68
Table feed per rotation ($I_{helical}$, mm)	4.19	3.31	0.44	0.63	2.0	3.0	3.0	4.3	10.0	20.0	57
Pitch [$I_{helical}/(nT)$]	1.15	0.66	0.10	0.33	0.65	1.00	1.00	1.00	2.00	5.00	47
L (mm)	206	86	16	63	82	139	190	275	339	350	30
$CTDI_{free\,air}$ (mGy)	86	58	10	24	26	47	69	119	163	300	31
$CTDI_{vol}$ (mGy)	30	19	3	2	8	14	26	43	63	82	31
DLP (mGy-cm)	606	546	146	31	76	181	338	1137	1430	1437	14
$E_{cervical}$ (mSv)	6.0	5.6	1.6	0.4	0.9	2.0	2.7	9.7	16.1	18.3	13
$E_{thoracic}$ (mSv)	8	8	2	0	1	3	4	11	21	23	13
$E_{lumbosacral}$ (mSv)	7.0	6.4	1.8	0.4	1.0	2.8	3.4	9.7	17.5	19.8	13

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Spine, 60 Hospitals

Distribution of mAs per rotation
Spine, 52 Hospitals

Distribution of Effective Dose (E)
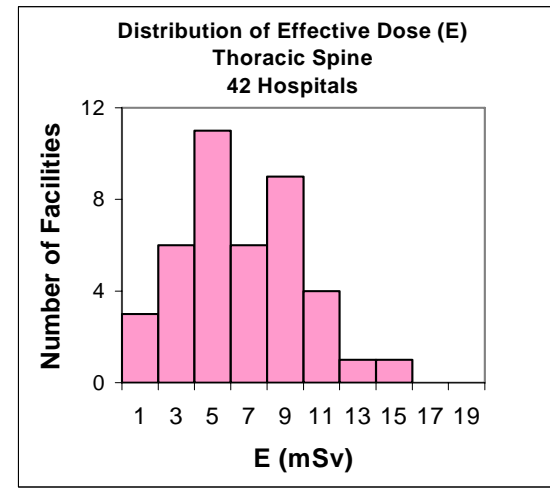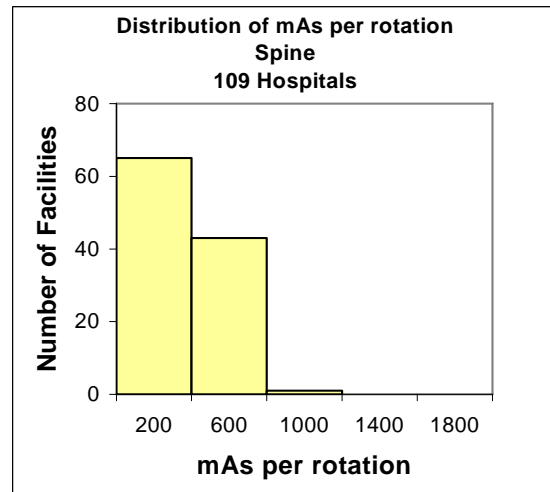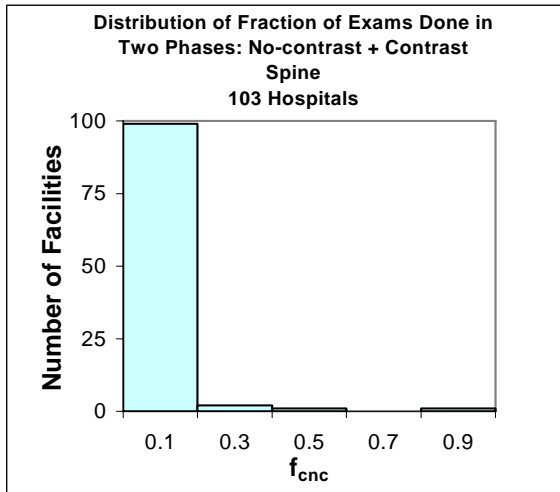Thoracic Spine, 13 Hospitals

70
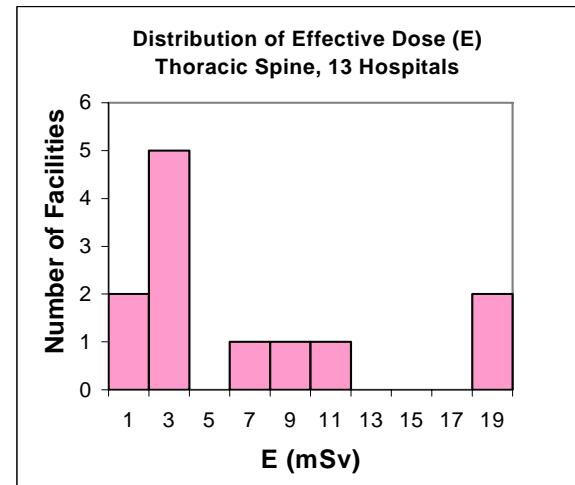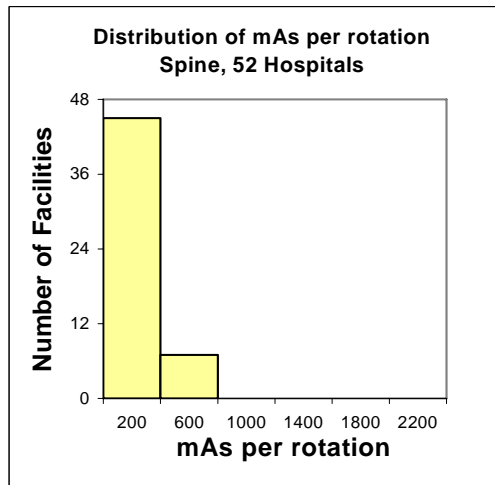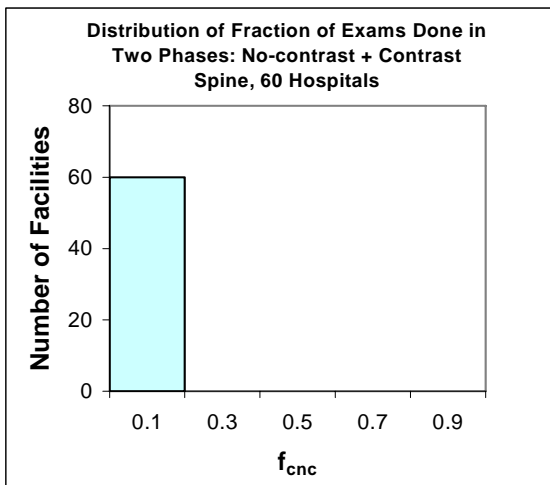
Table 1.55. Exams of the spine (cervical, thoracic, or lumbosacral); helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.7	2.5	0.8	1.0	1.0	1.3	4.0	5.0	7.1	8.0	10
Scouts per exam	1.50	0.52	0.14	1.00	1	1	2	2	2	2	14
f_{nc}	0.93	0.12	0.03	0.70	0.70	0.90	1.00	1.00	1.00	1.00	13
f_c	0.05	0.11	0.03	0.00	0.00	0.00	0.00	0.01	0.30	0.30	13
f_{cnc}	0.02	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.11	0.25	13
kVp	128.5	9.0	2.5	120.0	120	120	130	140	140	140	13
mA	187	103	29	83	83	100	175	223	337	467	13
Time (s) per rotation	1.70	0.99	0.30	0.75	0.78	0.90	1.00	2.75	3.00	3.00	11
mAs per rotation	311	187	56	112	135	180	250	394	615	750	11
Reconstruct. increm. (mm)	2.8	1.0	0.3	1.5	2	2	3	3	4	5	10
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	12
Slice width (T, mm)	3.63	1.02	0.28	2.50	2.5	3.0	3.0	5.0	5.0	5.0	13
Table feed per rotation ($I_{helical}$, mm)	3.86	1.10	0.33	2.50	2.8	3.0	3.0	5.0	5.0	5.0	11
Pitch [$I_{helical}/(nT)$]	1.02	0.08	0.02	1.00	1.00	1.00	1.00	1.00	1.13	1.25	11
L (mm)	194	54	18	100	124	165	180	250	258	260	9
$CTDI_{free\ air}$ (mGy)	125	106	40	20	21	26	153	175	264	299	7
$CTDI_{vol}$ (mGy)	34	23	9	10	10	12	41	44	64	72	7
DLP (mGy-cm)	733	299	134	253	347	724	757	866	1025	1064	5
$E_{cervical}$ (mSv)	8.1	4.4	2.0	1.3	2.3	6.4	9.8	10.2	12.1	12.6	5
$E_{thoracic}$ (mSv)	12	6	3	3	5	12	13	13	19	21	5
$E_{lumbosacral}$ (mSv)	10.4	5.4	2.4	2.4	4.0	10.3	11.0	11.0	16.2	17.5	5

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Spine, 13 Facilities Other than Hospitals

Distribution of mAs per rotation Spine, 11 Facilities Other than Hospitals

Distribution of Effective Dose (E) Lumbosacral Spine, 5 Facilities Other than Hospitals

Table 1.56. Chest+abdomen+pelvis exam, axial scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.0	4.2	0.7	0.1	0.3	1.0	2.0	4.0	10.0	25.0	41
Scouts per exam	1.38	0.49	0.06	1.00	1	1	1	2	2	2	69
f_{nc}	0.19	0.31	0.05	0.00	0.00	0.00	0.05	0.17	1.00	1.00	44
f_c	0.49	0.44	0.07	0.00	0.00	0.00	0.55	0.95	1.00	1.00	44
f_{cnc}	0.31	0.42	0.06	0.00	0.00	0.00	0.03	0.79	1.00	1.00	44
kVp	123.6	6.8	0.9	120.0	120	120	120	120	140	140	59
mA	183	59	8	60	100	130	188	205	281	340	60
Time (s) per rotation	1.90	0.66	0.08	1.00	1.00	1.43	2.00	2.03	3.00	4.00	60
mAs per rotation	314	106	14	100	178	248	300	383	488	600	56
Slices per contrast phase	71.0	14.1	1.9	43.8	50	60	70	80	92	100	53
Slices per rotation (n)	1.05	0.39	0.05	1.00	1.0	1.0	1.0	1.0	1.0	4.0	59
Slice width (T, mm)	9.33	1.29	0.16	5.00	7.0	9.5	10.0	10.0	10.0	10.0	63
Table increment (I_{axial}, mm)	9.46	1.40	0.18	5.00	7.0	10.0	10.0	10.0	10.0	15.0	61
$I_{axial}/(nT)$	1.01	0.09	0.01	0.80	0.98	1.00	1.00	1.00	1.03	1.50	56
L (mm)	677	137	19	438	500	600	659	750	933	1000	50
$CTDI_{free\ air}$ (mGy)	76	31	6	27	30	51	74	104	127	129	31
$CTDI_{vol}$ (mGy)	24	10	2	6	11	15	24	29	40	44	33
DLP (mGy-cm)	1604	748	132	414	666	957	1508	2074	2841	3147	32
E (mSv)	35.1	19.6	4.3	12.0	14.4	21.2	29.7	47.4	74.6	75.9	21

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest+Abdomen+Pelvis 44 Hospitals and Other Facilities

Distribution of mAs per rotation Chest+Abdomen+Pelvis 56 Hospitals and Other Facilities

Distribution of Effective Dose (E) Chest+Abdomen+Pelvis 21 Hospitals and Other Facilities

Table 1.57. Chest+abdomen+pelvis exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.0	4.9	1.0	0.2	0.3	1.0	1.8	3.0	5.0	25.0	24
Scouts per exam	1.34	0.48	0.07	1.00	1	1	1	2	2	2	44
f_{nc}	0.15	0.28	0.06	0.00	0.00	0.00	0.02	0.17	0.84	1.00	24
f_c	0.68	0.41	0.08	0.00	0.00	0.40	0.90	0.96	1.00	1.00	24
f_{cnc}	0.17	0.34	0.07	0.00	0.00	0.00	0.01	0.10	0.99	1.00	24
kVp	122.9	6.8	1.1	120.0	120	120	120	120	140	140	37
mA	193	55	9	100	119	140	200	233	282	300	39
Time (s) per rotation	1.85	0.69	0.11	1.00	1.00	1.00	2.00	2.00	2.84	4.00	37
mAs per rotation	323	104	17	200	200	250	290	400	500	600	36
Slices per contrast phase	73.3	13.6	2.4	50.0	53	62	71	86	92	100	32
Slices per rotation (n)	1.08	0.49	0.08	1.00	1.0	1.0	1.0	1.0	1.0	4.0	37
Slice width (T, mm)	9.13	1.45	0.23	5.00	6.0	8.5	10.0	10.0	10.0	10.0	40
Table increment (I_{axial}, mm)	9.19	1.36	0.22	5.00	6.9	8.5	10.0	10.0	10.0	10.0	38
$I_{axial}/(nT)$	1.00	0.04	0.01	0.85	0.97	1.00	1.00	1.00	1.00	1.11	35
L (mm)	678	126	23	451	502	600	659	750	900	1000	31
$CTDI_{free\ air}$ (mGy)	74	33	8	29	31	47	70	106	126	129	18
$CTDI_{vol}$ (mGy)	23	11	2	6	10	14	20	31	40	44	20
DLP (mGy-cm)	1567	841	193	414	662	900	1426	2130	2964	3147	19
E (mSv)	30.2	17.2	5.2	12.0	13.2	17.5	24.9	38.5	57.5	67.3	11

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest+Abdomen+Pelvis 24 Hospitals

Distribution of mAs per rotation Chest+Abdomen+Pelvis 36 Hospitals

Distribution of Effective Dose (E) Chest+Abdomen+Pelvis 11 Hospitals

Table 1.58. Chest+abdomen+pelvis exam, axial scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.1	3.0	0.7	0.1	0.4	1.0	2.0	4.0	10.0	10.0	17
Scouts per exam	1.44	0.51	0.10	1.00	1	1	1	2	2	2	25
f_{nc}	0.24	0.35	0.08	0.00	0.00	0.01	0.10	0.21	1.00	1.00	20
f_c	0.27	0.37	0.08	0.00	0.00	0.00	0.05	0.49	0.90	0.99	20
f_{cnc}	0.47	0.45	0.10	0.00	0.00	0.00	0.50	0.90	1.00	1.00	20
kVp	124.7	6.9	1.5	120.0	120	120	120	130	140	140	22
mA	165	62	13	60	100	125	170	200	250	340	21
Time (s) per rotation	1.98	0.60	0.13	1.00	1.00	1.90	2.00	2.10	3.00	3.00	23
mAs per rotation	299	110	25	100	119	230	322	373	465	510	20
Slices per contrast phase	67.3	14.2	3.1	43.8	50	55	68	80	90	96	21
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	22
Slice width (T, mm)	9.67	0.86	0.18	7.50	7.5	10.0	10.0	10.0	10.0	10.0	23
Table increment (I_{axial}, mm)	9.91	1.37	0.29	7.50	7.6	10.0	10.0	10.0	10.0	15.0	23
$I_{axial}/(nT)$	1.03	0.14	0.03	0.80	1.00	1.00	1.00	1.00	1.33	1.50	21
L (mm)	676	156	36	438	494	538	675	800	961	970	19
$CTDI_{free\ air}$ (mGy)	79	29	8	27	32	64	82	99	117	129	13
$CTDI_{vol}$ (mGy)	25	8	2	14	15	20	26	28	37	41	13
DLP (mGy-cm)	1659	614	170	638	775	1346	1897	2054	2502	2597	13
E (mSv)	40.5	21.5	6.8	14.4	17.5	28.1	32.3	52.8	75.3	75.9	10

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest+Abdomen+Pelvis, 20 Facilities Other than Hospitals

Distribution of mAs per rotation Chest+Abdomen+Pelvis, 20 Facilities Other than Hospitals

Distribution of Effective Dose (E) Chest+Abdomen+Pelvis, 10 Facilities Other than Hospitals
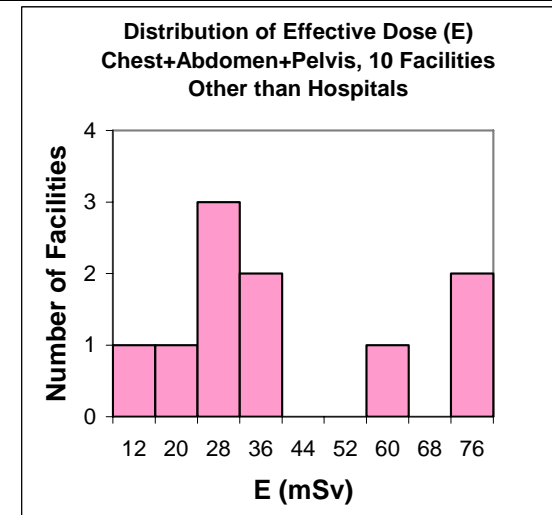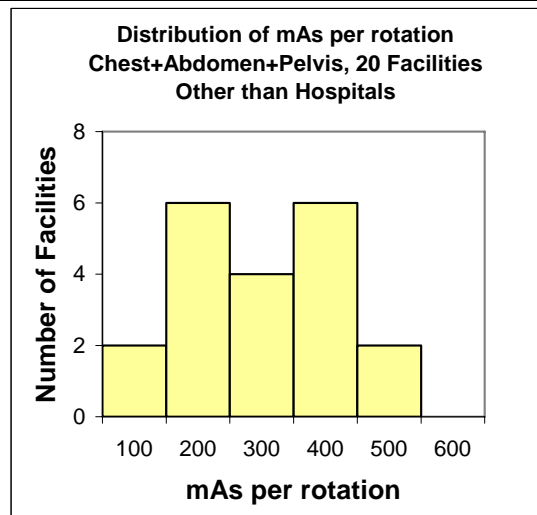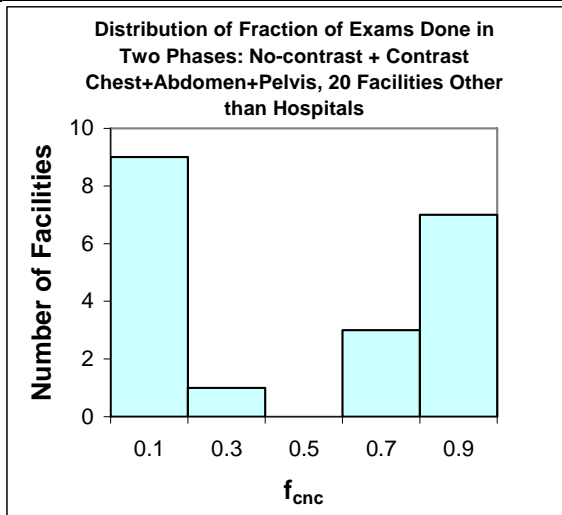
Table 1.59. Chest+abdomen+pelvis exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.2	7.3	0.7	0.5	1.0	2.0	5.0	7.5	18.0	60.0	113
Scouts per exam	1.40	0.49	0.04	1.00	1	1	1	2	2	2	150
f_{nc}	0.10	0.21	0.02	0.00	0.00	0.00	0.01	0.10	0.52	1.00	117
f_c	0.66	0.40	0.04	0.00	0.00	0.20	0.85	0.99	1.00	1.00	117
f_{cnc}	0.24	0.38	0.04	0.00	0.00	0.00	0.00	0.40	1.00	1.00	117
kVp	122.6	5.8	0.5	110.0	120	120	120	120	140	140	139
mA	221	60	5	80	125	200	225	250	304	400	137
Time (s) per rotation	1.09	0.34	0.03	0.50	0.75	1.00	1.00	1.00	2.00	2.00	122
mAs per rotation	230	73	7	83	123	193	225	260	338	600	115
Reconstruct. increm. (mm)	7.7	1.8	0.2	2.0	5	7	8	9	10	10	106
Slices per rotation (n)	1.12	0.57	0.05	1.00	1.0	1.0	1.0	1.0	1.0	4.0	110
Slice width (T, mm)	7.79	1.70	0.15	5.00	5.0	7.0	8.0	10.0	10.0	10.0	136
Table feed per rotation ($I_{helical}$, mm)	10.04	4.35	0.40	1.75	5.0	7.0	10.0	12.0	15.0	42.0	119
Pitch [$I_{helical}/(nT)$]	1.23	0.37	0.04	0.80	0.94	1.00	1.00	1.50	1.83	3.00	95
L (mm)	641	132	17	360	441	550	650	700	886	945	63
$CTDI_{free\,air}$ (mGy)	57	27	3	8	25	37	50	73	108	120	77
$CTDI_{vol}$ (mGy)	17	9	1	2	6	11	15	19	37	46	64
DLP (mGy-cm)	1078	638	115	266	471	663	833	1279	2532	2802	31
E (mSv)	17.9	11.7	2.2	5.3	6.1	9.7	14.2	26.0	40.2	52.5	29

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest+Abdomen+Pelvis, 117 Hospitals and Other Facilities

Distribution of mAs per rotation Chest+Abdomen+Pelvis, 115 Hospitals and Other Facilities

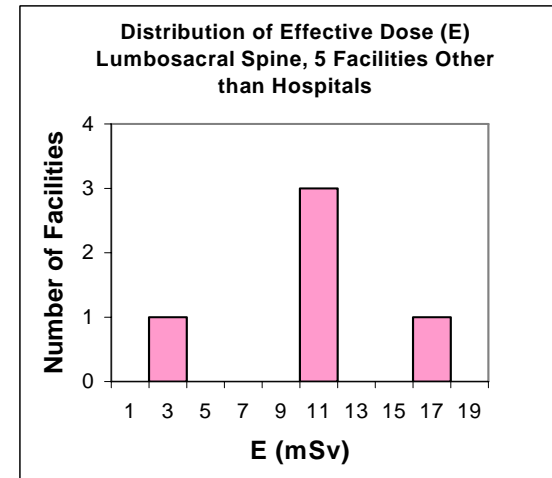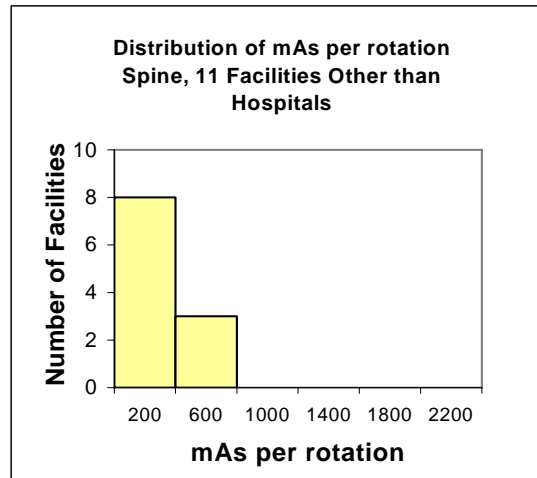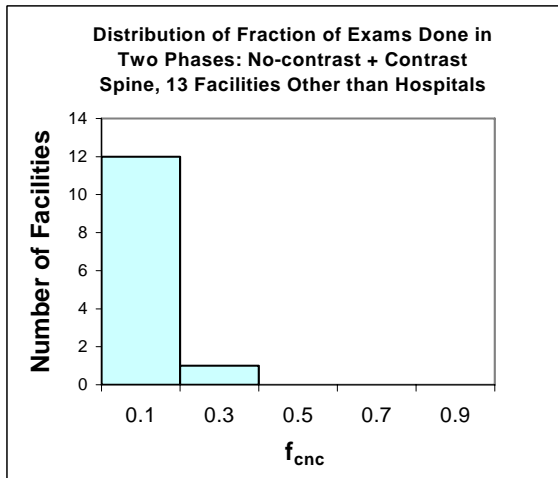Distribution of Effective Dose (E) Chest+Abdomen+Pelvis, 29 Hospitals and Other Facilities
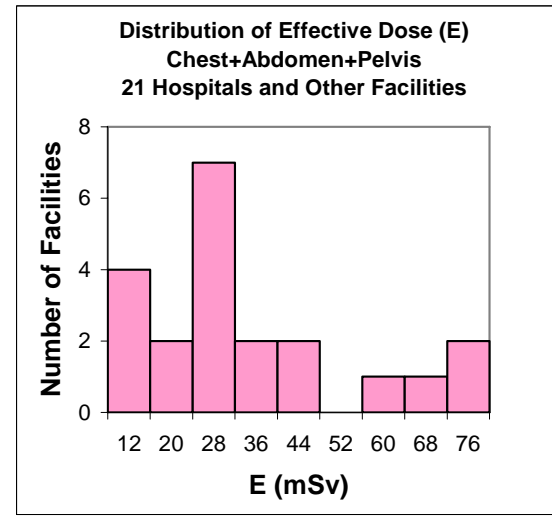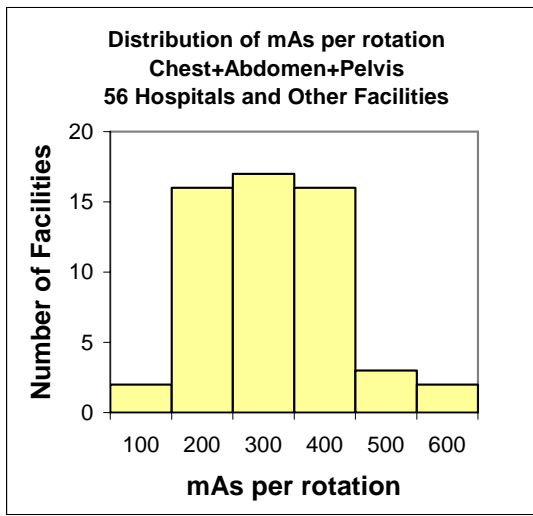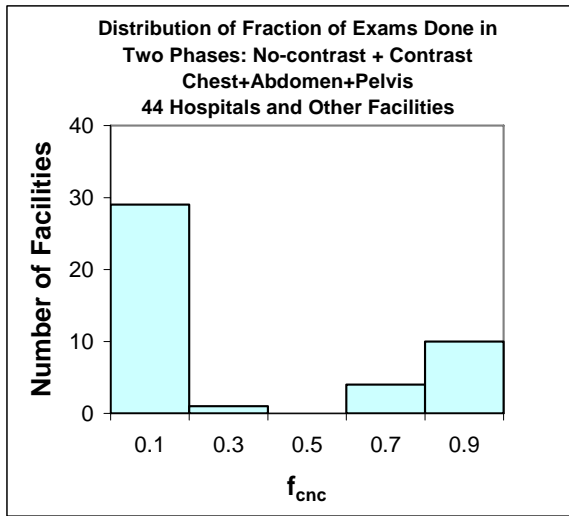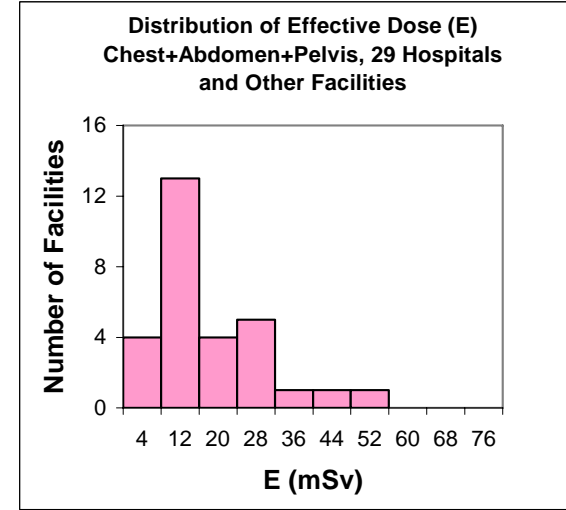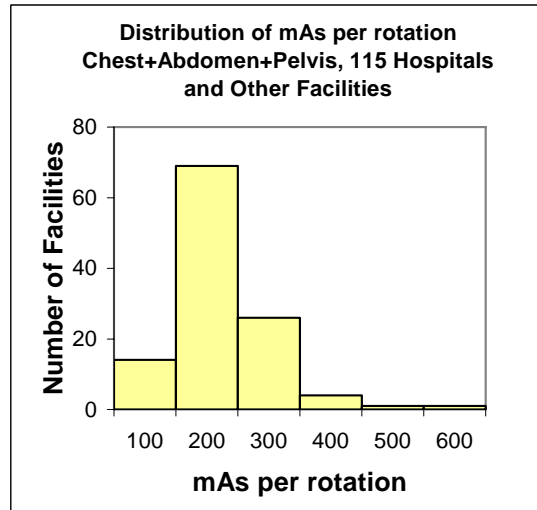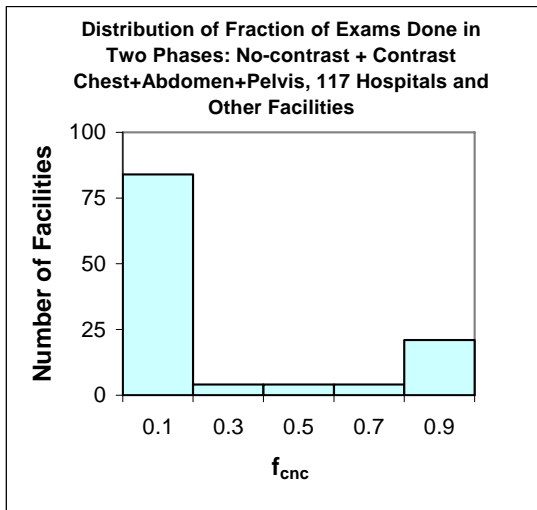
Table 1.60. Chest+abdomen+pelvis exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.2	7.6	0.8	0.5	1.0	2.0	5.0	7.3	15.9	60.0	95
Scouts per exam	1.41	0.49	0.04	1.00	1	1	1	2	2	2	123
f_{nc}	0.11	0.22	0.02	0.00	0.00	0.00	0.02	0.10	0.56	1.00	97
f_c	0.66	0.40	0.04	0.00	0.00	0.25	0.85	0.99	1.00	1.00	97
f_{cnc}	0.23	0.37	0.04	0.00	0.00	0.00	0.00	0.40	1.00	1.00	97
kVp	122.8	5.9	0.6	120.0	120	120	120	120	140	140	113
mA	222	55	5	80	125	200	223	250	300	400	112
Time (s) per rotation	1.10	0.34	0.03	0.50	0.75	1.00	1.00	1.00	2.00	2.00	98
mAs per rotation	232	77	8	83	127	199	225	261	385	600	92
Reconstruct. increm. (mm)	7.5	1.7	0.2	2.0	5	7	7	9	10	10	88
Slices per rotation (n)	1.14	0.62	0.07	1.00	1.0	1.0	1.0	1.0	1.5	4.0	91
Slice width (T, mm)	7.65	1.69	0.16	5.00	5.0	7.0	7.0	8.9	10.0	10.0	111
Table feed per rotation ($I_{helical}$, mm)	10.07	4.64	0.47	1.75	5.0	7.0	10.0	12.0	15.0	42.0	97
Pitch [$I_{helical}/(nT)$]	1.24	0.39	0.04	0.80	0.92	1.00	1.00	1.50	2.00	3.00	79
L (mm)	641	128	18	360	424	555	650	700	870	940	51
$CTDI_{free air}$ (mGy)	55	26	3	8	26	38	48	72	109	120	61
$CTDI_{vol}$ (mGy)	16	9	1	2	6	11	13	18	34	46	52
DLP (mGy-cm)	909	479	100	266	436	649	757	983	1652	2395	23
E (mSv)	14.0	6.9	1.5	5.7	6.6	8.6	11.5	16.2	27.2	28.6	21

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest+Abdomen+Pelvis, 97 Hospitals

Distribution of mAs per rotation Chest+Abdomen+Pelvis, 92 Hospitals

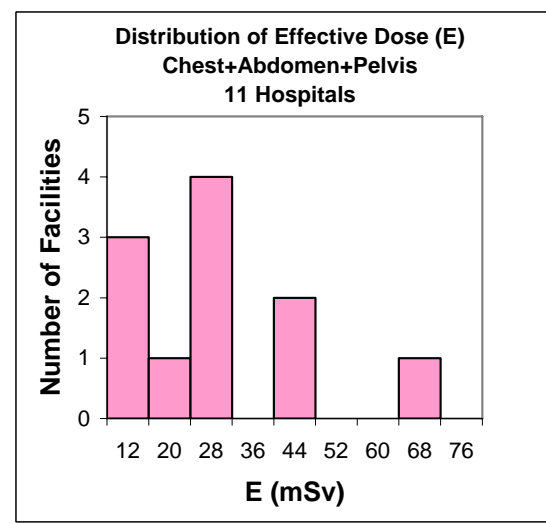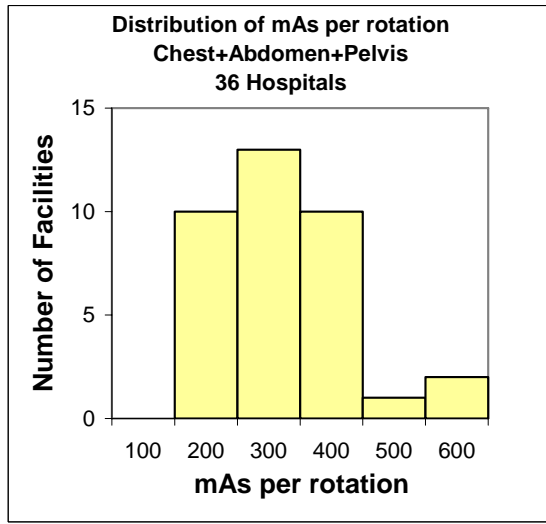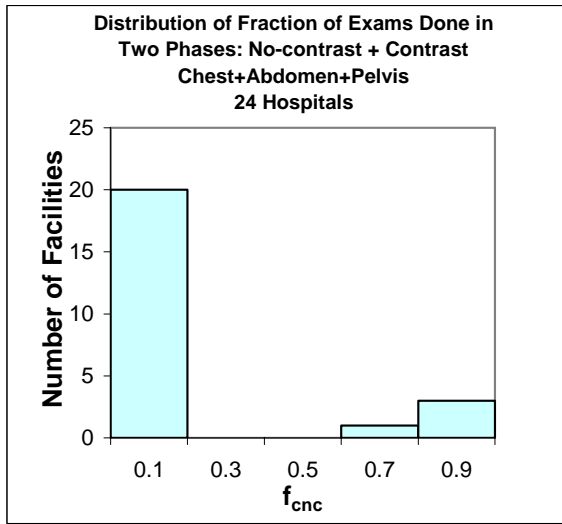Distribution of Effective Dose (E) Chest+Abdomen+Pelvis, 21 Hospitals
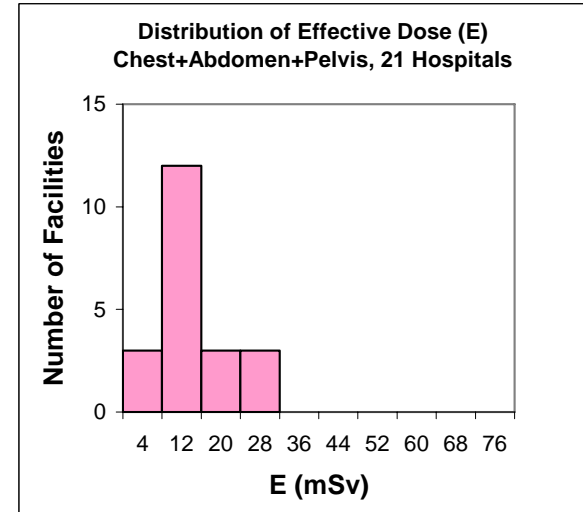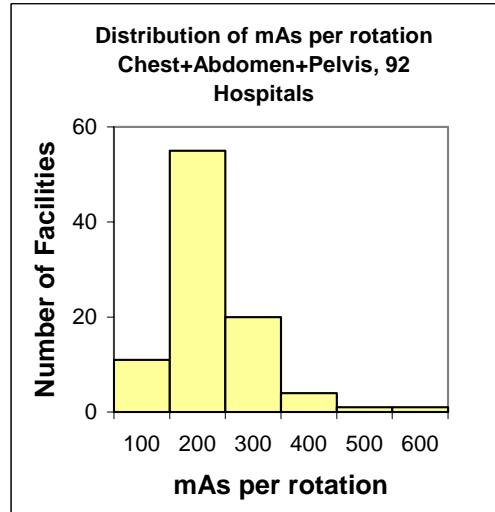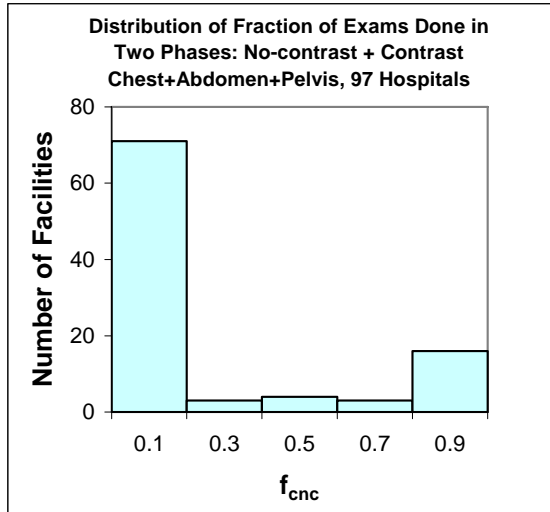
Table 1.61. Chest+abdomen+pelvis exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.4	6.0	1.4	1.0	1.0	1.3	5.0	8.0	18.3	20.0	18
Scouts per exam	1.37	0.49	0.09	1.00	1	1	1	2	2	2	27
f_{nc}	0.06	0.14	0.03	0.00	0.00	0.00	0.01	0.07	0.22	0.60	20
f_c	0.63	0.43	0.10	0.00	0.00	0.15	0.85	0.99	1.00	1.00	20
f_{cnc}	0.30	0.44	0.10	0.00	0.00	0.00	0.00	0.76	1.00	1.00	20
kVp	121.5	5.4	1.1	110.0	120	120	120	120	130	140	26
mA	218	77	15	83	90	160	240	250	336	400	25
Time (s) per rotation	1.08	0.31	0.06	0.75	0.75	0.80	1.00	1.13	1.50	1.90	24
mAs per rotation	224	56	12	119	121	184	250	253	300	300	23
Reconstruct. increm. (mm)	8.3	1.9	0.4	5.0	5	7	8	10	10	10	18
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	19
Slice width (T, mm)	8.44	1.65	0.33	5.00	5.3	7.0	8.5	10.0	10.0	10.0	25
Table feed per rotation ($I_{helical}$, mm)	9.93	2.80	0.60	5.00	7.0	8.4	10.0	10.0	15.0	15.0	22
Pitch [$I_{helical}/(nT)$]	1.15	0.22	0.05	0.94	0.99	1.00	1.00	1.28	1.50	1.50	16
L (mm)	640	152	44	440	446	500	640	728	865	945	12
CTDI$_{free\ air}$ (mGy)	63	29	7	22	27	35	63	84	103	105	16
CTDI$_{vol}$ (mGy)	20	9	3	10	11	15	17	20	37	37	12
DLP (mGy-cm)	1564	813	288	533	695	1110	1240	2082	2756	2802	8
E (mSv)	28.3	15.5	5.5	5.3	8.8	17.5	28.4	36.6	49.6	52.5	8

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Chest+Abdomen+Pelvis, 20 Facilities Other than Hospitals

Distribution of mAs per rotation Chest+Abdomen+Pelvis, 23 Facilities Other than Hospitals

Distribution of Effective Dose (E) Chest+Abdomen+Pelvis, 8 Facilities Other than Hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.62. Exams of the skull (including facial bones, orbits, sella turcica, complex sinuses); axial scanning, hospitals and other facilities											
Exams per week	3.8	5.2	0.5	0.1	0.5	1.0	2.0	5.0	11.5	40.0	115
Scouts per exam	1.37	0.52	0.04	1.00	1	1	1	2	2	4	154
f_{nc}	0.86	0.28	0.03	0.00	0.02	0.90	1.00	1.00	1.00	1.00	121
f_c	0.06	0.20	0.02	0.00	0.00	0.00	0.00	0.01	0.50	1.00	121
f_{cnc}	0.07	0.20	0.02	0.00	0.00	0.00	0.00	0.01	0.40	1.00	121
kVp	124.6	9.0	0.8	80.0	120	120	120	130	140	140	144
mA	179	61	5	40	91	130	178	210	280	340	144
Time (s) per rotation	1.90	0.81	0.07	0.80	1.00	1.00	2.00	2.00	3.00	5.00	141
mAs per rotation	320	134	11	90	124	233	300	400	570	800	136
Slices per contrast phase	31.7	13.9	1.2	15.0	17	24	30	36	55	100	124
Slices per rotation (n)	1.04	0.28	0.02	1.00	1.0	1.0	1.0	1.0	1.0	4.0	136
Slice width (T, mm)	3.49	1.65	0.14	1.00	2.0	3.0	3.0	3.7	7.5	10.0	142
Table increment (I_{axial}, mm)	3.52	2.00	0.17	1.00	2.0	2.5	3.0	3.8	7.5	15.0	137
$I_{axial}/(nT)$	0.99	0.17	0.02	0.50	0.67	1.00	1.00	1.00	1.00	2.00	122
L (mm)	98	46	4	25	41	74	90	110	191	250	107
$CTDI_{free\ air}$ (mGy)	86	46	5	17	28	50	79	112	171	253	98
$CTDI_{vol}$ (mGy)	61	42	5	11	17	33	53	74	114	326	83
DLP (mGy-cm)	600	391	46	117	150	380	522	700	1310	1986	71
E (mSv)	1.2	0.8	0.1	0.1	0.3	0.7	1.1	1.5	3.4	3.6	60

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Skull
121 Hospitals and Other Facilities

Distribution of mAs per rotation
Skull
136 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Skull
60 Hospitals and Other Facilities

Table 1.63. Exams of the skull (including facial bones, orbits, sella turcica, complex sinuses); axial scanning, hospitals only											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.9	5.4	0.6	0.2	0.5	1.0	2.0	5.0	10.0	40.0	83
Scouts per exam	1.37	0.53	0.05	1.00	1	1	1	2	2	4	107
f_{nc}	0.91	0.24	0.03	0.00	0.16	0.98	1.00	1.00	1.00	1.00	85
f_c	0.04	0.16	0.02	0.00	0.00	0.00	0.00	0.00	0.11	1.00	85
f_{cnc}	0.05	0.18	0.02	0.00	0.00	0.00	0.00	0.00	0.24	1.00	85
kVp	124.5	9.7	1.0	80.0	110	120	120	130	140	140	101
mA	188	61	6	40	100	140	200	240	280	340	103
Time (s) per rotation	1.78	0.75	0.08	0.80	1.00	1.00	2.00	2.00	3.00	5.00	100
mAs per rotation	313	120	12	90	150	240	300	400	500	800	97
Slices per contrast phase	31.8	15.0	1.6	15.0	17	23	30	36	58	100	85
Slices per rotation (n)	1.05	0.34	0.03	1.00	1.0	1.0	1.0	1.0	1.0	4.0	95
Slice width (T, mm)	3.50	1.65	0.17	1.00	2.0	3.0	3.0	3.3	7.5	10.0	99
Table increment (I_{axial}, mm)	3.59	2.14	0.22	1.00	2.0	3.0	3.0	3.9	7.5	15.0	95
$I_{axial}/(nT)$	0.99	0.15	0.02	0.67	0.67	1.00	1.00	1.00	1.00	1.67	83
L (mm)	98	47	5	25	42	73	90	113	188	250	72
$CTDI_{free\,air}$ (mGy)	79	40	5	17	31	49	73	103	163	184	68
$CTDI_{vol}$ (mGy)	55	28	4	13	18	32	50	69	110	129	57
DLP (mGy-cm)	563	349	50	117	149	373	510	683	1220	1986	49
E (mSv)	1.2	0.8	0.1	0.2	0.3	0.7	1.1	1.4	2.3	3.6	40

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Skull
85 Hospitals

Distribution of mAs per rotation
Skull
97 Hospitals

Distribution of Effective Dose (E)
Skull
40 Hospitals

Table 1.64. Exams of the skull (including facial bones, orbits, sella turcica, complex sinuses); axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.5	4.9	0.9	0.1	0.4	1.0	1.5	3.3	14.1	21.0	32
Scouts per exam	1.38	0.48	0.07	1.00	1	1	1	2	2	2	47
f_{nc}	0.76	0.34	0.06	0.00	0.00	0.62	0.93	1.00	1.00	1.00	36
f_c	0.11	0.27	0.04	0.00	0.00	0.00	0.00	0.06	0.85	1.00	36
f_{cnc}	0.10	0.24	0.04	0.00	0.00	0.00	0.00	0.06	0.55	1.00	36
kVp	124.6	7.2	1.1	110.0	120	120	120	130	140	140	43
mA	158	58	9	63	80	120	140	200	250	300	41
Time (s) per rotation	2.20	0.88	0.14	1.00	1.00	1.50	2.00	3.00	3.80	4.00	41
mAs per rotation	337	163	26	94	118	218	333	400	603	760	39
Slices per contrast phase	31.7	11.2	1.8	15.0	16	25	30	36	53	65	39
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	41
Slice width (T, mm)	3.48	1.66	0.25	1.00	2.0	3.0	3.0	4.0	6.7	10.0	43
Table increment (I_{axial}, mm)	3.36	1.67	0.26	1.00	2.0	2.3	3.0	3.5	6.8	10.0	42
$I_{axial}/(nT)$	0.99	0.21	0.03	0.50	0.66	1.00	1.00	1.00	1.00	2.00	39
L (mm)	99	44	8	29	46	75	90	109	181	227	35
$CTDI_{free\ air}$ (mGy)	100	54	10	19	27	59	90	131	171	253	30
$CTDI_{vol}$ (mGy)	74	61	12	11	16	45	59	92	126	326	26
DLP (mGy-cm)	685	469	100	117	175	383	591	816	1743	1916	22
E (mSv)	1.3	1.0	0.2	0.1	0.2	0.7	0.9	1.8	3.4	3.5	20

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Skull, 36 Facilities Other than Hospitals

Distribution of mAs per rotation
Skull, 39 Facilities Other than Hospitals

Distribution of Effective Dose (E)
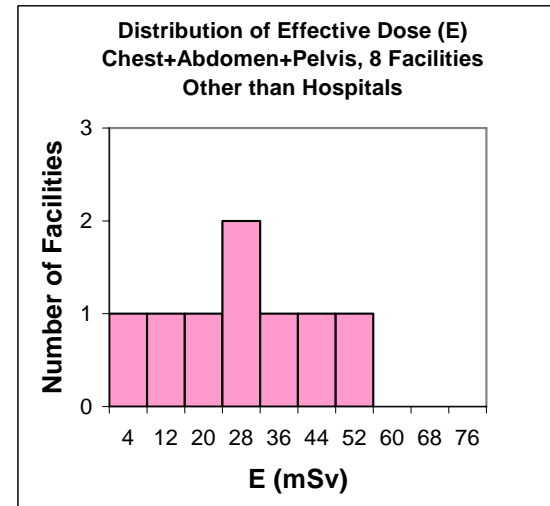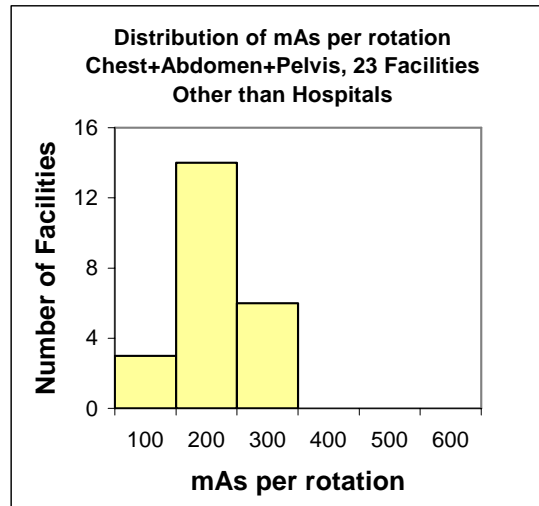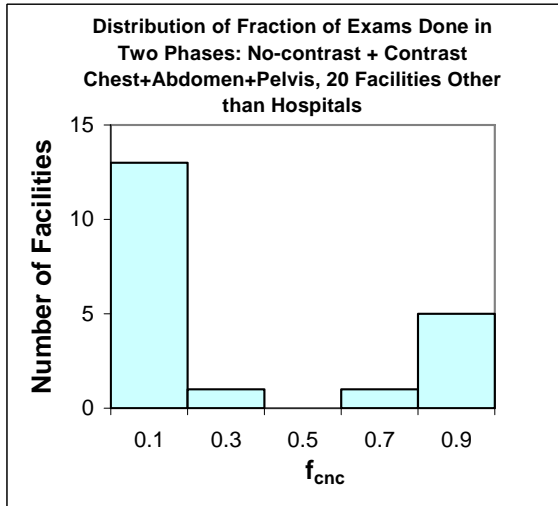Skull, 20 Facilities Other than Hospitals
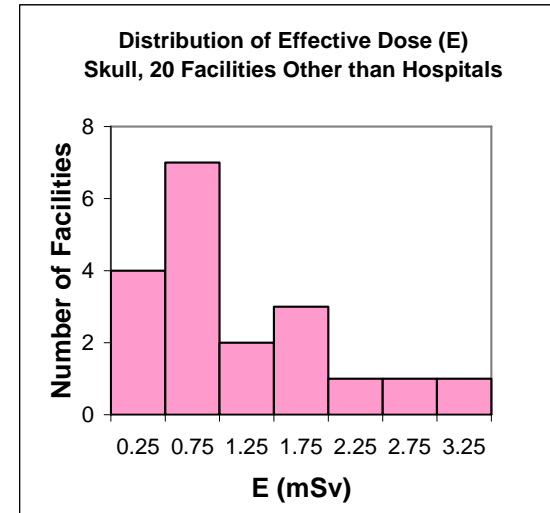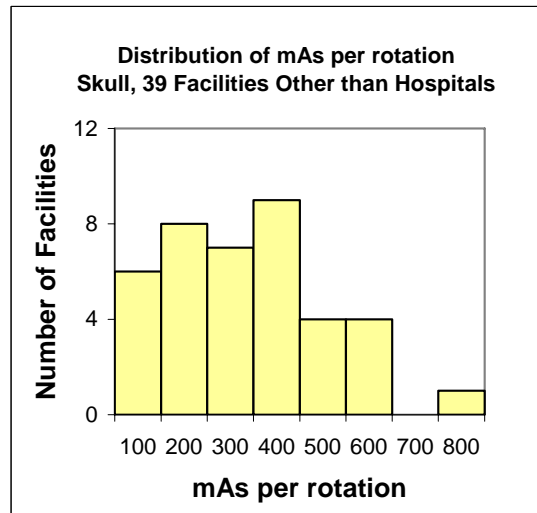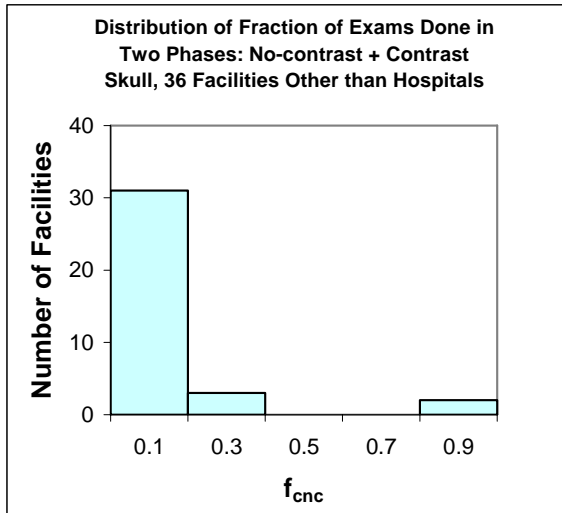
Table 1.65. Exams of the skull (including facial bones, orbits, sella turcica, complex sinuses); helical scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.1	3.4	0.5	0.1	1.0	2.0	3.0	5.0	10.3	15.0	58
Scouts per exam	1.37	0.50	0.06	1.00	1	1	1	2	2	3	81
f_{nc}	0.84	0.28	0.03	0.00	0.13	0.85	0.99	1.00	1.00	1.00	65
f_c	0.10	0.24	0.03	0.00	0.00	0.00	0.00	0.01	0.65	1.00	65
f_{cnc}	0.06	0.16	0.02	0.00	0.00	0.00	0.00	0.05	0.47	0.90	65
kVp	124.7	8.2	1.0	110.0	120	120	120	130	140	140	73
mA	202	63	7	63	101	160	200	250	280	400	71
Time (s) per rotation	1.20	0.45	0.06	0.50	0.75	1.00	1.00	1.50	2.00	3.00	63
mAs per rotation	223	90	12	112	125	159	200	253	400	600	60
Reconstruct. increm. (mm)	2.7	1.1	0.1	0.6	1	2	3	3	5	7	59
Slices per rotation (n)	1.16	0.67	0.09	1.00	1.0	1.0	1.0	1.0	1.5	4.0	58
Slice width (T, mm)	3.18	0.98	0.12	0.50	1.3	3.0	3.0	3.0	5.0	7.0	70
Table feed per rotation ($I_{helical}$, mm)	3.70	2.42	0.31	1.00	1.8	3.0	3.0	4.1	5.1	16.0	60
Pitch [$I_{helical}/(nT)$]	1.16	0.64	0.09	0.60	0.77	1.00	1.00	1.00	1.90	5.00	47
L (mm)	137	57	10	35	57	100	125	160	250	256	36
$CTDI_{free\ air}$ (mGy)	58	32	5	18	20	33	52	68	122	148	47
$CTDI_{vol}$ (mGy)	38	26	4	3	14	17	31	42	85	119	35
DLP (mGy-cm)	492	340	80	43	66	185	442	660	993	1272	18
E (mSv)	1.1	0.8	0.2	0.3	0.3	0.5	0.9	1.6	2.4	3.1	17

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Skull, 65 Hospitals and Other Facilities

Distribution of mAs per rotation Skull, 60 Hospitals and Other Facilities

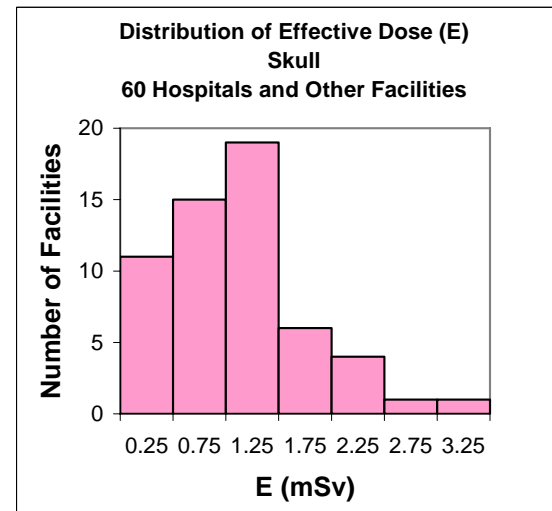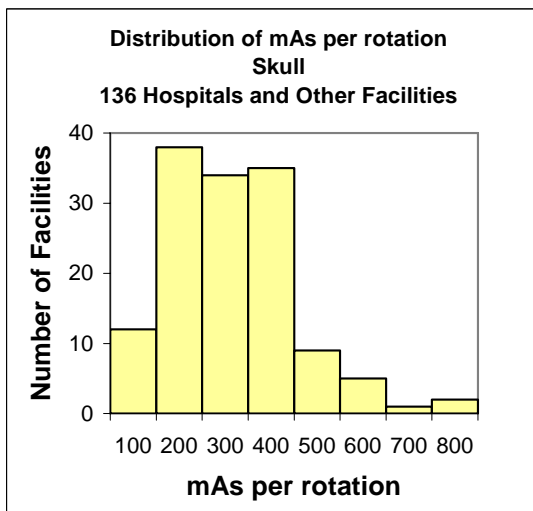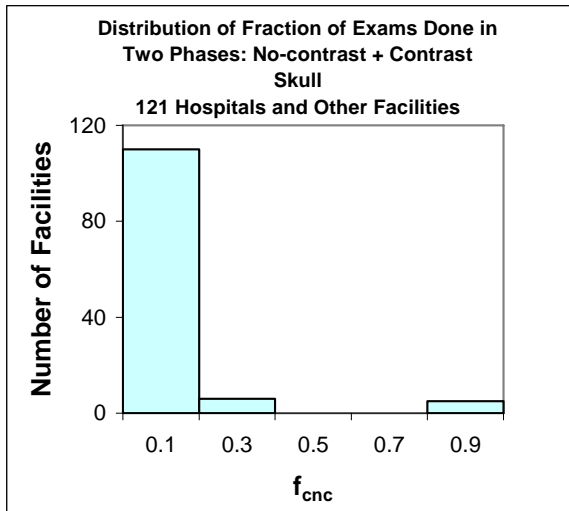Distribution of Effective Dose (E) Skull, 17 Hospitals and Other Facilities
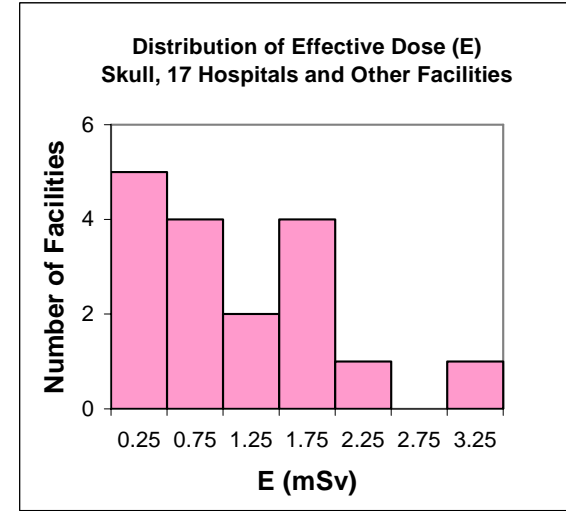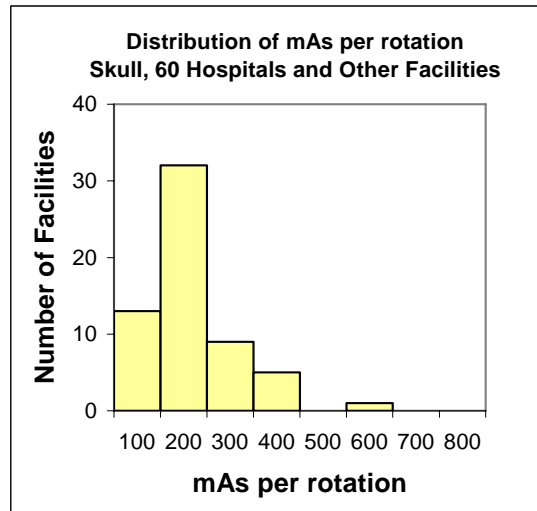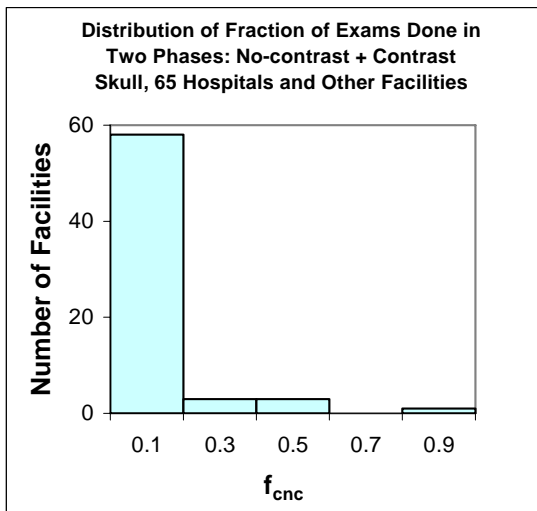
Table 1.66. Exams of the skull (including facial bones, orbits, sella turcica, complex sinuses); helical scanning, hospitals only											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.3	3.4	0.5	0.1	1.0	2.0	3.0	6.0	10.0	15.0	49
Scouts per exam	1.39	0.52	0.06	1.00	1	1	1	2	2	3	66
f_{nc}	0.87	0.25	0.03	0.01	0.28	0.90	1.00	1.00	1.00	1.00	53
f_c	0.08	0.22	0.03	0.00	0.00	0.00	0.00	0.01	0.54	0.99	53
f_{cnc}	0.05	0.14	0.02	0.00	0.00	0.00	0.00	0.02	0.25	0.90	53
kVp	124.9	8.6	1.1	110.0	120	120	120	130	140	140	60
mA	209	60	8	83	119	170	200	250	280	400	58
Time (s) per rotation	1.16	0.37	0.05	0.50	0.75	1.00	1.00	1.42	2.00	2.00	51
mAs per rotation	221	75	11	120	128	169	200	253	391	400	48
Reconstruct. increm. (mm)	2.8	1.2	0.2	0.6	1	2	3	3	5	7	50
Slices per rotation (n)	1.19	0.73	0.11	1.00	1.0	1.0	1.0	1.0	3.0	4.0	48
Slice width (T, mm)	3.25	0.96	0.13	0.50	2.4	3.0	3.0	3.0	5.0	7.0	59
Table feed per rotation ($I_{helical}$, mm)	3.83	2.58	0.36	1.14	1.9	3.0	3.0	4.4	5.5	16.0	51
Pitch [$I_{helical}/(nT)$]	1.19	0.69	0.11	0.60	0.75	1.00	1.00	1.00	2.00	5.00	40
L (mm)	144	59	12	48	89	100	125	168	250	256	26
$CTDI_{free\ air}$ (mGy)	58	31	5	18	20	35	51	73	116	133	38
$CTDI_{vol}$ (mGy)	38	26	5	3	13	17	29	43	82	119	29
DLP (mGy-cm)	458	367	98	43	61	153	404	660	1058	1272	14
E (mSv)	1.1	0.8	0.2	0.3	0.3	0.3	0.8	1.6	2.3	3.1	13

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Skull, 53 Hospitals

Distribution of mAs per rotation Skull, 48 Hospitals

Distribution of Effective Dose (E) Skull, 13 Hospitals

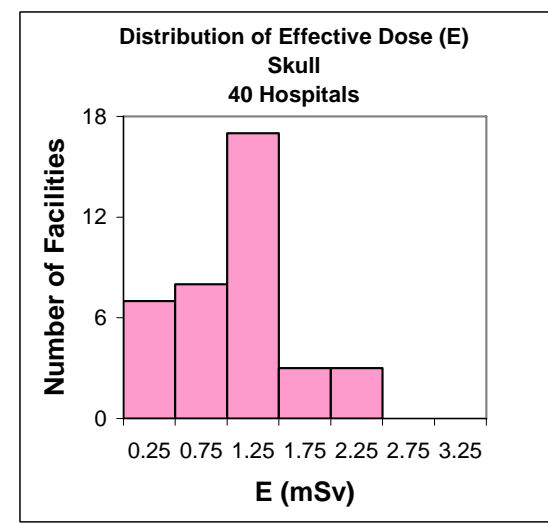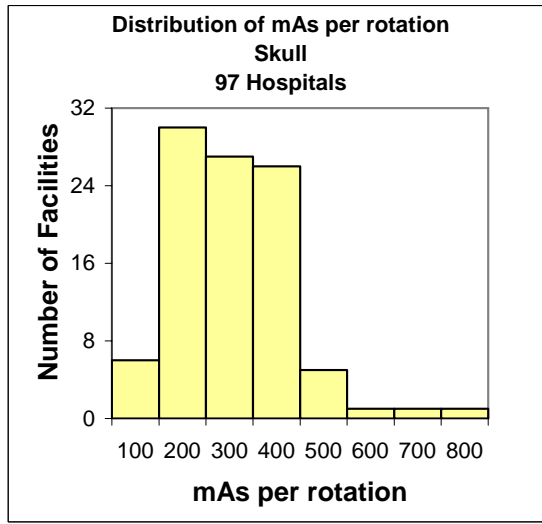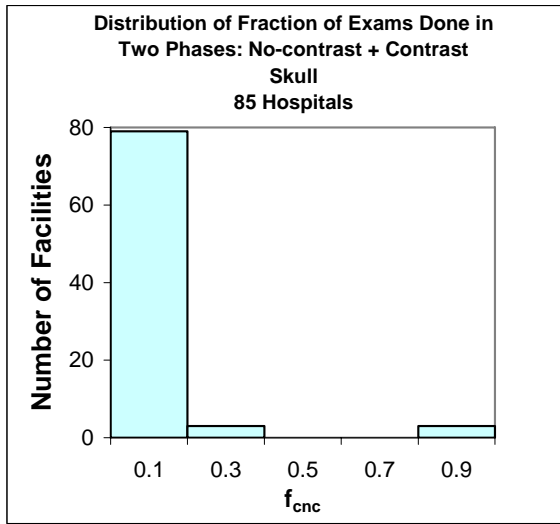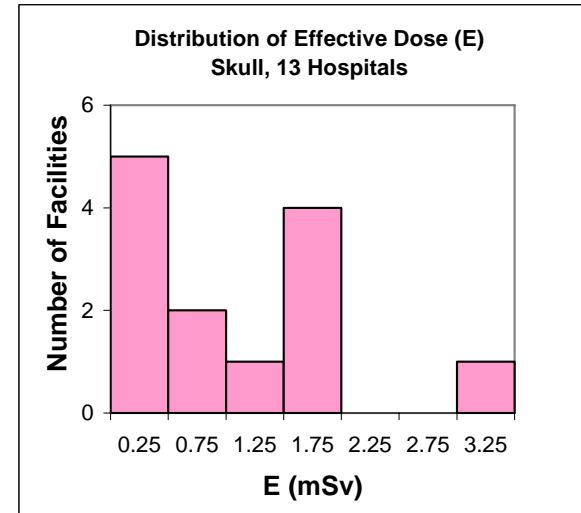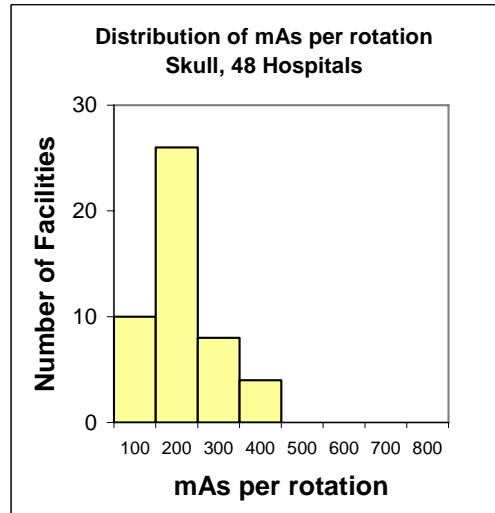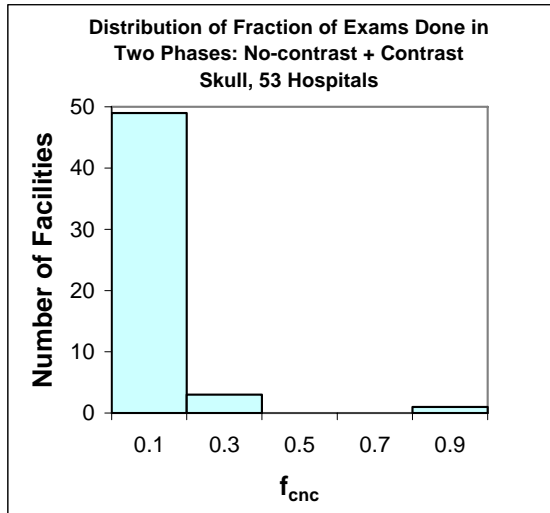| Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.67. Exams of the skull (including facial bones, orbits, sella turcica, complex sinuses); helical scanning, facilities other than hospitals											
Exams per week	3.3	3.7	1.2	0.8	0.9	1.0	1.0	4.0	9.2	12.0	9
Scouts per exam	1.27	0.46	0.12	1.00	1	1	1	2	2	2	15
f_{nc}	0.70	0.37	0.11	0.00	0.14	0.45	0.95	1.00	1.00	1.00	12
f_c	0.16	0.33	0.10	0.00	0.00	0.00	0.00	0.07	0.82	1.00	12
f_{cnc}	0.14	0.22	0.06	0.00	0.00	0.00	0.00	0.19	0.50	0.50	12
kVp	123.8	6.5	1.8	120.0	120	120	120	130	134	140	13
mA	172	67	19	63	75	130	170	200	280	300	13
Time (s) per rotation	1.39	0.69	0.20	0.75	0.78	0.95	1.00	1.90	2.45	3.00	12
mAs per rotation	232	141	41	112	116	152	198	225	490	600	12
Reconstruct. increm. (mm)	2.5	1.0	0.3	0.6	1	3	3	3	3	3	9
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	10
Slice width (T, mm)	2.80	1.03	0.31	1.00	1.2	2.8	3.0	3.0	4.0	5.0	11
Table feed per rotation ($I_{helical}$, mm)	3.00	1.00	0.33	1.00	1.8	3.0	3.0	3.0	4.2	5.0	9
Pitch [$I_{helical}/(nT)$]	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	7
L (mm)	119	50	16	35	46	87	123	150	182	200	10
$CTDI_{free\ air}$ (mGy)	57	39	13	20	22	30	56	66	116	148	9
$CTDI_{vol}$ (mGy)	38	24	10	19	19	23	33	39	74	85	6
DLP (mGy-cm)	614	216	108	424	437	489	557	681	871	919	4
E (mSv)	1.3	0.6	0.3	0.9	0.9	0.9	1.1	1.5	2.1	2.2	4

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Skull, 12 Facilities Other than Hospitals

Distribution of mAs per rotation Skull, 8 Facilities Other than Hospitals

Distribution of Effective Dose (E) Skull, 4 Facilities Other than Hospitals

Table 1.68. Kidney exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.0	2.6	0.5	0.1	0.2	1.0	1.0	2.0	8.6	10.0	23
Scouts per exam	1.12	0.33	0.04	1.00	1	1	1	1	2	2	59
f_{nc}	0.16	0.26	0.05	0.00	0.00	0.00	0.04	0.20	0.75	1.00	32
f_c	0.27	0.38	0.07	0.00	0.00	0.00	0.03	0.50	0.99	1.00	32
f_{cnc}	0.57	0.44	0.08	0.00	0.00	0.00	0.78	0.99	1.00	1.00	32
kVp	122.1	4.5	0.6	120.0	120	120	120	120	132	135	49
mA	182	59	9	70	104	130	175	203	270	400	48
Time (s) per rotation	1.98	0.71	0.10	0.75	1.00	1.80	2.00	2.18	3.00	4.00	48
mAs per rotation	329	111	17	100	166	250	320	400	504	630	45
Slices per contrast phase	28.1	10.9	1.8	8.0	15	20	25	36	47	50	35
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	46
Slice width (T, mm)	6.58	2.28	0.34	4.00	5.0	5.0	5.0	10.0	10.0	10.0	45
Table increment (I_{axial}, mm)	6.50	2.23	0.33	4.00	5.0	5.0	5.0	10.0	10.0	10.0	45
$I_{axial}/(nT)$	1.01	0.04	0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.25	39
L (mm)	176	90	16	75	83	115	150	200	338	500	32
$CTDI_{free\ air}$ (mGy)	75	44	8	19	28	49	65	90	123	248	28
$CTDI_{vol}$ (mGy)	28	31	6	6	9	15	20	31	43	170	25
DLP (mGy-cm)	407	259	58	115	139	219	363	532	886	981	20
E (mSv)	10.5	7.5	2.3	3.2	3.4	5.4	7.7	12.4	24.2	25.0	11

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Kidney
32 Hospitals and Other Facilities

Distribution of mAs per rotation Kidney
45 Hospitals and Other Facilities

Distribution of Effective Dose (E) Kidney
11 Hospitals and Other Facilities
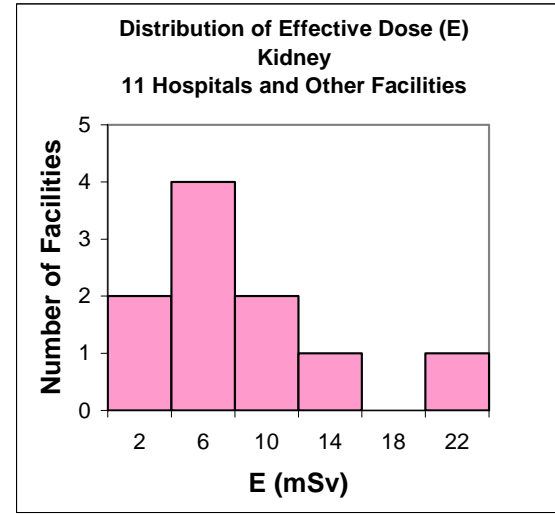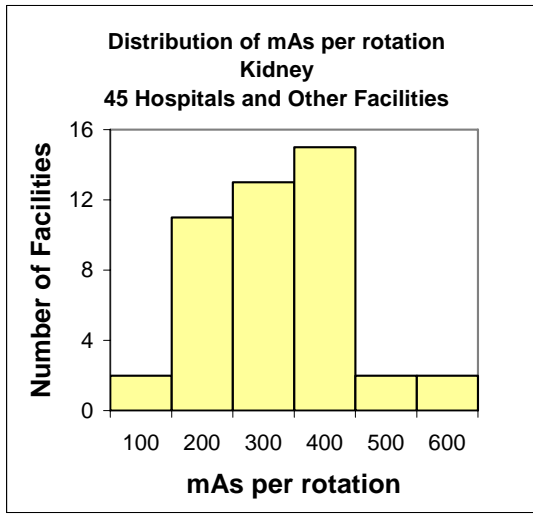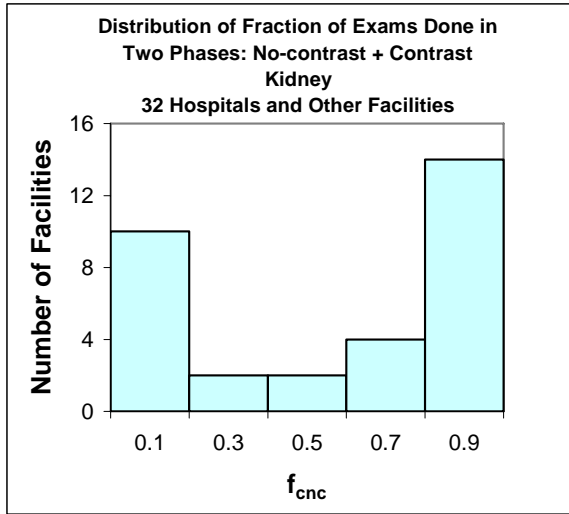
Table 1.69. Kidney exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.5	3.1	0.8	0.2	0.4	1.0	1.0	2.5	9.3	10.0	15
Scouts per exam	1.18	0.39	0.06	1.00	1	1	1	1	2	2	39
f_{nc}	0.14	0.21	0.05	0.00	0.00	0.00	0.04	0.19	0.54	0.75	18
f_c	0.38	0.42	0.10	0.00	0.00	0.00	0.13	0.81	1.00	1.00	18
f_{cnc}	0.48	0.41	0.10	0.00	0.00	0.00	0.50	0.88	1.00	1.00	18
kVp	121.2	3.9	0.7	120.0	120	120	120	120	132	135	31
mA	194	61	11	110	126	140	200	225	277	400	32
Time (s) per rotation	1.91	0.74	0.14	0.75	1.00	1.13	2.00	2.00	3.00	4.00	30
mAs per rotation	328	88	16	150	195	260	320	400	445	480	29
Slices per contrast phase	28.1	10.8	2.4	15.0	15	20	25	36	45	50	21
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	29
Slice width (T, mm)	6.90	2.39	0.44	4.00	5.0	5.0	5.0	10.0	10.0	10.0	29
Table increment (I_{axial}, mm)	6.79	2.36	0.45	4.00	5.0	5.0	5.0	10.0	10.0	10.0	28
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	24
L (mm)	190	105	24	75	89	120	150	200	354	500	19
$CTDI_{free\ air}$ (mGy)	63	29	7	19	26	45	55	85	109	111	16
$CTDI_{vol}$ (mGy)	20	10	2	6	8	14	19	28	35	35	15
DLP (mGy-cm)	404	273	76	115	130	225	353	521	921	981	13
E (mSv)	6.5	2.4	1.1	3.6	3.8	4.4	7.4	7.7	9.0	9.4	5

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Kidney
18 Hospitals

Distribution of mAs per rotation
Kidney
29 Hospitals

Distribution of Effective Dose (E)
Kidney
5 Hospitals
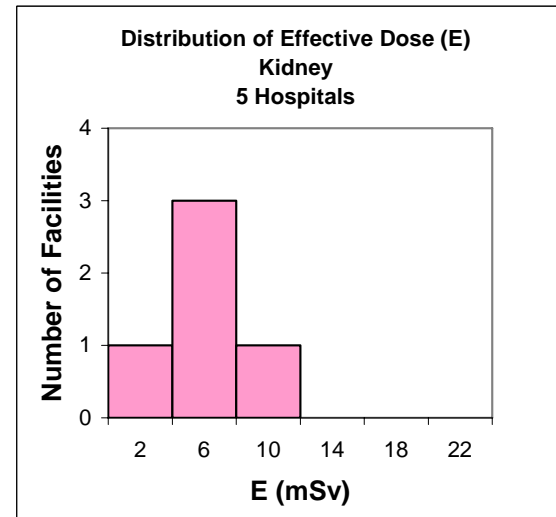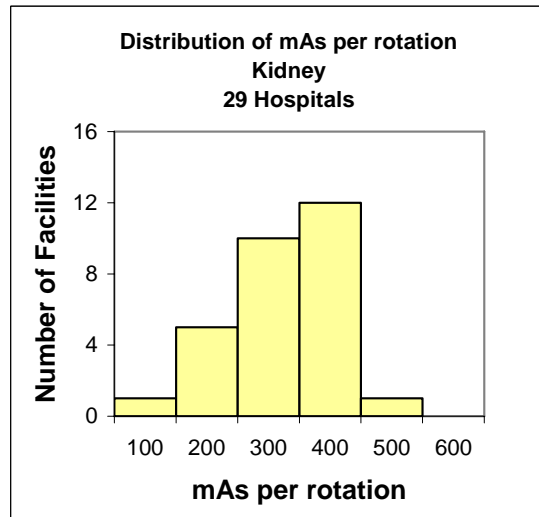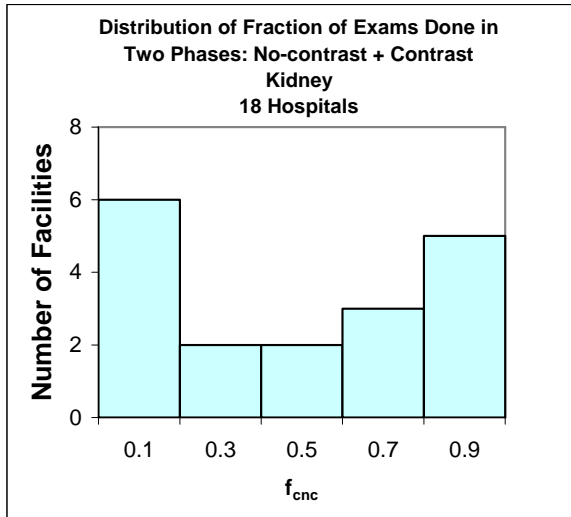
Table 1.70. Kidney exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.1	0.7	0.2	0.1	0.2	0.9	1.0	1.6	2.0	2.0	8
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	20
f_{nc}	0.19	0.32	0.09	0.00	0.00	0.00	0.04	0.21	0.84	1.00	14
f_c	0.13	0.28	0.07	0.00	0.00	0.00	0.00	0.04	0.66	0.95	14
f_{cnc}	0.68	0.45	0.12	0.00	0.00	0.18	0.97	1.00	1.00	1.00	14
kVp	123.5	5.1	1.2	120.0	120	120	120	130	130	133	18
mA	158	49	12	70	93	124	170	200	220	250	16
Time (s) per rotation	2.11	0.65	0.15	1.00	1.00	2.00	2.00	2.63	3.00	3.00	18
mAs per rotation	330	148	37	100	153	233	322	400	593	630	16
Slices per contrast phase	28.1	11.4	3.1	8.0	15	20	26	35	47	50	14
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	17
Slice width (T, mm)	6.00	2.00	0.50	5.00	5.0	5.0	5.0	5.3	10.0	10.0	16
Table increment (I_{axial}, mm)	6.03	1.99	0.48	5.00	5.0	5.0	5.0	5.0	10.0	10.0	17
$I_{axial}/(nT)$	1.02	0.06	0.02	1.00	1.00	1.00	1.00	1.00	1.08	1.25	15
L (mm)	155	59	16	80	83	100	150	200	244	250	13
$CTDI_{free\ air}$ (mGy)	90	57	17	27	35	62	77	100	183	248	12
$CTDI_{vol}$ (mGy)	40	47	15	12	13	18	29	34	114	170	10
DLP (mGy-cm)	414	251	95	180	187	214	373	551	781	816	7
E (mSv)	13.8	8.9	3.6	3.2	4.0	7.5	12.4	21.1	24.6	25.0	6

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Kidney 14 Facilities Other than Hospitals

Distribution of mAs per rotation Kidney 16 Facilities Other than Hospitals

Distribution of Effective Dose (E) Kidney 6 Facilities Other than Hospitals
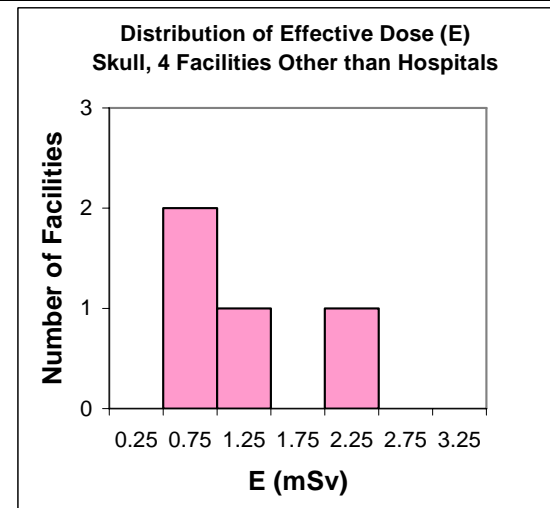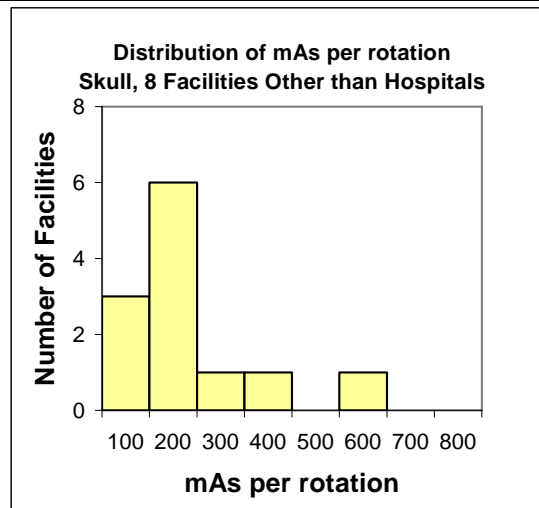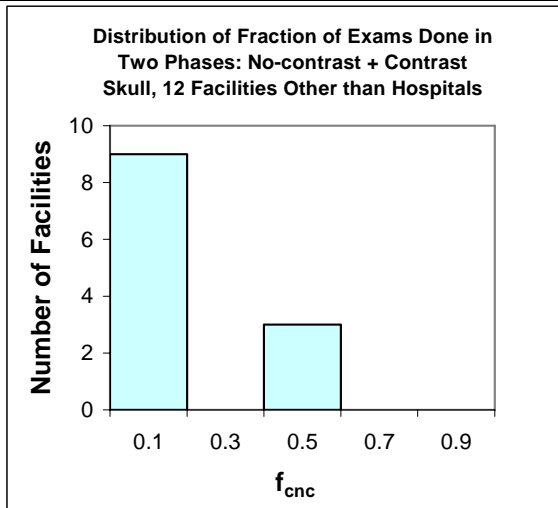
Table 1.71. Kidney exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.0	6.0	0.8	0.1	0.5	1.0	2.0	5.0	20.0	25.0	61
Scouts per exam	1.26	0.46	0.05	1.00	1	1	1	1	2	3	101
f_{nc}	0.38	0.41	0.05	0.00	0.00	0.00	0.20	0.88	1.00	1.00	73
f_c	0.11	0.24	0.03	0.00	0.00	0.00	0.00	0.10	0.65	1.00	73
f_{cnc}	0.50	0.44	0.05	0.00	0.00	0.00	0.50	0.99	1.00	1.00	73
kVp	122.6	5.7	0.6	120.0	120	120	120	120	140	140	94
mA	228	63	7	80	110	200	250	260	300	400	94
Time (s) per rotation	1.10	0.35	0.04	0.75	0.75	1.00	1.00	1.00	2.00	2.00	79
mAs per rotation	241	78	9	112	127	200	250	260	372	600	77
Reconstruct. increm. (mm)	5.2	1.7	0.2	2.0	3	5	5	5	8	10	79
Slices per rotation (n)	1.12	0.60	0.07	1.00	1.0	1.0	1.0	1.0	1.0	4.0	74
Slice width (T, mm)	5.60	1.39	0.15	3.00	4.5	5.0	5.0	5.0	8.0	10.0	91
Table feed per rotation ($I_{helical}$, mm)	7.43	3.82	0.43	4.00	5.0	5.0	7.0	7.5	15.0	30.0	78
Pitch [$I_{helical}/(nT)$]	1.29	0.40	0.05	0.83	1.00	1.00	1.00	1.50	2.00	3.00	65
L (mm)	239	117	19	45	94	150	205	349	423	500	40
$CTDI_{free\,air}$ (mGy)	61	29	4	19	21	38	52	86	109	131	58
$CTDI_{vol}$ (mGy)	17	9	1	2	7	11	15	21	33	46	48
DLP (mGy-cm)	471	411	84	90	108	203	407	513	1193	1843	24
E (mSv)	8.8	6.9	1.4	2.4	2.6	4.7	8.0	9.5	14.7	36.2	23

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Kidney, 73 Hospitals and Other Facilities

Distribution of mAs per rotation Kidney, 77 Hospitals and Other Facilities

Distribution of Effective Dose (E) Kidney, 23 Hospitals and Other Facilities

Table 1.72. Kidney exam, helical scanning, hospitals only											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.9	6.1	0.9	0.1	0.5	1.0	2.0	5.0	19.6	25.0	49
Scouts per exam	1.30	0.49	0.05	1.00	1	1	1	2	2	3	84
f_{nc}	0.37	0.40	0.05	0.00	0.00	0.00	0.18	0.80	1.00	1.00	58
f_c	0.12	0.24	0.03	0.00	0.00	0.00	0.00	0.10	0.56	1.00	58
f_{cnc}	0.51	0.44	0.06	0.00	0.00	0.00	0.50	0.99	1.00	1.00	58
kVp	122.3	5.6	0.6	120.0	120	120	120	120	140	140	77
mA	229	60	7	80	125	200	250	260	300	400	77
Time (s) per rotation	1.11	0.35	0.04	0.75	0.75	1.00	1.00	1.00	2.00	2.00	64
mAs per rotation	244	79	10	120	129	200	250	259	368	600	62
Reconstruct. increm. (mm)	5.2	1.8	0.2	2.0	3	5	5	5	10	10	65
Slices per rotation (n)	1.15	0.65	0.08	1.00	1.0	1.0	1.0	1.0	1.0	4.0	62
Slice width (T, mm)	5.67	1.48	0.17	3.00	4.7	5.0	5.0	5.8	8.7	10.0	74
Table feed per rotation ($I_{helical}$, mm)	7.78	4.09	0.51	4.00	5.0	5.0	7.0	7.7	15.0	30.0	64
Pitch [$I_{helical}/(nT)$]	1.32	0.42	0.06	0.83	0.96	1.00	1.15	1.50	2.00	3.00	54
L (mm)	242	125	22	45	88	150	210	353	445	500	31
$CTDI_{free\ air}$ (mGy)	59	26	4	19	22	39	52	78	107	110	47
$CTDI_{vol}$ (mGy)	17	9	1	2	6	10	15	20	34	46	41
DLP (mGy-cm)	459	406	89	90	103	197	432	507	1198	1843	21
E (mSv)	8.6	7.2	1.6	2.4	2.5	4.9	7.9	8.7	15.4	36.2	20

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Kidney, 58 Hospitals

Distribution of mAs per rotation Kidney, 62 Hospitals

Distribution of Effective Dose (E) Kidney, 20 Hospitals

Table 1.73. Kidney exam, helical scanning, facilities other than hospitals											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.2	5.7	1.7	0.5	0.8	1.0	3.0	7.0	14.5	20.0	12
Scouts per exam	1.06	0.24	0.06	1.00	1	1	1	1	1	2	17
f_{nc}	0.44	0.45	0.12	0.00	0.00	0.04	0.20	1.00	1.00	1.00	15
f_c	0.10	0.26	0.07	0.00	0.00	0.00	0.00	0.03	0.52	0.98	15
f_{cnc}	0.47	0.45	0.12	0.00	0.00	0.00	0.34	0.90	1.00	1.00	15
kVp	123.5	6.1	1.5	120.0	120	120	120	130	132	140	17
mA	219	79	19	83	83	160	240	250	320	400	17
Time (s) per rotation	1.04	0.34	0.09	0.75	0.75	0.80	1.00	1.00	1.62	1.90	15
mAs per rotation	229	78	20	112	117	161	250	283	323	375	15
Reconstruct. increm. (mm)	5.1	0.7	0.2	4.0	5	5	5	5	6	8	14
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	12
Slice width (T, mm)	5.29	0.87	0.21	4.00	4.8	5.0	5.0	5.0	7.1	7.5	17
Table feed per rotation ($I_{helical}$, mm)	5.84	1.45	0.39	5.00	5.0	5.0	5.0	5.9	8.4	10.0	14
Pitch [$I_{helical}/(nT)$]	1.15	0.30	0.09	1.00	1.00	1.00	1.00	1.16	1.63	2.00	11
L (mm)	231	94	31	150	150	180	190	250	390	400	9
$CTDI_{free\ air}$ (mGy)	69	39	12	20	22	32	85	89	125	131	11
$CTDI_{vol}$ (mGy)	17	7	3	11	11	13	14	19	29	31	7
DLP (mGy-cm)	558	529	305	218	225	254	289	729	1080	1168	3
E (mSv)	10.1	5.2	3.0	4.5	5.1	7.7	11.0	12.9	14.4	14.8	3

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Kidney, 15 Facilities Other than Hospitals

Distribution of mAs per rotation Kidney, 15 Facilities Other than Hospitals

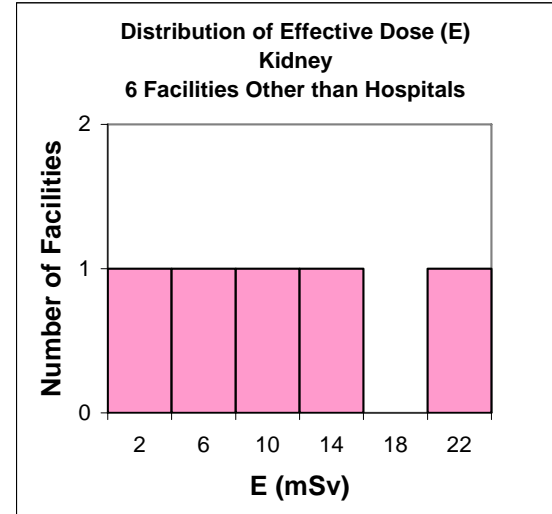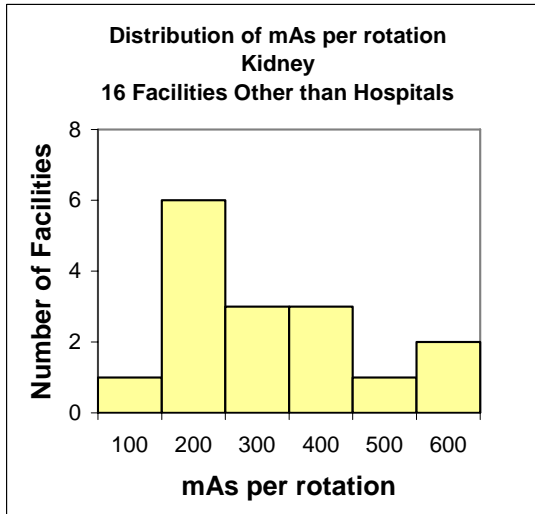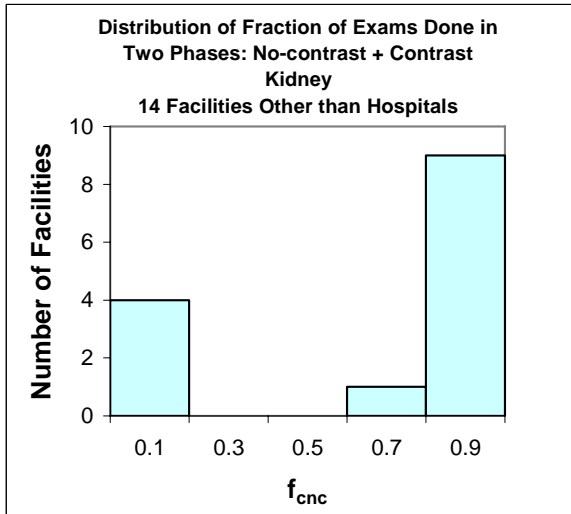Distribution of Effective Dose (E) Kidney, 3 Facilities Other than Hospitals

Table 1.74. Liver exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.7	1.2	0.3	0.1	0.2	1.0	1.5	2.0	3.6	5.0	15
Scouts per exam	1.11	0.31	0.04	1.00	1	1	1	1	2	2	55
f_{nc}	0.11	0.28	0.05	0.00	0.00	0.00	0.01	0.05	0.88	1.00	26
f_c	0.38	0.43	0.08	0.00	0.00	0.00	0.08	0.88	0.99	1.00	26
f_{cnc}	0.51	0.46	0.09	0.00	0.00	0.00	0.50	1.00	1.00	1.00	26
kVp	122.3	4.7	0.7	120.0	120	120	120	120	133	135	44
mA	184	64	10	70	101	135	175	205	298	400	43
Time (s) per rotation	1.92	0.62	0.10	1.00	1.00	1.80	2.00	2.00	3.00	3.00	41
mAs per rotation	327	103	17	100	196	253	306	400	485	630	38
Slices per contrast phase	25.0	8.2	1.5	10.0	15	20	25	30	40	50	31
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	41
Slice width (T, mm)	9.39	1.36	0.21	5.00	6.9	10.0	10.0	10.0	10.0	10.0	40
Table increment (I_{axial}, mm)	9.39	2.38	0.38	5.00	5.0	9.6	10.0	10.0	10.0	20.0	40
$I_{axial}/(nT)$	1.01	0.19	0.03	0.50	1.00	1.00	1.00	1.00	1.00	2.00	35
L (mm)	227	85	16	85	129	180	200	250	368	500	29
$CTDI_{free\ air}$ (mGy)	73	44	9	27	34	49	65	86	108	248	24
$CTDI_{vol}$ (mGy)	28	33	7	7	13	15	20	29	35	170	22
DLP (mGy-cm)	432	215	51	138	189	294	352	569	748	981	18
E (mSv)	9.3	4.8	1.6	4.7	5.0	6.1	7.4	9.3	17.5	18.7	9

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Liver
26 Hospitals and Other Facilities

Distribution of mAs per rotation
Liver
38 Hospitals and Other Facilities

Distribution of Effective Dose (E)
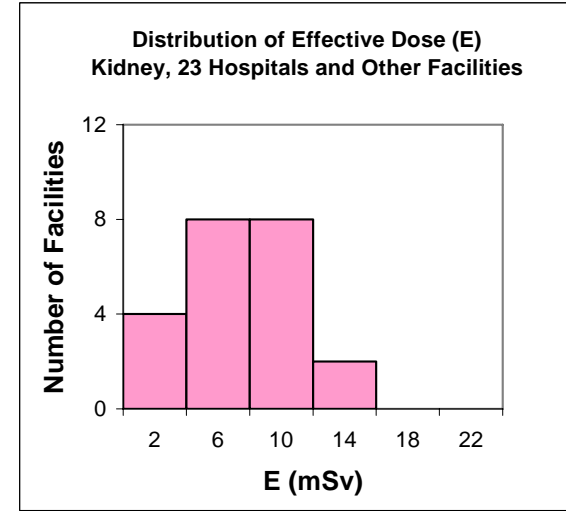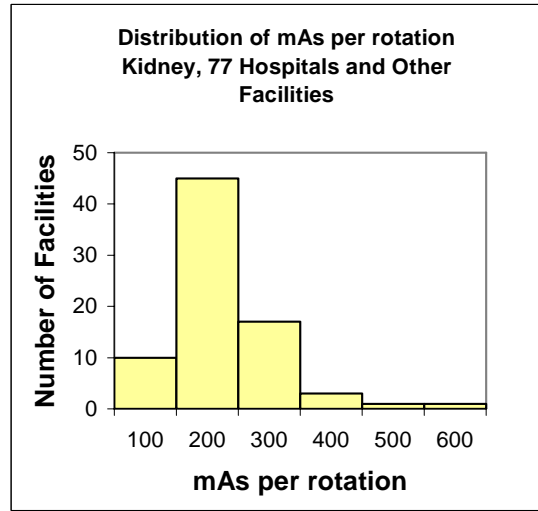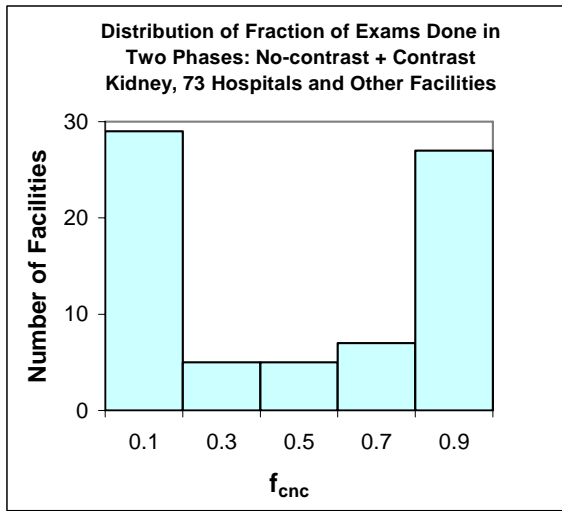Liver
9 Hospitals and Other Facilities

Table 1.75. Liver exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.0	1.5	0.5	0.2	0.3	0.9	2.0	2.3	4.3	5.0	8
Scouts per exam	1.17	0.38	0.06	1.00	1	1	1	1	2	2	36
f_{nc}	0.09	0.26	0.07	0.00	0.00	0.00	0.01	0.02	0.42	1.00	14
f_c	0.53	0.42	0.11	0.00	0.00	0.05	0.64	0.90	0.99	1.00	14
f_{cnc}	0.38	0.42	0.11	0.00	0.00	0.00	0.18	0.80	1.00	1.00	14
kVp	121.4	4.1	0.8	120.0	120	120	120	120	132	135	27
mA	198	68	13	105	124	140	200	240	300	400	28
Time (s) per rotation	1.87	0.62	0.13	1.00	1.00	1.38	2.00	2.00	2.97	3.00	24
mAs per rotation	338	77	16	240	241	278	300	400	447	480	23
Slices per contrast phase	26.5	9.2	2.1	15.0	15	20	25	30	41	50	19
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	25
Slice width (T, mm)	9.34	1.50	0.30	5.00	5.4	10.0	10.0	10.0	10.0	10.0	25
Table increment (I_{axial}, mm)	9.10	1.76	0.36	5.00	5.0	9.6	10.0	10.0	10.0	10.0	24
$I_{axial}/(nT)$	0.98	0.11	0.02	0.50	1.00	1.00	1.00	1.00	1.00	1.00	21
L (mm)	237	95	22	128	130	176	215	250	415	500	18
$CTDI_{free\ air}$ (mGy)	64	26	7	34	34	46	55	84	105	108	13
$CTDI_{vol}$ (mGy)	21	9	2	7	10	15	19	27	35	35	13
DLP (mGy-cm)	433	243	70	138	171	307	352	544	830	981	12
E (mSv)	7.0	1.5	0.7	5.4	5.5	6.1	6.8	7.4	8.9	9.2	5

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Liver
14 Hospitals

Distribution of mAs per rotation
Liver
23 Hospitals

Distribution of Effective Dose (E)
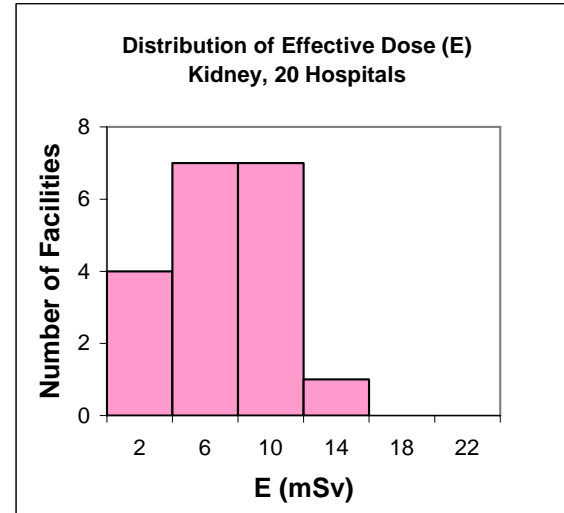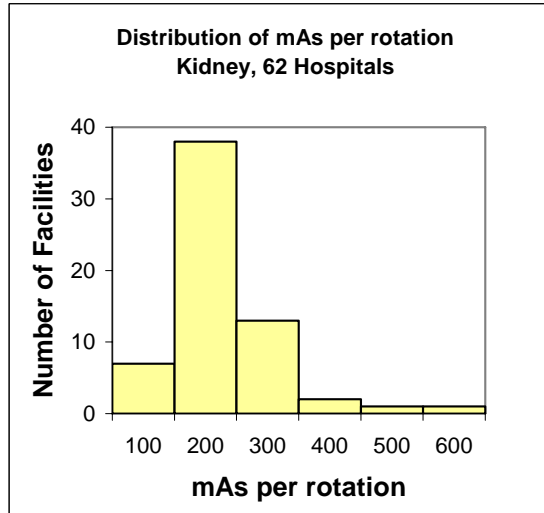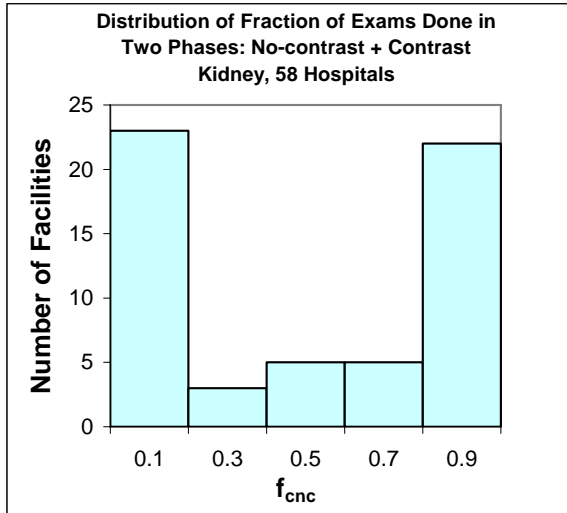Liver
5 Hospitals

Table 1.76. Liver exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.3	0.7	0.3	0.1	0.4	1.0	1.5	1.8	2.0	2.0	7
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	19
f_{nc}	0.14	0.31	0.09	0.00	0.00	0.00	0.01	0.05	0.73	1.00	12
f_c	0.21	0.38	0.11	0.00	0.00	0.00	0.00	0.16	0.97	0.99	12
f_{cnc}	0.65	0.48	0.14	0.00	0.00	0.00	0.97	1.00	1.00	1.00	12
kVp	123.7	5.2	1.3	120.0	120	120	120	130	131	133	17
mA	158	48	13	70	91	128	170	188	222	250	15
Time (s) per rotation	2.01	0.62	0.15	1.00	1.00	1.90	2.00	2.10	3.00	3.00	17
mAs per rotation	311	136	35	100	149	222	312	365	546	630	15
Slices per contrast phase	22.8	6.2	1.8	10.0	14	20	23	28	30	30	12
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	16
Slice width (T, mm)	9.47	1.11	0.29	7.00	7.4	10.0	10.0	10.0	10.0	10.0	15
Table increment (I_{axial}, mm)	9.81	3.12	0.78	5.00	6.5	9.4	10.0	10.0	12.5	20.0	16
$I_{axial}/(nT)$	1.07	0.27	0.07	1.00	1.00	1.00	1.00	1.00	1.35	2.00	14
L (mm)	210	65	20	85	118	184	200	260	300	300	11
$CTDI_{free\ air}$ (mGy)	85	59	18	27	34	57	69	87	178	248	11
$CTDI_{vol}$ (mGy)	39	50	17	13	14	14	23	30	115	170	9
DLP (mGy-cm)	430	166	68	266	267	280	420	569	612	622	6
E (mSv)	12.1	6.3	3.2	4.7	5.4	8.1	12.5	16.5	18.3	18.7	4

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Liver
12 Facilities Other than Hospitals

Distribution of mAs per rotation
Liver
17 Facilities Other than Hospitals

Distribution of Effective Dose (E)
Liver
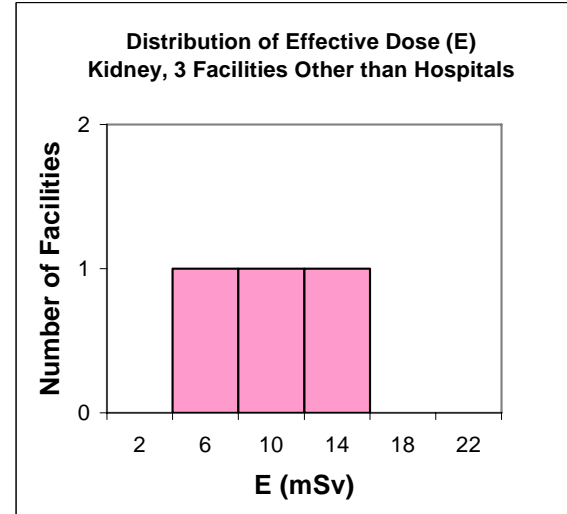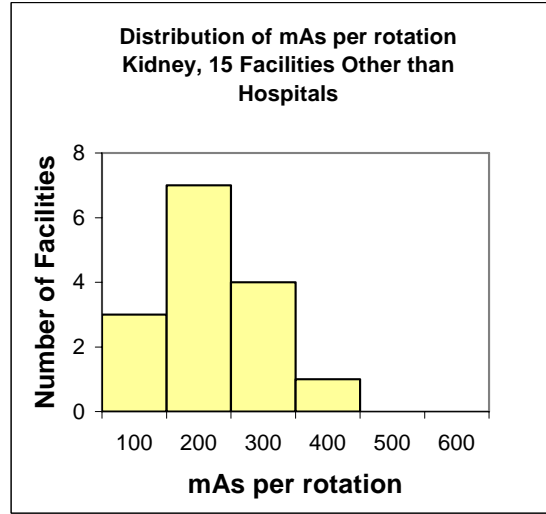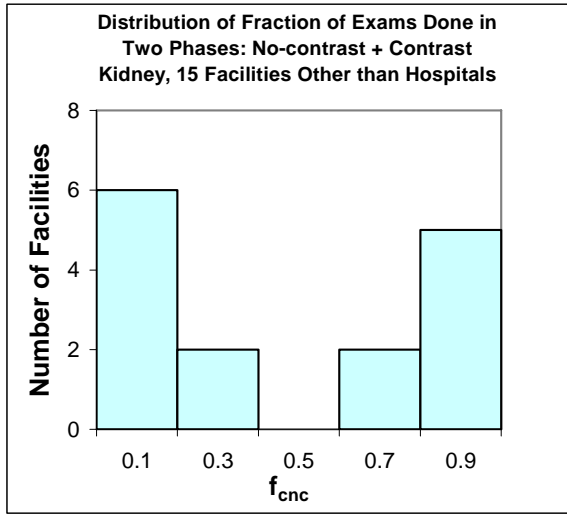4 Facilities Other than Hospitals

Table 1.77. Liver exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.4	6.3	0.9	0.5	0.7	1.0	2.0	4.0	20.0	25.0	45
Scouts per exam	1.28	0.47	0.05	1.00	1	1	1	2	2	3	90
f_{nc}	0.18	0.33	0.04	0.00	0.00	0.00	0.02	0.15	1.00	1.00	61
f_c	0.40	0.43	0.05	0.00	0.00	0.00	0.15	0.87	0.99	1.00	61
f_{cnc}	0.42	0.44	0.06	0.00	0.00	0.00	0.20	0.99	1.00	1.00	61
kVp	121.8	4.5	0.5	120.0	120	120	120	120	130	140	82
mA	231	63	7	80	125	200	250	280	300	400	81
Time (s) per rotation	1.12	0.34	0.04	0.75	0.75	1.00	1.00	1.00	1.96	2.00	69
mAs per rotation	245	72	9	110	128	200	250	280	300	600	66
Reconstruct. increm. (mm)	7.0	1.9	0.2	2.0	5	5	7	8	10	10	65
Slices per rotation (n)	1.05	0.37	0.05	1.00	1.0	1.0	1.0	1.0	1.0	4.0	65
Slice width (T, mm)	7.14	1.77	0.20	5.00	5.0	5.0	7.0	8.0	10.0	10.0	79
Table feed per rotation ($I_{helical}$, mm)	8.78	3.11	0.37	4.06	5.0	7.0	8.0	10.5	15.0	15.0	69
Pitch [$I_{helical}/(nT)$]	1.22	0.36	0.05	0.88	1.00	1.00	1.00	1.50	1.60	3.00	57
L (mm)	248	80	14	105	134	200	245	300	379	420	33
$CTDI_{free\,air}$ (mGy)	58	29	4	18	22	36	51	73	110	131	50
$CTDI_{vol}$ (mGy)	16	8	1	2	7	11	15	19	30	43	41
DLP (mGy-cm)	361	174	41	52	148	226	347	483	635	671	18
E (mSv)	7.9	5.3	1.3	0.8	1.9	4.2	7.8	8.9	17.6	21.9	17

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Liver, 61 Hospitals and Other Facilities

Distribution of mAs per rotation Liver, 66 Hospitals and Other Facilities

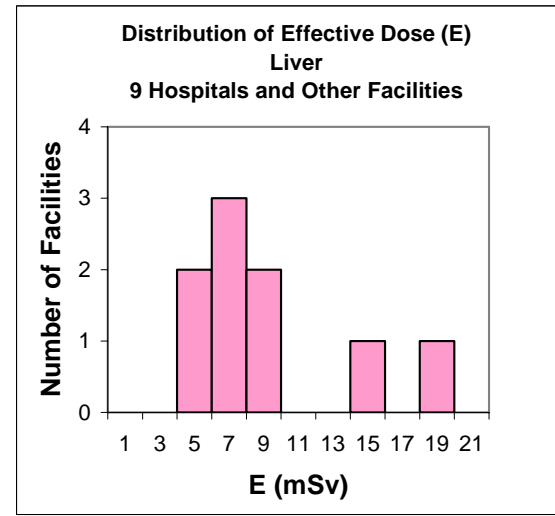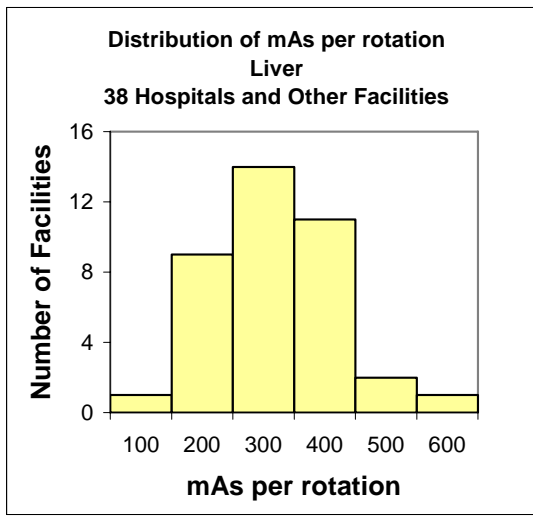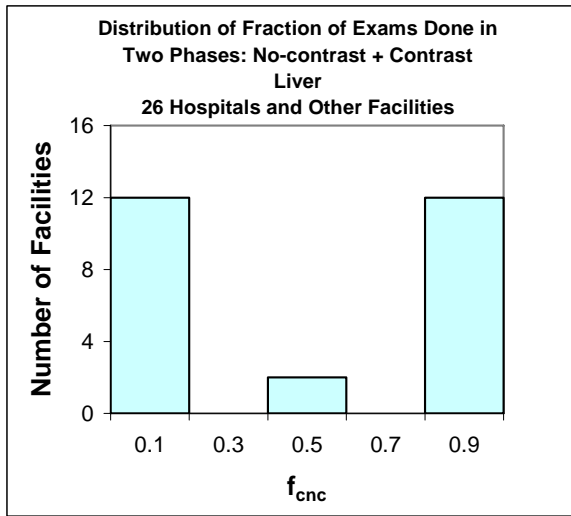Distribution of Effective Dose (E) Liver, 17 Hospitals and Other Facilities

Table 1.78. Liver exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.7	6.9	1.2	0.5	0.9	1.0	2.0	4.0	21.5	25.0	35
Scouts per exam	1.33	0.50	0.06	1.00	1	1	1	2	2	3	75
f_{nc}	0.19	0.32	0.05	0.00	0.00	0.00	0.05	0.21	1.00	1.00	48
f_c	0.40	0.42	0.06	0.00	0.00	0.00	0.18	0.86	1.00	1.00	48
f_{cnc}	0.41	0.43	0.06	0.00	0.00	0.00	0.20	0.96	1.00	1.00	48
kVp	121.8	4.6	0.6	120.0	120	120	120	120	130	140	68
mA	232	60	7	80	125	200	250	278	300	400	67
Time (s) per rotation	1.12	0.33	0.04	0.75	0.75	1.00	1.00	1.00	2.00	2.00	56
mAs per rotation	247	73	10	110	138	200	250	275	300	600	53
Reconstruct. increm. (mm)	7.2	1.9	0.3	2.0	5	5	7	8	10	10	53
Slices per rotation (n)	1.06	0.41	0.06	1.00	1.0	1.0	1.0	1.0	1.0	4.0	54
Slice width (T, mm)	7.20	1.73	0.21	5.00	5.0	5.0	7.0	8.0	10.0	10.0	65
Table feed per rotation ($I_{helical}$, mm)	8.87	3.10	0.41	4.06	5.0	7.0	8.0	10.5	15.0	15.0	57
Pitch [$I_{helical}/(nT)$]	1.22	0.38	0.05	0.88	1.00	1.00	1.00	1.50	1.50	3.00	47
L (mm)	256	82	16	105	129	200	248	311	387	420	26
$CTDI_{free\ air}$ (mGy)	55	26	4	18	24	36	49	72	108	110	40
$CTDI_{vol}$ (mGy)	17	9	1	2	6	11	15	21	32	43	34
DLP (mGy-cm)	376	179	45	52	137	235	402	502	639	671	16
E (mSv)	8.1	5.4	1.4	0.8	2.6	4.5	7.8	8.7	18.1	21.9	15

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Liver, 48 Hospitals

Distribution of mAs per rotation
Liver, 53 Hospitals

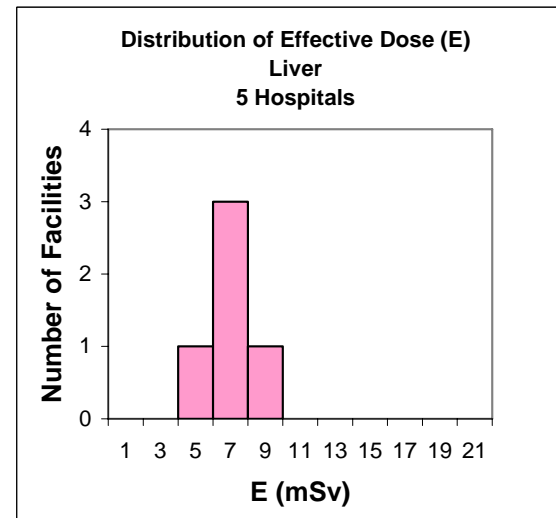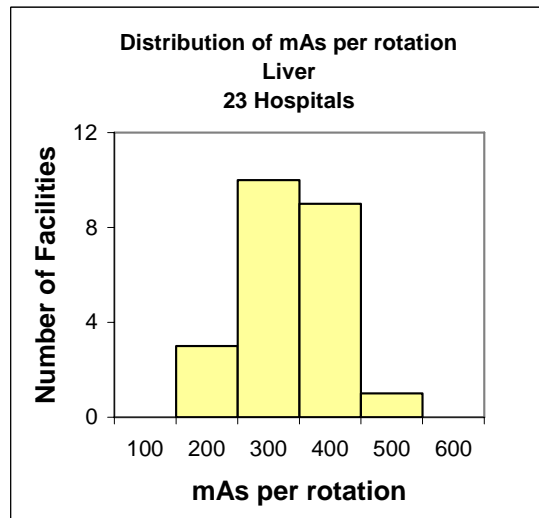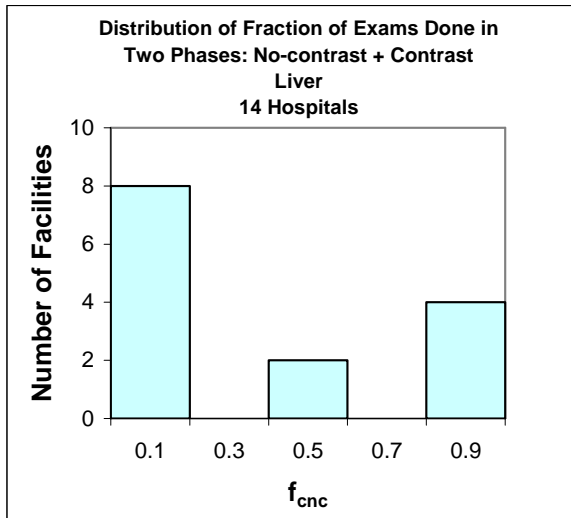Distribution of Effective Dose (E)
Liver, 15 Hospitals

Table 1.79. Liver exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.1	3.0	1.0	0.5	0.7	1.0	2.0	4.3	8.2	10.0	10
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	15
f_{nc}	0.16	0.37	0.10	0.00	0.00	0.00	0.00	0.02	1.00	1.00	13
f_c	0.37	0.47	0.13	0.00	0.00	0.00	0.00	0.96	0.99	0.99	13
f_{cnc}	0.46	0.49	0.14	0.00	0.00	0.00	0.20	1.00	1.00	1.00	13
kVp	122.1	4.3	1.1	120.0	120	120	120	120	130	130	14
mA	228	82	22	83	110	200	230	275	335	400	14
Time (s) per rotation	1.12	0.36	0.10	0.75	0.75	0.80	1.00	1.50	1.66	1.90	13
mAs per rotation	240	74	20	112	139	188	250	300	330	375	13
Reconstruct. increm. (mm)	6.3	1.8	0.5	5.0	5	5	5	8	9	10	12
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	11
Slice width (T, mm)	6.89	2.02	0.54	5.00	5.0	5.0	6.8	8.0	10.0	10.0	14
Table feed per rotation ($I_{helical}$, mm)	8.35	3.24	0.94	5.00	5.0	5.5	8.3	10.0	13.4	15.0	12
Pitch [$I_{helical}/(nT)$]	1.20	0.32	0.10	1.00	1.00	1.00	1.06	1.20	1.78	2.00	10
L (mm)	216	66	25	150	159	180	200	226	320	350	7
$CTDI_{free\,air}$ (mGy)	68	38	12	20	22	44	61	87	126	131	10
$CTDI_{vol}$ (mGy)	15	4	1	11	11	12	14	17	19	20	7
DLP (mGy-cm)	246	61	43	203	208	225	246	268	285	289	2
E (mSv)	6.6	6.2	4.4	2.1	2.6	4.4	6.6	8.8	10.5	11.0	2

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Liver, 13 Facilities Other than Hospitals

Distribution of mAs per rotation Liver, 13 Facilities Other than Hospitals

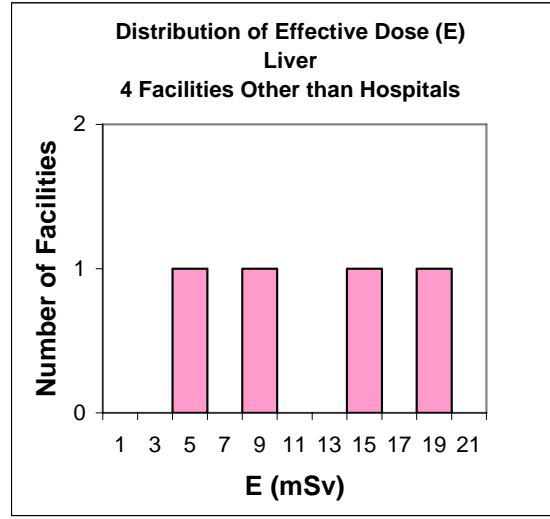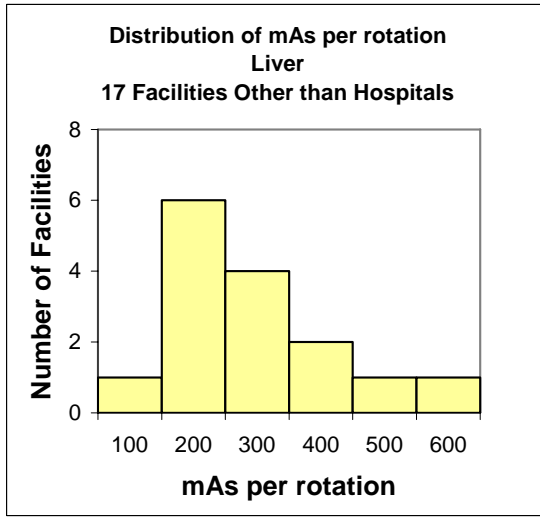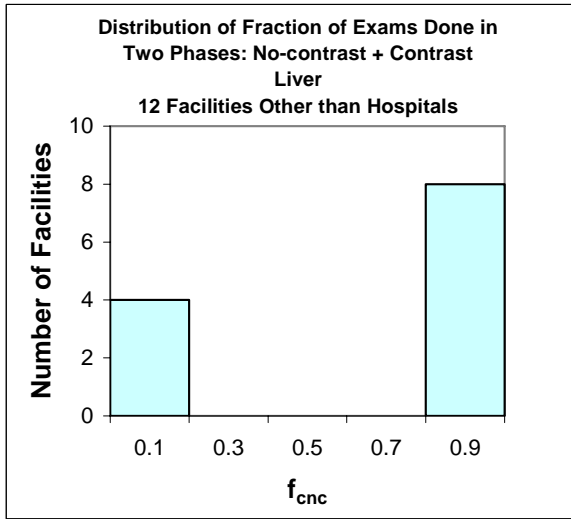Distribution of Effective Dose (E) Liver, 2 Facilities Other than Hospitals

Table 1.80. Pancreas exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.5	1.7	0.4	0.1	0.2	1.0	1.0	1.5	2.6	8.0	19
Scouts per exam	1.11	0.31	0.04	1.00	1	1	1	1	2	2	56
f_{nc}	0.14	0.31	0.06	0.00	0.00	0.00	0.01	0.05	1.00	1.00	29
f_c	0.49	0.46	0.09	0.00	0.00	0.00	0.50	0.98	1.00	1.00	29
f_{cnc}	0.37	0.46	0.09	0.00	0.00	0.00	0.00	0.98	1.00	1.00	29
kVp	122.6	5.2	0.8	120.0	120	120	120	120	133	140	47
mA	183	61	9	70	101	133	175	208	271	400	46
Time (s) per rotation	2.11	0.75	0.11	0.75	1.00	1.93	2.00	2.65	3.00	4.50	46
mAs per rotation	343	115	18	100	172	260	338	415	510	630	42
Slices per contrast phase	25.2	13.5	2.3	5.0	6	20	24	30	43	80	36
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	44
Slice width (T, mm)	5.87	1.99	0.30	3.00	3.9	5.0	5.0	5.3	10.0	10.0	44
Table increment (I_{axial}, mm)	5.73	1.96	0.30	3.00	3.1	5.0	5.0	5.0	10.0	10.0	43
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	38
L (mm)	142	83	15	30	50	100	123	152	306	400	32
$CTDI_{free\ air}$ (mGy)	80	47	9	19	31	51	69	100	152	248	27
$CTDI_{vol}$ (mGy)	30	31	6	9	13	16	22	34	44	170	25
DLP (mGy-cm)	321	225	49	47	110	140	233	382	785	881	21
E (mSv)	7.6	6.0	1.8	1.8	2.0	3.6	5.3	9.6	17.8	21.6	11

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Pancreas
29 Hospitals and Other Facilities

Distribution of mAs per rotation
Pancreas
42 Hospitals and Other Facilities

Distribution of Effective Dose (E)
Pancreas
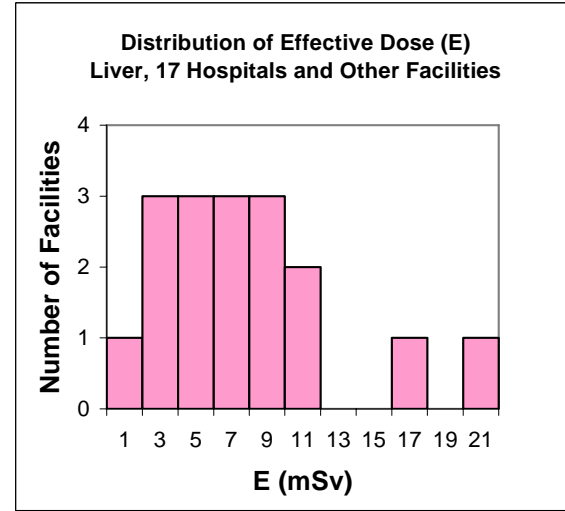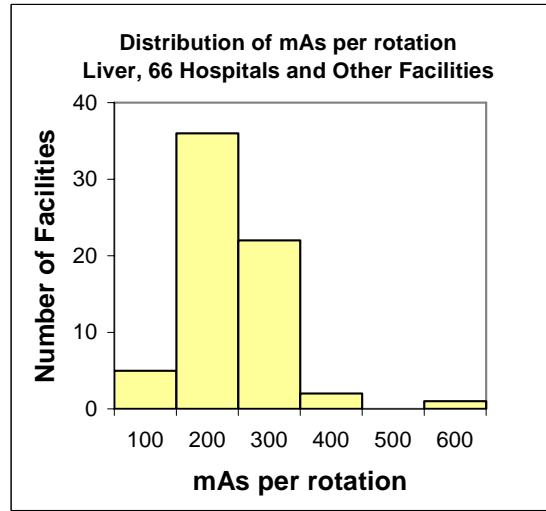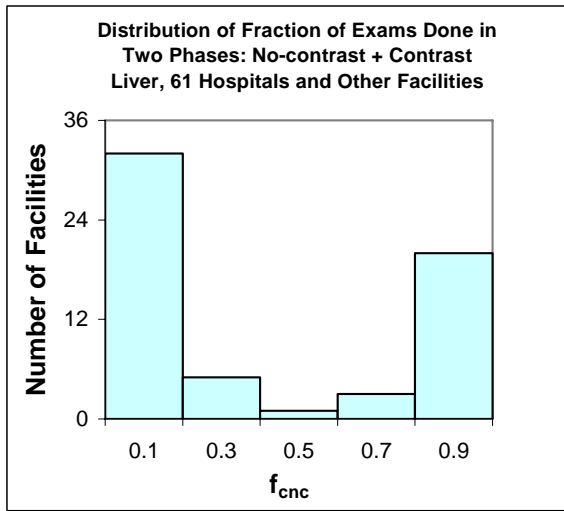11 Hospitals and Other Facilities

96
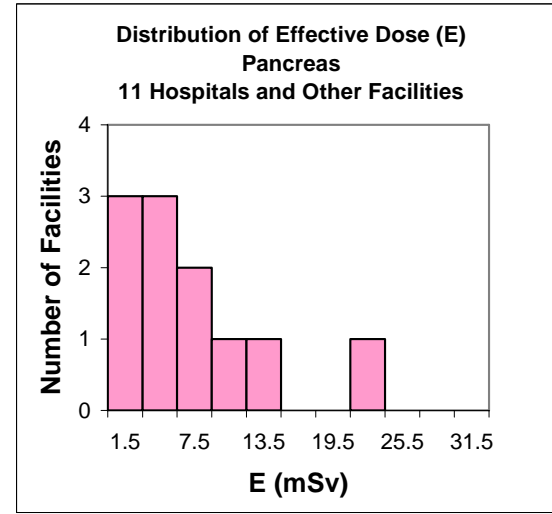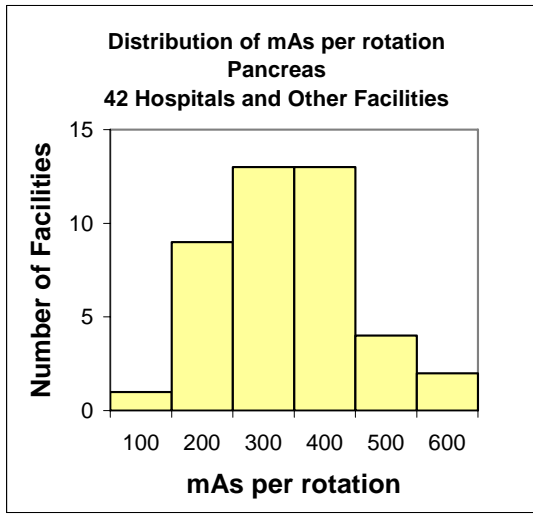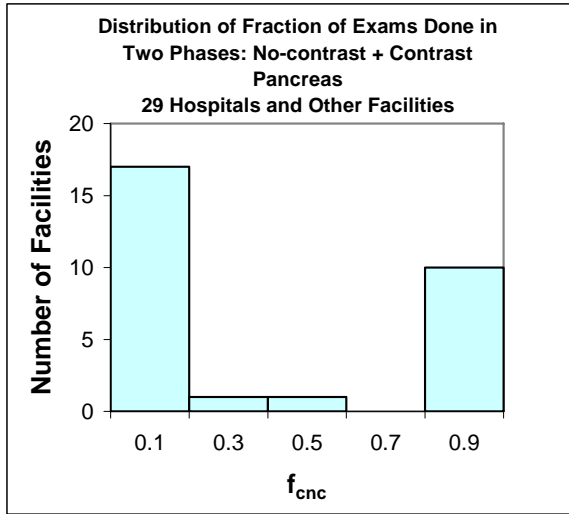
Table 1.81. Pancreas exam, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.6	2.2	0.7	0.2	0.3	1.0	1.0	1.0	5.0	8.0	11
Scouts per exam	1.17	0.38	0.06	1.00	1	1	1	1	2	2	35
f_{nc}	0.08	0.26	0.07	0.00	0.00	0.00	0.00	0.02	0.37	1.00	15
f_c	0.73	0.40	0.10	0.00	0.00	0.63	0.98	1.00	1.00	1.00	15
f_{cnc}	0.19	0.36	0.09	0.00	0.00	0.00	0.00	0.17	1.00	1.00	15
kVp	121.4	4.0	0.8	120.0	120	120	120	120	132	135	28
mA	198	64	12	105	124	140	200	225	290	400	29
Time (s) per rotation	2.07	0.81	0.16	0.75	1.00	1.70	2.00	2.50	3.14	4.50	27
mAs per rotation	344	88	18	165	208	280	340	420	474	500	25
Slices per contrast phase	28.0	15.6	3.4	5.0	10	20	24	30	50	80	21
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	26
Slice width (T, mm)	6.03	2.11	0.41	3.00	4.1	5.0	5.0	6.8	10.0	10.0	27
Table increment (I_{axial}, mm)	5.91	2.02	0.40	3.00	4.0	5.0	5.0	6.0	10.0	10.0	25
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	22
L (mm)	159	100	23	30	48	100	125	200	378	400	19
$CTDI_{free\,air}$ (mGy)	66	28	7	19	34	47	61	81	109	111	14
$CTDI_{vol}$ (mGy)	22	9	2	9	11	15	20	30	35	35	14
DLP (mGy-cm)	330	251	70	47	84	134	309	382	823	881	13
E (mSv)	4.1	2.9	1.3	1.8	1.9	2.2	2.7	5.3	8.0	8.6	5

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast
Pancreas
15 Hospitals

Distribution of mAs per rotation
Pancreas
25 Hospitals

Distribution of Effective Dose (E)
Pancreas
5 Hospitals

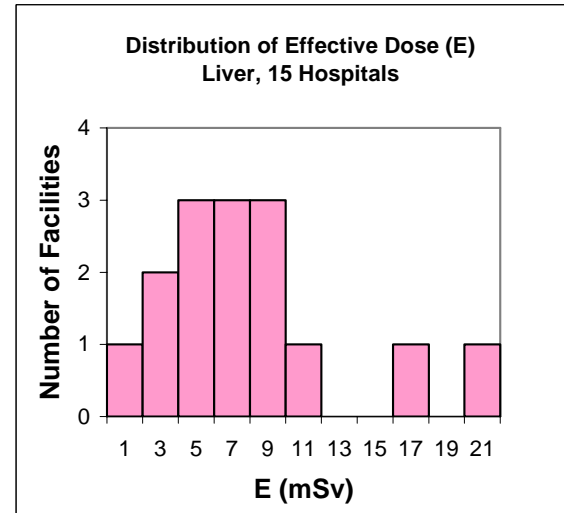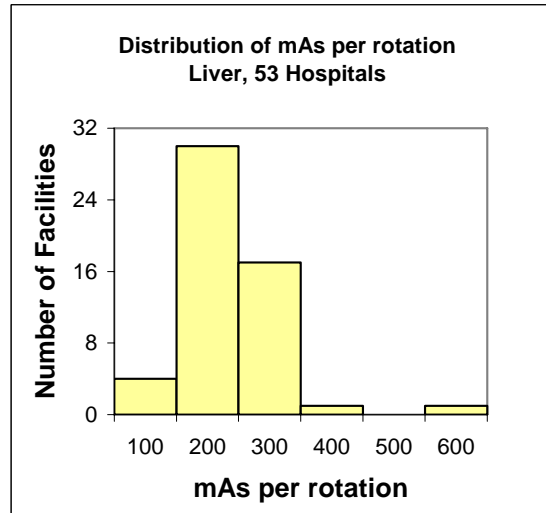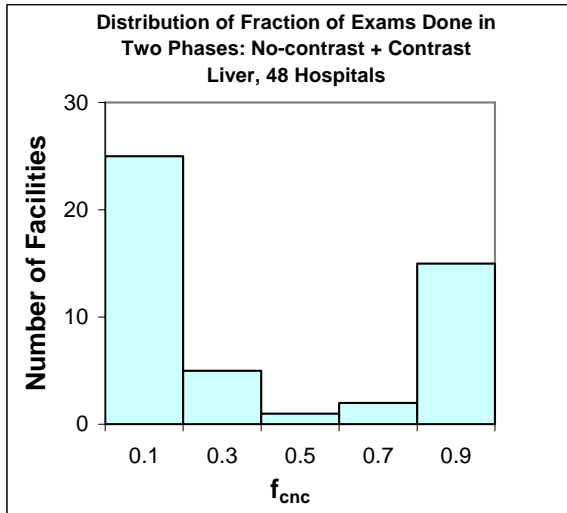## Table 1.82. Pancreas exam, axial scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.3	0.6	0.2	0.1	0.4	1.0	1.3	1.6	2.0	2.0	8
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	21
f_{nc}	0.20	0.36	0.10	0.00	0.00	0.00	0.04	0.10	1.00	1.00	14
f_c	0.24	0.39	0.10	0.00	0.00	0.00	0.00	0.39	0.92	0.95	14
f_{cnc}	0.56	0.49	0.13	0.00	0.00	0.00	0.90	1.00	1.00	1.00	14
kVp	124.4	6.3	1.4	120.0	120	120	120	130	134	140	19
mA	159	47	12	70	94	125	170	200	218	250	17
Time (s) per rotation	2.16	0.67	0.15	1.00	1.00	2.00	2.00	2.80	3.00	3.00	19
mAs per rotation	341	149	36	100	156	240	333	400	590	630	17
Slices per contrast phase	21.4	9.2	2.4	5.0	6	15	21	30	31	34	15
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	18
Slice width (T, mm)	5.62	1.83	0.44	3.00	4.6	5.0	5.0	5.0	10.0	10.0	17
Table increment (I_{axial}, mm)	5.47	1.88	0.44	3.00	3.0	5.0	5.0	5.0	10.0	10.0	18
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	16
L (mm)	116	41	11	50	62	75	105	150	163	170	13
$CTDI_{free\ air}$ (mGy)	96	58	16	27	36	63	85	108	197	248	13
$CTDI_{vol}$ (mGy)	41	44	13	14	15	19	30	38	108	170	11
DLP (mGy-cm)	307	192	68	127	131	188	230	386	605	611	8
E (mSv)	10.5	6.6	2.7	4.5	4.6	5.4	8.9	13.3	19.7	21.6	6

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pancreas 14 Facilities Other than Hospitals

Distribution of mAs per rotation Pancreas 17 Facilities Other than Hospitals

Distribution of Effective Dose (E) Pancreas 6 Facilities Other than Hospitals
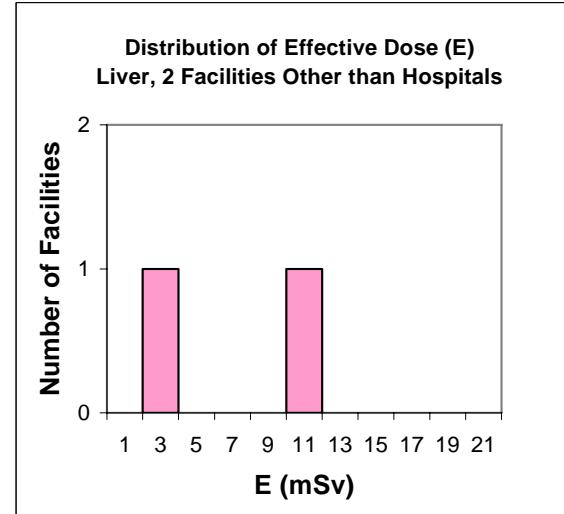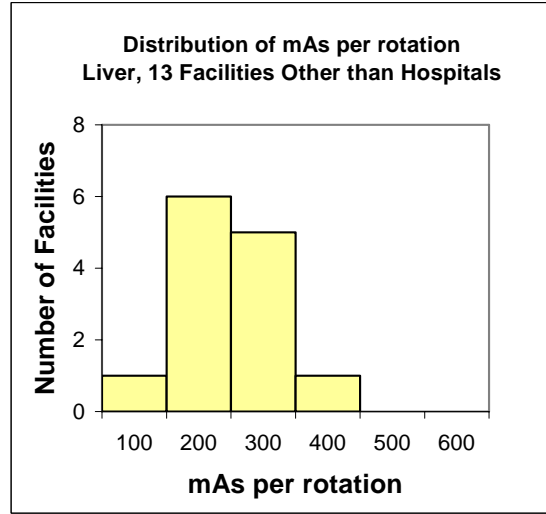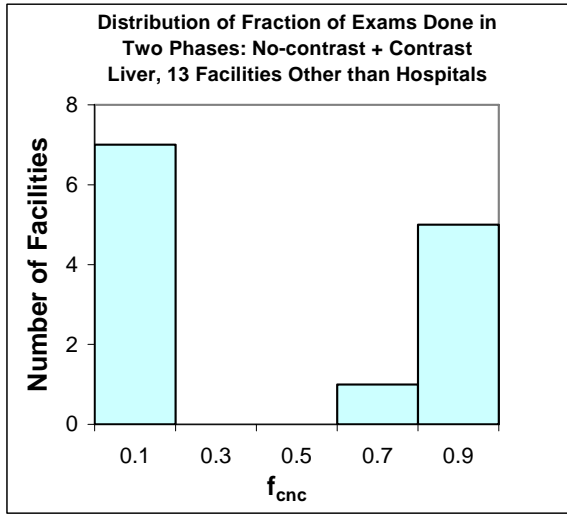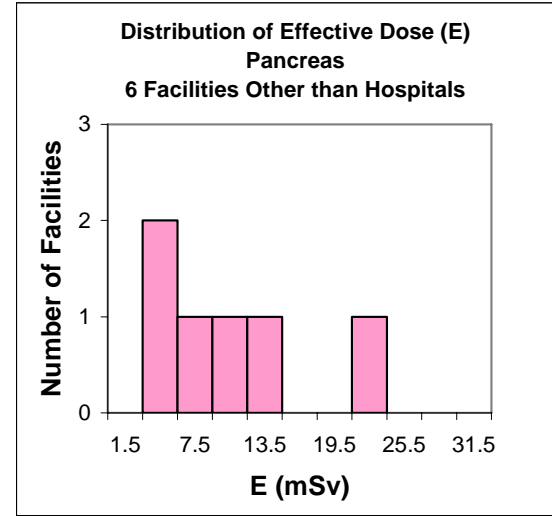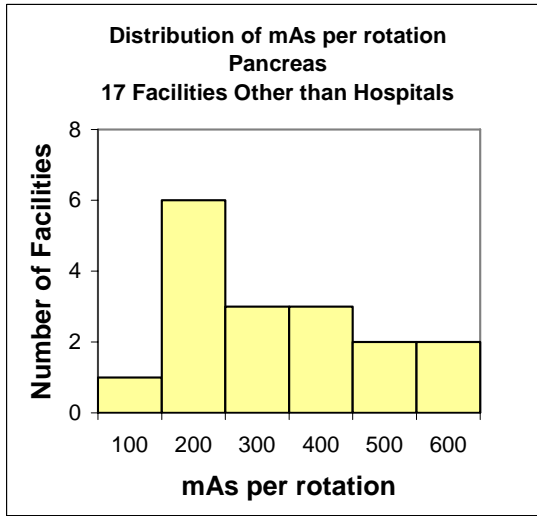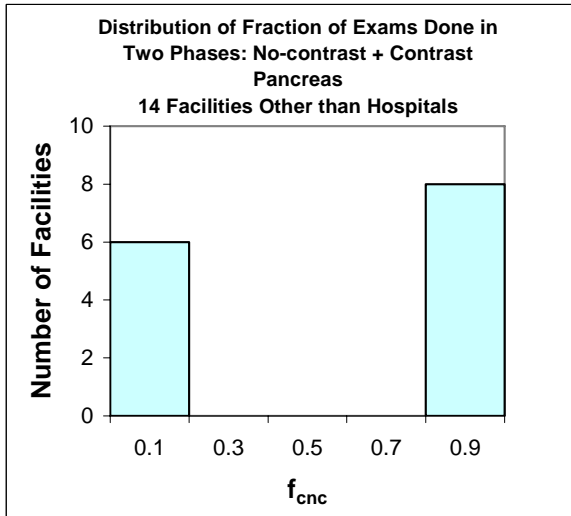
Table 1.83. Pancreas exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.7	5.5	0.8	0.0	0.5	1.0	2.0	3.8	19.5	25.0	42
Scouts per exam	1.27	0.44	0.05	1.00	1	1	1	2	2	2	90
f_{nc}	0.13	0.28	0.04	0.00	0.00	0.00	0.01	0.05	0.92	1.00	57
f_c	0.55	0.47	0.06	0.00	0.00	0.00	0.87	0.99	1.00	1.00	57
f_{cnc}	0.33	0.43	0.06	0.00	0.00	0.00	0.03	0.94	1.00	1.00	58
kVp	122.3	5.3	0.6	120.0	120	120	120	120	130	140	82
mA	232	64	7	80	125	200	250	280	300	400	83
Time (s) per rotation	1.12	0.37	0.04	0.75	0.75	1.00	1.00	1.00	2.00	2.00	71
mAs per rotation	252	90	11	110	123	200	250	300	400	600	68
Reconstruct. increm. (mm)	4.7	1.7	0.2	2.0	2	4	5	5	8	10	68
Slices per rotation (n)	1.10	0.53	0.07	1.00	1.0	1.0	1.0	1.0	1.0	4.0	63
Slice width (T, mm)	5.05	1.56	0.17	2.00	3.0	5.0	5.0	5.0	8.0	10.0	81
Table feed per rotation ($I_{helical}$, mm)	6.45	3.82	0.47	2.00	3.0	5.0	5.0	7.5	11.6	30.0	67
Pitch [$I_{helical}/(nT)$]	1.21	0.37	0.05	0.83	1.00	1.00	1.00	1.50	1.78	3.00	54
L (mm)	191	97	17	60	69	110	180	245	358	392	33
$CTDI_{free\ air}$ (mGy)	62	33	5	19	21	36	52	86	119	137	50
$CTDI_{vol}$ (mGy)	18	10	2	2	6	10	15	23	35	50	38
DLP (mGy-cm)	330	218	53	52	64	206	289	495	662	838	17
E (mSv)	8.9	8.8	2.3	1.3	1.5	2.5	6.6	11.8	25.2	31.9	14

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pancreas, 58 Hospitals and Other Facilities

Distribution of mAs per rotation Pancreas, 68 Hospitals and Other Facilities

Distribution of Effective Dose (E) Pancreas, 14 Hospitals and Other Facilities
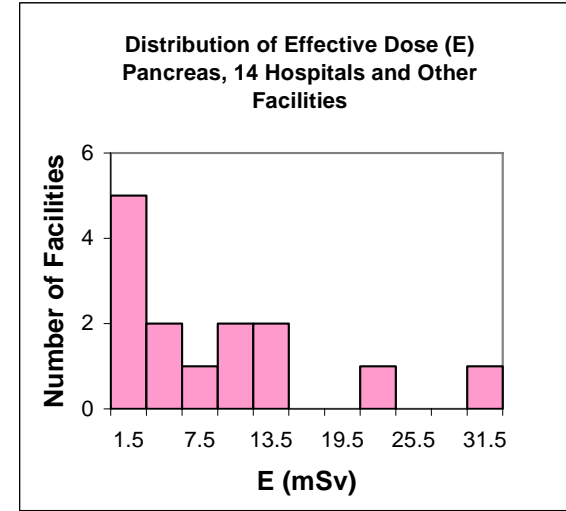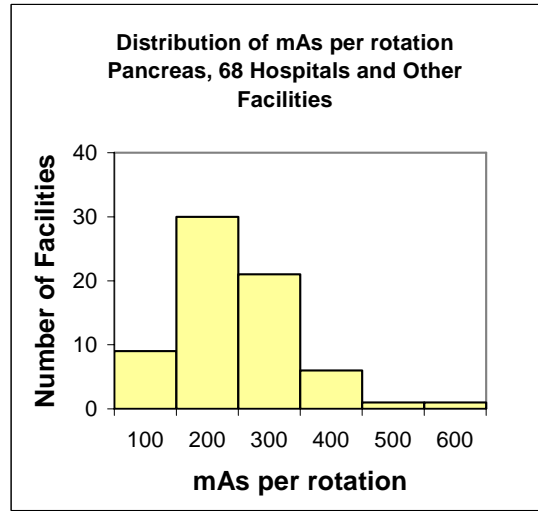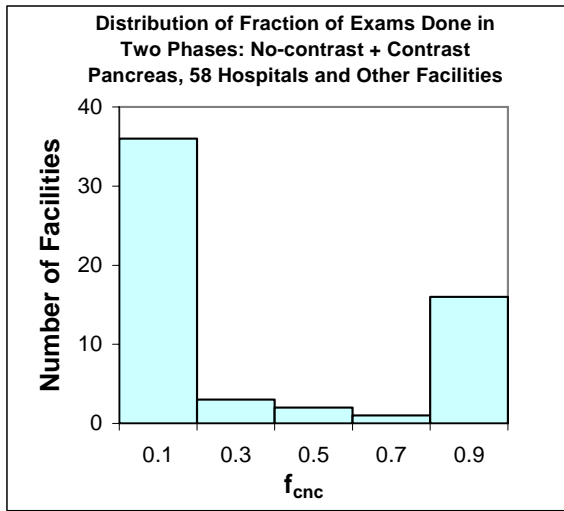
Table 1.84. Pancreas exam, helical scanning, hospitals only											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.1	5.2	0.9	0.0	0.4	1.0	2.0	2.0	12.2	25.0	34
Scouts per exam	1.32	0.47	0.05	1.00	1	1	1	2	2	2	76
f_{nc}	0.12	0.25	0.04	0.00	0.00	0.00	0.01	0.05	0.82	1.00	45
f_c	0.57	0.46	0.07	0.00	0.00	0.00	0.87	1.00	1.00	1.00	45
f_{cnc}	0.33	0.43	0.06	0.00	0.00	0.00	0.05	0.88	1.00	1.00	46
kVp	122.0	5.0	0.6	120.0	120	120	120	120	130	140	69
mA	233	61	7	80	125	200	250	280	300	400	70
Time (s) per rotation	1.13	0.37	0.05	0.75	0.75	1.00	1.00	1.00	2.00	2.00	59
mAs per rotation	256	90	12	110	126	200	250	300	400	600	56
Reconstruct. increm. (mm)	4.8	1.8	0.2	2.0	2	4	5	5	8	10	57
Slices per rotation (n)	1.11	0.57	0.08	1.00	1.0	1.0	1.0	1.0	1.0	4.0	54
Slice width (T, mm)	5.08	1.61	0.20	2.00	3.0	5.0	5.0	5.0	8.0	10.0	68
Table feed per rotation ($I_{helical}$, mm)	6.60	4.09	0.55	2.00	3.0	5.0	5.0	7.5	12.8	30.0	56
Pitch [$I_{helical}/(nT)$]	1.20	0.36	0.05	0.83	1.00	1.00	1.00	1.50	1.50	3.00	46
L (mm)	191	102	20	60	76	103	163	249	365	392	26
$CTDI_{free\ air}$ (mGy)	59	30	5	19	21	38	52	83	109	137	41
$CTDI_{vol}$ (mGy)	18	11	2	2	5	10	16	24	36	50	33
DLP (mGy-cm)	340	230	59	52	62	187	297	510	684	838	15
E (mSv)	9.1	9.3	2.7	1.3	1.5	2.3	6.6	10.4	26.2	31.9	12

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pancreas, 46 Hospitals

Distribution of mAs per rotation Pancreas, 56 Hospitals

Distribution of Effective Dose (E) Pancreas, 12 Hospitals
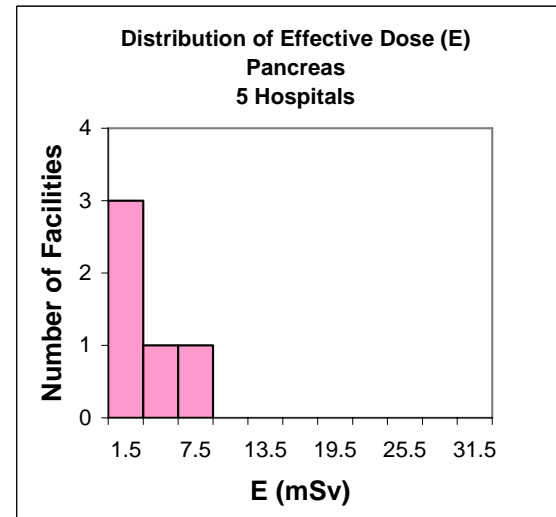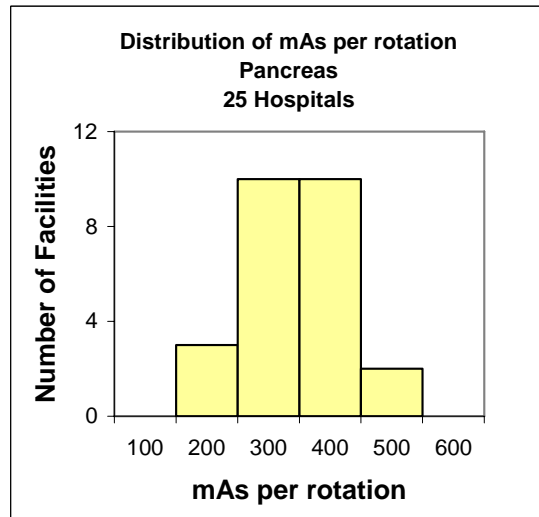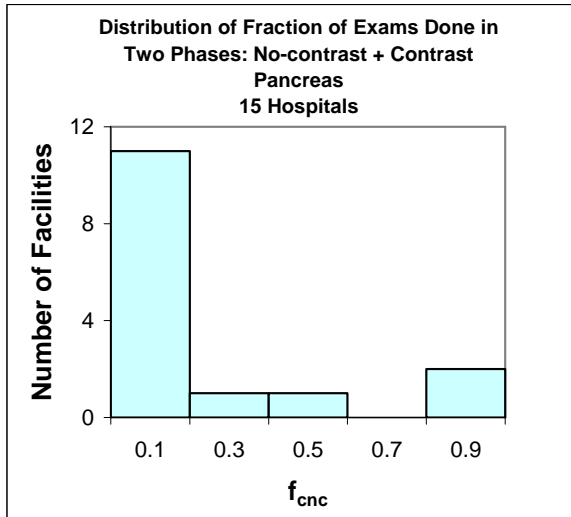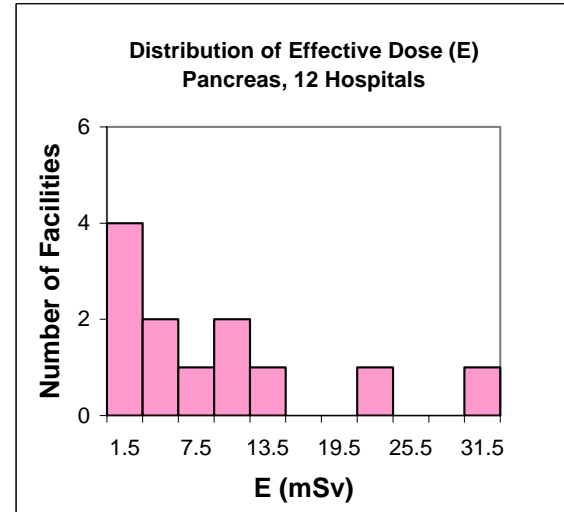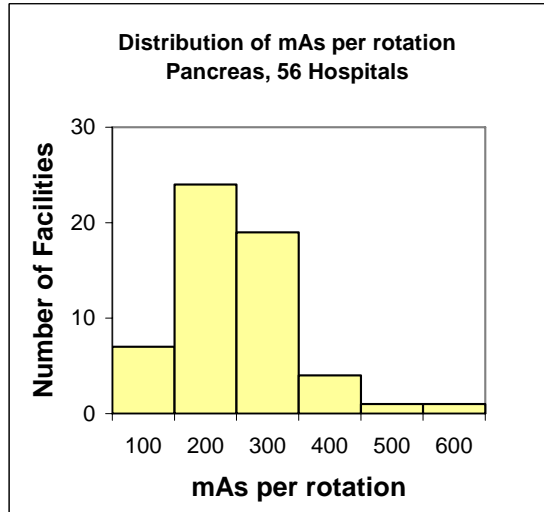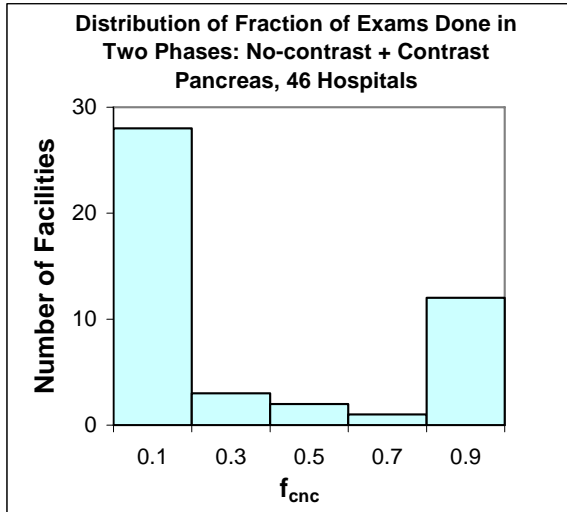
Table 1.85. Pancreas exam, helical scanning, facilities other than hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.1	6.5	2.3	0.5	0.7	1.0	5.0	7.0	16.5	20.0	8
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	14
f_{nc}	0.18	0.38	0.11	0.00	0.00	0.00	0.01	0.05	1.00	1.00	12
f_c	0.49	0.51	0.15	0.00	0.00	0.00	0.45	0.98	1.00	1.00	12
f_{cnc}	0.34	0.48	0.14	0.00	0.00	0.00	0.01	0.96	1.00	1.00	12
kVp	123.8	6.5	1.8	120.0	120	120	120	130	134	140	13
mA	227	79	22	83	117	200	220	250	340	400	13
Time (s) per rotation	1.06	0.37	0.11	0.75	0.75	0.79	1.00	1.13	1.68	1.90	12
mAs per rotation	232	86	25	112	121	163	220	300	363	375	12
Reconstruct. increm. (mm)	4.3	1.3	0.4	2.0	3	3	5	5	6	7	11
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	9
Slice width (T, mm)	4.92	1.30	0.36	3.00	3.0	5.0	5.0	5.0	6.7	7.0	13
Table feed per rotation ($I_{helical}$, mm)	5.70	1.99	0.60	3.00	3.0	5.0	5.6	6.5	8.8	10.0	11
Pitch [$I_{helical}/(nT)$]	1.28	0.45	0.16	1.00	1.00	1.00	1.06	1.34	2.00	2.00	8
L (mm)	189	86	33	60	87	165	180	200	305	350	7
$CTDI_{free\ air}$ (mGy)	72	43	14	20	22	31	71	118	126	131	9
$CTDI_{vol}$ (mGy)	13	4	2	9	9	11	12	14	18	19	5
DLP (mGy-cm)	254	51	36	218	221	236	254	272	286	289	2
E (mSv)	7.5	7.0	4.9	2.6	3.1	5.1	7.5	10.0	12.0	12.5	2

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Pancreas, 12 Facilities Other than Hospitals

Distribution of mAs per rotation Pancreas, 12 Facilities Other than Hospitals

Distribution of Effective Dose (E) Pancreas, 2 Facilities Other than Hospitals

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.86. Neck (soft tissue) exam, axial scanning, hospitals and other facilities											
Exams per week	1.3	0.9	0.3	0.5	0.5	0.9	1.0	1.4	2.8	3.0	8
Scouts per exam	1.27	0.47	0.14	1.00	1	1	1	2	2	2	11
f_{nc}	0.15	0.31	0.10	0.00	0.00	0.00	0.05	0.10	0.63	1.00	10
f_c	0.63	0.45	0.14	0.00	0.00	0.15	0.89	0.99	1.00	1.00	10
f_{cnc}	0.22	0.40	0.13	0.00	0.00	0.00	0.00	0.23	0.96	1.00	10
kVp	122.0	4.2	1.3	120.0	120	120	120	120	130	130	10
mA	153	37	11	100	100	128	160	175	200	200	11
Time (s) per rotation	1.90	0.70	0.21	1.00	1.00	1.45	2.00	2.00	3.00	3.00	11
mAs per rotation	281	107	32	160	170	195	300	320	455	510	11
Slices per contrast phase	36.0	11.7	3.7	25.0	25	30	35	36	56	65	10
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	7
Slice width (T, mm)	4.45	0.93	0.28	3.00	3.0	4.0	5.0	5.0	5.0	5.0	11
Table increment (I_{axial}, mm)	4.50	0.85	0.27	3.00	3.0	4.3	5.0	5.0	5.0	5.0	10
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6
L (mm)	158	47	19	90	99	131	163	179	214	225	6
$CTDI_{free\ air}$ (mGy)	63	32	12	15	21	47	64	83	101	102	7
$CTDI_{vol}$ (mGy)	15	11	5	5	5	6	13	21	26	27	4
DLP (mGy-cm)	236	166	83	44	60	127	247	355	396	406	4
E (mSv)	3.6	2.9	1.7	0.3	0.8	2.5	4.7	5.2	5.7	5.8	3

Distribution of Numbers of Slices per Contrast Phase
Neck (soft tissue)
10 Hospitals and Other Facilities

Distribution of mAs per rotation
Neck (soft tissue)
11 Hospitals and Other Facilities

Distribution of CTDI$_{free\ air}$
Neck (soft tissue)
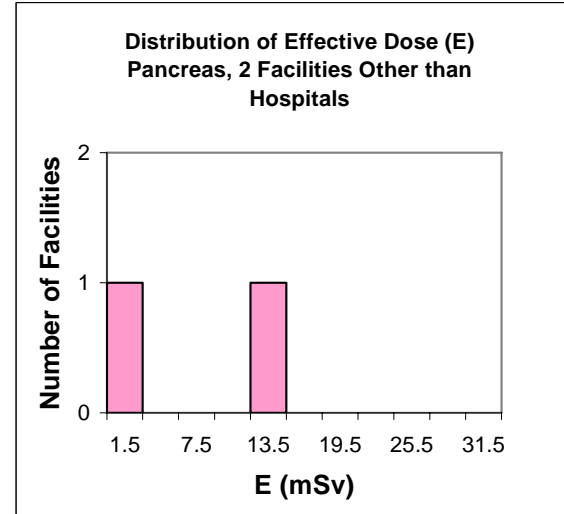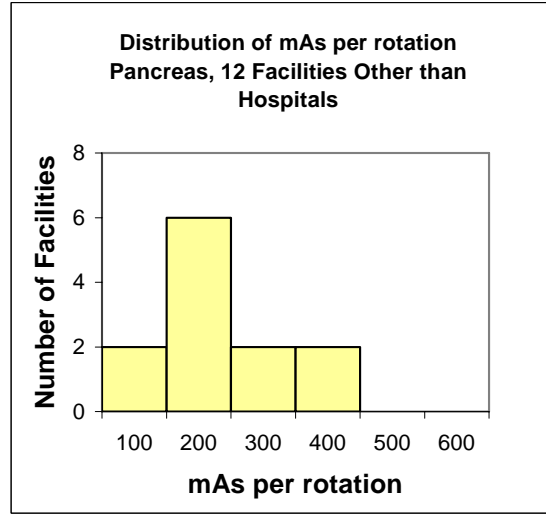7 Hospitals and Other Facilities
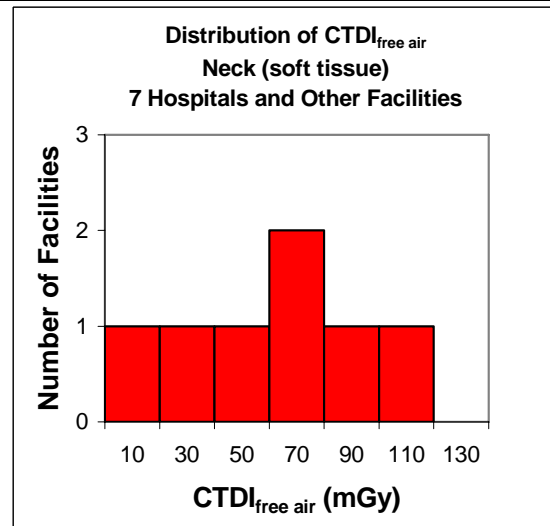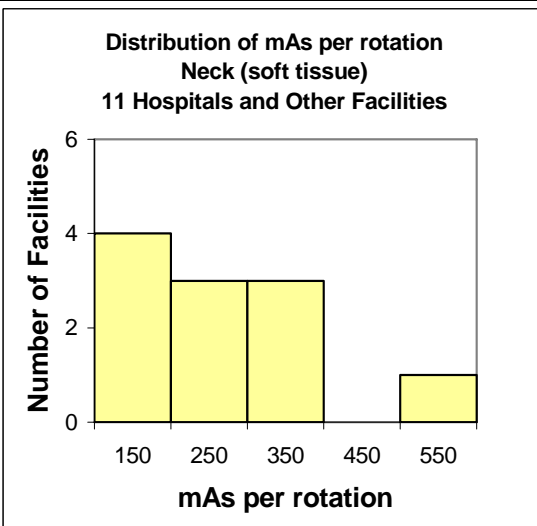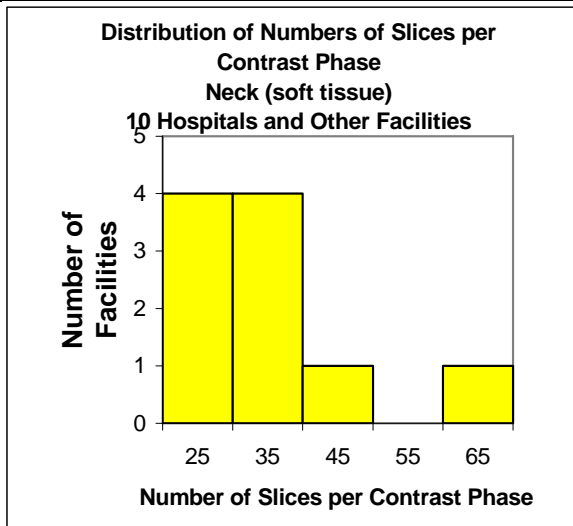
Table 1.87. Neck (soft tissue) exam, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.3	2.3	0.4	0.2	0.2	1.0	1.5	3.0	6.6	10.0	30
Scouts per exam	1.42	0.50	0.09	1.00	1	1	1	2	2	2	31
f_{nc}	0.17	0.32	0.06	0.00	0.00	0.00	0.00	0.17	0.99	1.00	31
f_c	0.75	0.39	0.07	0.00	0.00	0.58	1.00	1.00	1.00	1.00	31
f_{cnc}	0.07	0.21	0.04	0.00	0.00	0.00	0.00	0.00	0.53	0.95	31
kVp	124.0	9.3	1.7	110.0	110	120	120	130	140	140	30
mA	188	54	10	83	83	150	200	220	268	280	29
Time (s) per rotation	1.35	0.47	0.09	0.75	0.83	1.00	1.00	1.90	2.00	2.00	27
mAs per rotation	236	78	15	113	133	192	219	283	340	460	26
Reconstruct. increm. (mm)	4.0	1.1	0.2	1.0	3	3	4	5	5	5	21
Slices per rotation (n)	1.19	0.68	0.13	1.00	1.0	1.0	1.0	1.0	2.4	4.0	27
Slice width (T, mm)	4.48	1.05	0.19	3.00	3.0	3.3	5.0	5.0	5.0	7.5	30
Table feed per rotation ($I_{helical}$, mm)	5.40	2.79	0.56	2.00	2.2	4.4	5.0	6.0	10.5	15.0	25
Pitch [$I_{helical}/(nT)$]	1.06	0.23	0.05	0.50	0.74	1.00	1.00	1.21	1.50	1.50	20
L (mm)	225	93	28	75	89	175	215	285	350	350	11
$CTDI_{free\ air}$ (mGy)	66	31	7	26	33	45	55	80	132	138	21
$CTDI_{vol}$ (mGy)	26	18	5	7	8	10	22	35	53	60	12
DLP (mGy-cm)	545	493	201	207	214	240	377	551	1271	1504	6
E (mSv)	4.8	3.8	1.4	1.9	2.0	2.4	3.4	5.4	10.8	12.5	7

Distribution of Scanning Length (L) per contrast phase
Neck (soft tissue)
11 Hospitals and Other Facilities

Distribution of mAs per rotation
Neck (soft tissue)
26 Hospitals and Other Facilities

Distribution of $CTDI_{free\ air}$
Neck (soft tissue)
21 Hospitals and Other Facilities

Table 1.88. Exams of the extremities, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.9	1.9	0.4	0.1	0.2	0.5	1.0	2.1	4.7	8.0	20
Scouts per exam	1.58	0.50	0.10	1.00	1	1	2	2	2	2	26
f_{nc}	0.99	0.02	0.00	0.94	0.95	0.99	1.00	1.00	1.00	1.00	19
f_c	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	19
f_{cnc}	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	19
kVp	123.0	8.8	1.8	100.0	120	120	120	125	140	140	23
mA	157	45	10	80	84	126	160	180	238	240	22
Time (s) per rotation	1.67	0.73	0.15	0.80	1.00	1.00	1.50	2.00	3.00	3.00	23
mAs per rotation	247	84	18	120	158	188	225	315	390	435	21
Slices per contrast phase	43.1	31.3	6.8	14.0	16	25	30	48	100	120	21
Slices per rotation (n)	1.13	0.61	0.13	1.00	1.0	1.0	1.0	1.0	1.0	4.0	24
Slice width (T, mm)	3.14	1.59	0.32	1.00	1.0	2.0	3.0	4.0	5.0	7.5	25
Table increment (I_{axial}, mm)	3.23	1.57	0.31	1.00	1.0	2.0	3.0	4.0	5.0	7.5	25
$I_{axial}/(nT)$	0.98	0.08	0.02	0.67	0.83	1.00	1.00	1.00	1.00	1.14	24
L (mm)	99	43	10	25	59	70	90	113	194	201	19
$CTDI_{free\ air}$ (mGy)	65	31	7	16	19	41	65	73	110	139	17
$CTDI_{vol}$ (mGy)	42	22	6	7	10	27	41	56	73	82	14
DLP (mGy-cm)	348	209	60	67	76	230	319	530	654	703	12
E (mSv)											

Distribution of Numbers of Slices per Contrast Phase
Extremities
21 Hospitals and Other Facilities

Distribution of mAs per rotation
Extremities
21 Hospitals and Other Facilities

Distribution of CTDI$_{free\ air}$
Extremities
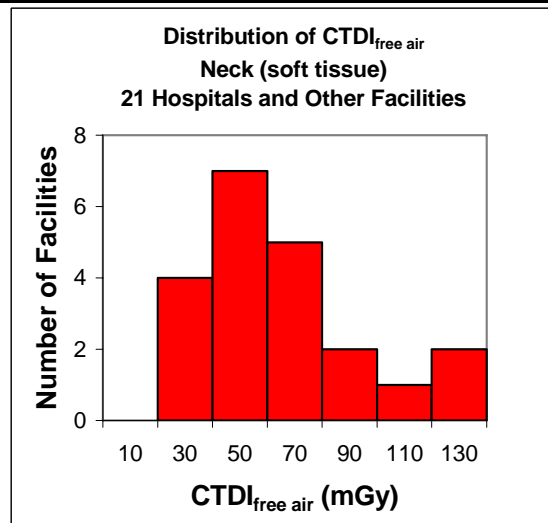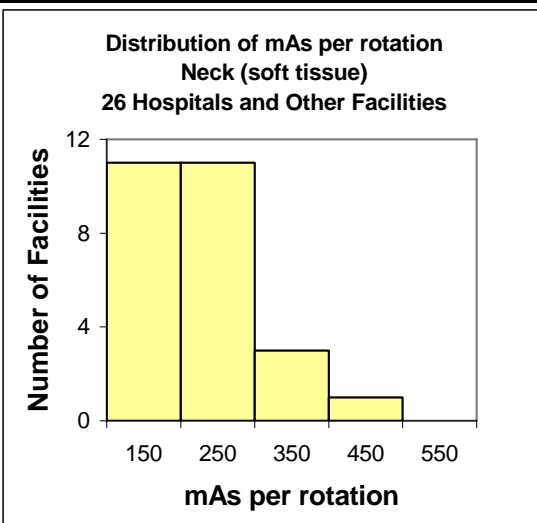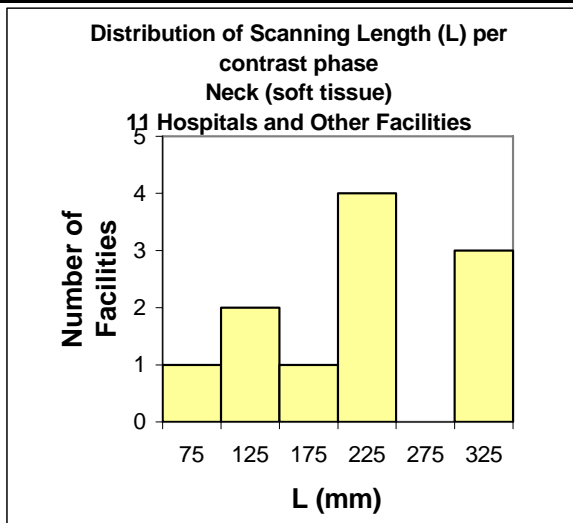17 Hospitals and Other Facilities
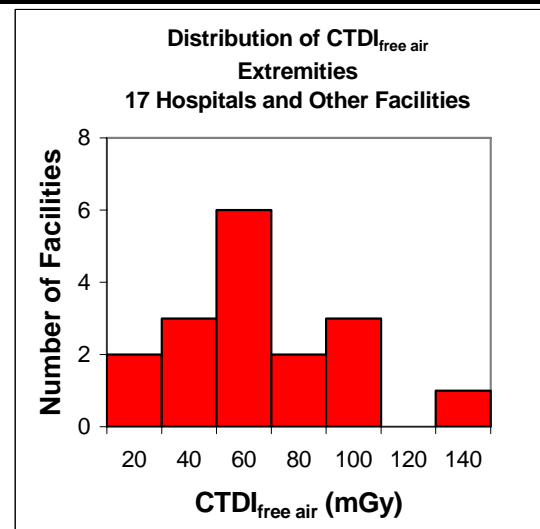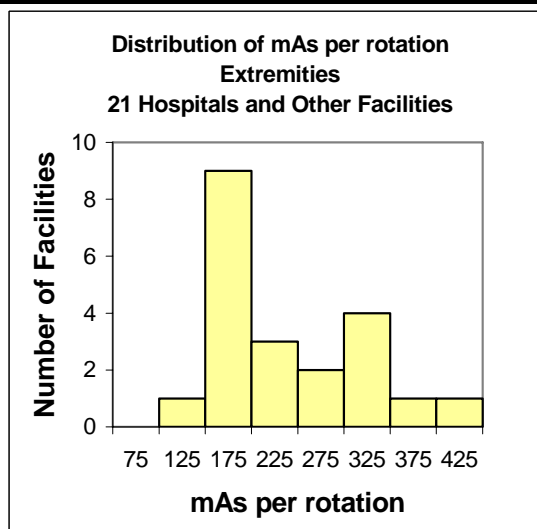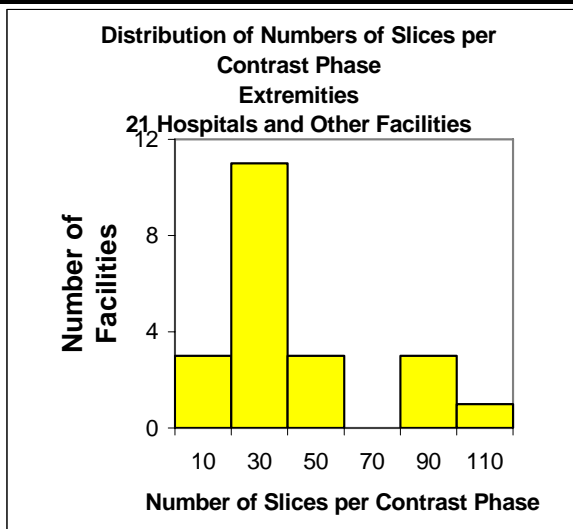
Table 1.89. Exams of the extremities, helical scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.1	1.3	0.3	0.1	0.4	1.0	2.0	2.9	4.2	5.0	18
Scouts per exam	1.52	0.50	0.11	1.00	1	1	2	2	2	2	22
f_{nc}	0.92	0.24	0.05	0.00	0.42	1.00	1.00	1.00	1.00	1.00	24
f_c	0.07	0.24	0.05	0.00	0.00	0.00	0.00	0.00	0.57	1.00	24
f_{cnc}	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.09	24
kVp	122.6	8.1	1.8	110.0	119	120	120	120	140	140	19
mA	168	64	15	83	89	128	150	200	282	300	19
Time (s) per rotation	1.24	0.62	0.16	0.75	0.75	1.00	1.00	1.25	2.30	3.00	15
mAs per rotation	194	96	25	68	68	118	188	260	327	390	15
Reconstruct. increm. (mm)	1.9	0.7	0.2	1.0	1	1	2	2	3	3	16
Slices per rotation (n)	1.25	0.77	0.18	1.00	1.0	1.0	1.0	1.0	2.7	4.0	18
Slice width (T, mm)	2.46	1.08	0.25	0.60	0.9	2.0	2.3	3.0	4.2	5.0	18
Table feed per rotation ($I_{helical}$, mm)	3.18	1.62	0.43	1.25	1.4	2.0	3.0	3.8	5.9	7.5	14
Pitch [$I_{helical}/(nT)$]	1.03	0.20	0.06	0.63	0.81	1.00	1.00	1.01	1.36	1.50	12
L (mm)	118	55	19	50	59	94	100	140	200	200	8
$CTDI_{free\ air}$ (mGy)	63	39	12	15	15	40	54	79	126	139	11
$CTDI_{vol}$ (mGy)	33	18	6	12	14	19	33	44	57	64	8
DLP (mGy-cm)	452	303	151	182	203	285	372	538	813	881	4
E (mSv)											

Distribution of Scanning Length (L) per contrast phase
Extremities
8 Hospitals and Other Facilities

Distribution of mAs per rotation
Extremities
15 Hospitals and Other Facilities

Distribution of CTDI$_{free\ air}$
Extremities
11 Hospitals and Other Facilities
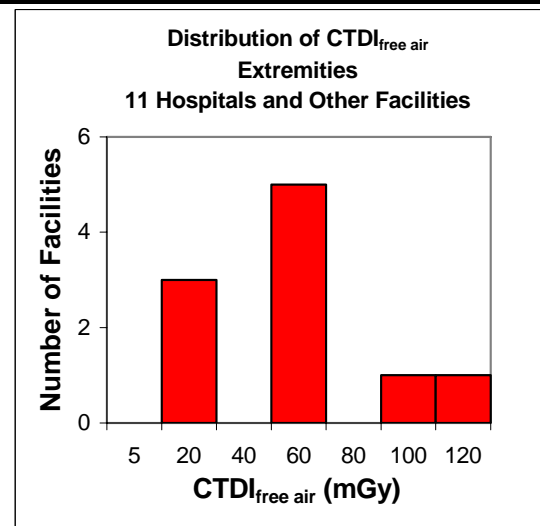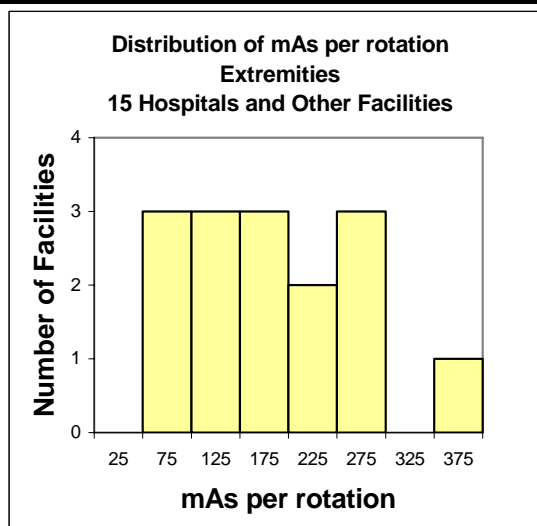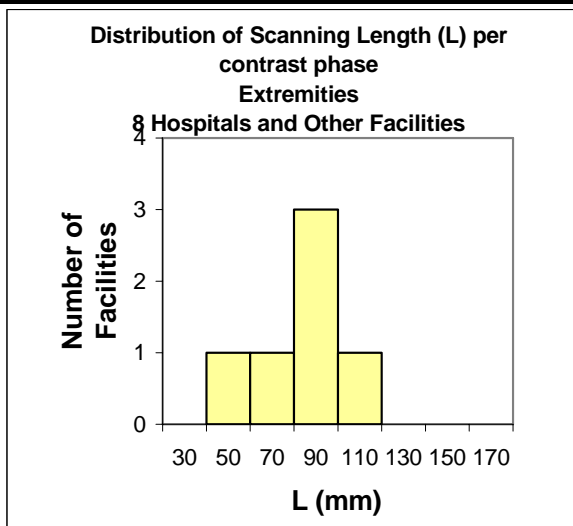
Table 1.90. Bone mineral densitometry, axial scanning, 4 hospitals and 2 other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	6.6	4.1	1.7	1.0	1.5	3.9	6.8	9.3	11.5	12.0	6
Scouts per exam	1.33	0.52	0.21	1.00	1	1	1	2	2	2	6
f_{nc}	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6
kVp	101.7	20.4	8.3	80.0	80	83	105	120	120	120	6
mA	98	25	10	70	70	78	100	115	128	130	6
Time (s) per rotation	1.70	0.81	0.33	1.00	1.00	1.03	1.55	2.08	2.78	3.00	6
mAs per rotation	182	126	51	70	70	80	155	239	356	390	6
Slices per contrast phase	4.2	1.3	0.6	3.0	3	3	4	5	6	6	5
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	6
Slice width (T, mm)	9.17	2.04	0.83	5.00	6.3	10.0	10.0	10.0	10.0	10.0	6
Table increment (I_{axial}, mm)	10.00	0.00	0.00	10.00	10.0	10.0	10.0	10.0	10.0	10.0	3
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3
L (mm)	40	10	6	30	31	35	40	45	49	50	3
$CTDI_{free\ air}$ (mGy)	72	74	52	20	25	46	72	98	119	125	2
$CTDI_{vol}$ (mGy)	9										1
DLP (mGy-cm)	26										1
E (mSv)	0.3										1

Distribution of kVp
Bone Mineral Densitometry
4 Hospitals and 2 Other Facilities

Distribution of mAs per rotation
Bone Mineral Densitometry
4 Hospitals and 2 Other Facilities

Distribution of Slice Width (T)
Bone Mineral Densitometry
4 Hospitals and 2 Other Facilities
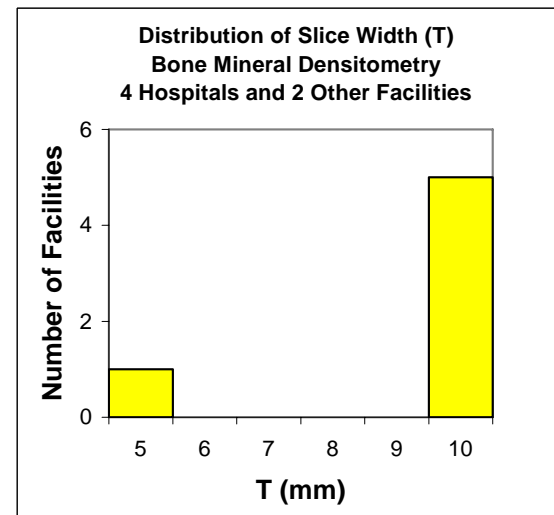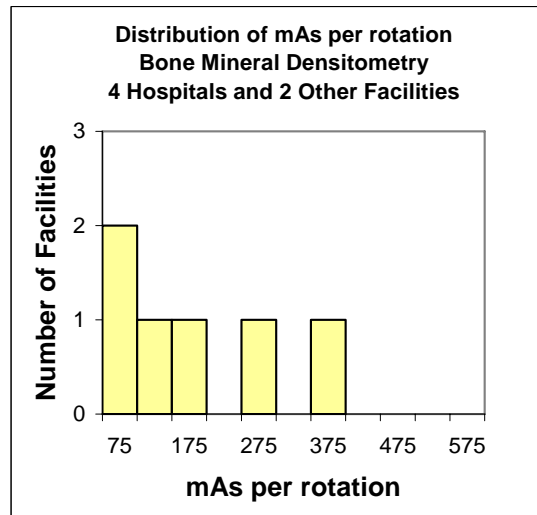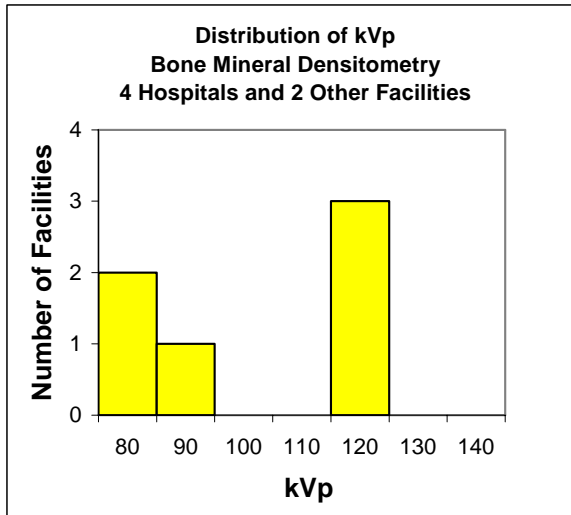
Table 1.91. Bone mineral densitometry, helical scanning, 1 hospital and 2 other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	4.0	3.0	1.7	1.0	1.3	2.5	4.0	5.5	6.7	7.0	3
Scouts per exam	1.33	0.58	0.33	1.00	1	1	1	2	2	2	3
f_{nc}	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
kVp	120.0	0.0	0.0	120.0	120	120	120	120	120	120	3
mA	143	51	30	100	103	115	130	165	193	200	3
Time (s) per rotation	2.17	0.76	0.44	1.50	1.55	1.75	2.00	2.50	2.90	3.00	3
mAs per rotation	332	232	134	195	196	198	200	400	560	600	3
Reconstruct. increm. (mm)	2.5	0.7	0.5	2.0	2	2	3	3	3	3	2
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	2
Slice width (T, mm)	3.00	0.00	0.00	3.00	3.0	3.0	3.0	3.0	3.0	3.0	2
Table feed per rotation ($I_{helical}$, mm)	3.00	0.00	0.00	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2
Pitch [$I_{helical}/(nT)$]	1.00										1
L (mm)	200										1
$CTDI_{free\ air}$ (mGy)	121	59	42	80	84	101	121	142	159	163	2
$CTDI_{vol}$ (mGy)	19										1
DLP (mGy-cm)	386										1
E (mSv)	5.9										1

Distribution of Exams per Week
Bone Mineral Densitometry
1 Hospital and 2 Other Facilities

Distribution of mAs per rotation
Bone Mineral Densitometry
1 Hospital and 2 Other Facilities

Distribution of CTDI$_{free\ air}$
Bone Mineral Densitometry
1 Hospital and 1 Other Facility

Table 1.92. Urography, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	10.2	11.1	5.0	1.0	1.4	3.0	5.0	14.0	25.2	28.0	5
Scouts per exam	1.67	0.52	0.21	1.00	1	1	2	2	2	2	6
f_{nc}	0.99	0.03	0.01	0.93	0.94	1.00	1.00	1.00	1.00	1.00	5
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5
f_{cnc}	0.01	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.06	0.07	5
kVp	121.7	4.1	1.7	120.0	120	120	120	120	128	130	6
mA	245	65	27	125	154	243	252	273	310	320	6
Time (s) per rotation	1.20	0.45	0.20	1.00	1.00	1.00	1.00	1.00	1.80	2.00	5
mAs per rotation	269	32	14	240	242	250	253	280	312	320	5
Reconstruct. increm. (mm)	4.7	0.8	0.3	3.0	4	5	5	5	5	5	6
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	3
Slice width (T, mm)	5.00	0.00	0.00	5.00	5.0	5.0	5.0	5.0	5.0	5.0	6
Table feed per rotation ($I_{helical}$, mm)	6.00	2.43	0.99	3.00	3.5	5.0	5.3	7.0	9.4	10.0	6
Pitch [$I_{helical}/(nT)$]	0.87	0.23	0.13	0.60	0.64	0.80	1.00	1.00	1.00	1.00	3
L (mm)	417	101	58	325	333	363	400	463	513	525	3
$CTDI_{free\ air}$ (mGy)	56	19	10	39	40	44	52	65	79	82	4
$CTDI_{vol}$ (mGy)	25	14	10	15	16	20	25	29	33	34	2
DLP (mGy-cm)	492										1
E (mSv)	7.2										1

Distribution of Scanning Length (L) per contrast phase Urography 3 Hospitals

Distribution of mAs per rotation Urography 5 Hospitals

Distribution of CTDI$_{free\ air}$ Urography 4 Hospitals

Table 1.93. High-resolution chest exam, axial scanning, hospitals and other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.7	1.8	0.6	0.5	0.7	1.0	3.0	3.5	5.0	5.0	8
Scouts per exam	1.33	0.50	0.17	1.00	1	1	1	2	2	2	9
f_{nc}	0.88	0.35	0.13	0.00	0.35	1.00	1.00	1.00	1.00	1.00	8
f_c	0.13	0.35	0.13	0.00	0.00	0.00	0.00	0.00	0.65	1.00	8
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8
kVp	127.8	9.7	3.2	120.0	120	120	120	140	140	140	9
mA	211	57	19	125	143	175	206	250	292	300	9
Time (s) per rotation	1.31	0.52	0.17	0.80	0.88	1.00	1.00	2.00	2.00	2.00	9
mAs per rotation	288	166	55	125	129	175	220	350	560	600	9
Slices per contrast phase	22.9	11.8	4.2	12.5	13	16	21	24	41	50	8
Slices per rotation (n)	1.33	1.00	0.33	1.0	1.0	1.0	1.0	1.0	2.8	4.0	9
Slice width (T, mm)	1.12	0.19	0.06	1.0	1.0	1.0	1.0	1.3	1.4	1.5	9
Table increment (I_{axial}, mm)	9.94	7.44	2.48	1.0	1.0	5.0	10.0	10.0	21.5	22.5	9
$I_{axial}/(nT)$	8.87	7.94	2.65	1.00	1.00	1.00	7.69	10.00	21.50	22.50	9
L (mm)	267	181	68	24	62	161	231	386	510	519	7
$CTDI_{free\ air}$ (mGy)	74	42	16	34	36	43	50	101	133	145	7
$CTDI_{vol}$ (mGy)	7	8	3	1	1	2	4	9	20	22	8
DLP (mGy-cm)	86	95	36	33	34	40	53	70	234	298	7
E (mSv)	1.5	1.8	0.7	0.4	0.5	0.7	0.9	1.1	4.1	5.1	6

Distribution of Pitch Values
High-Resolution Chest
9 Hospitals and Other Facilities

Distribution of mAs per rotation
High-Resolution Chest
9 Hospitals and Other Facilities

Distribution of Effective Dose (E)
High-Resolution Chest
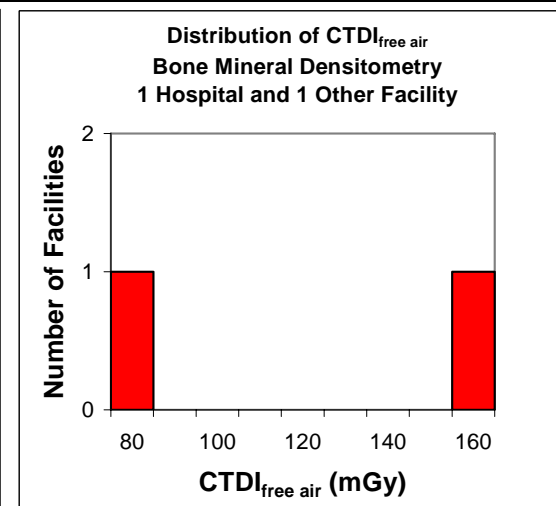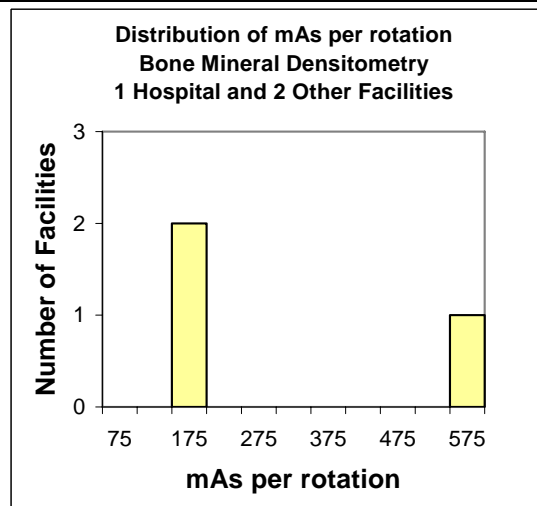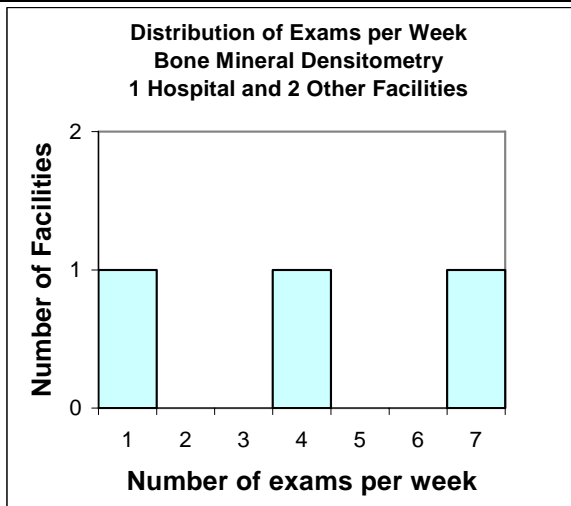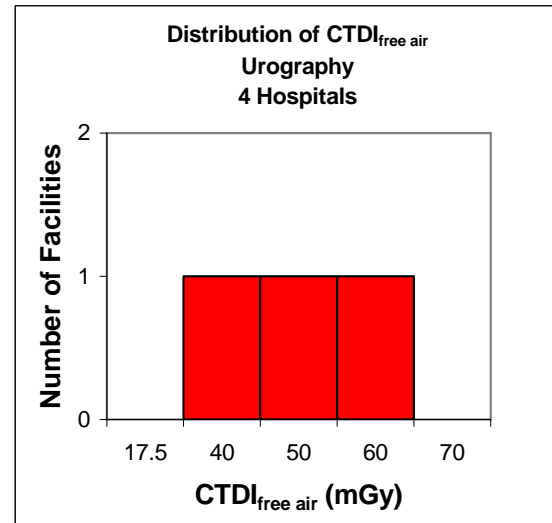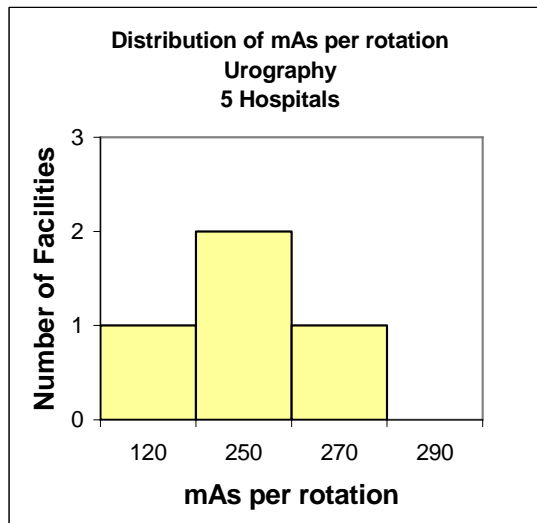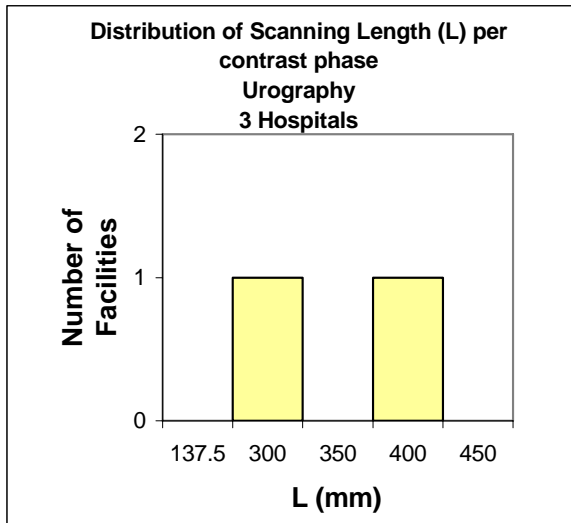6 Hospitals and Other Facilities
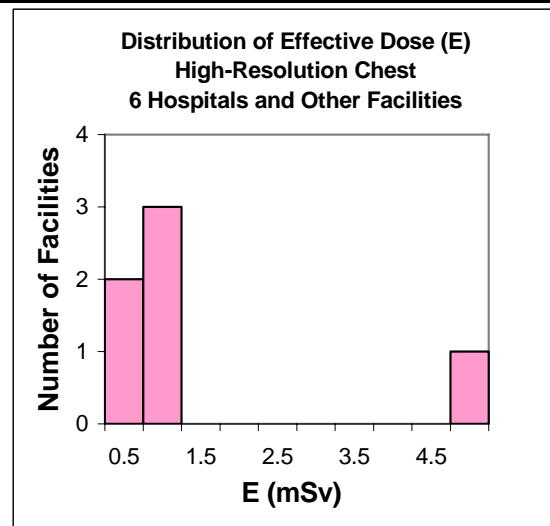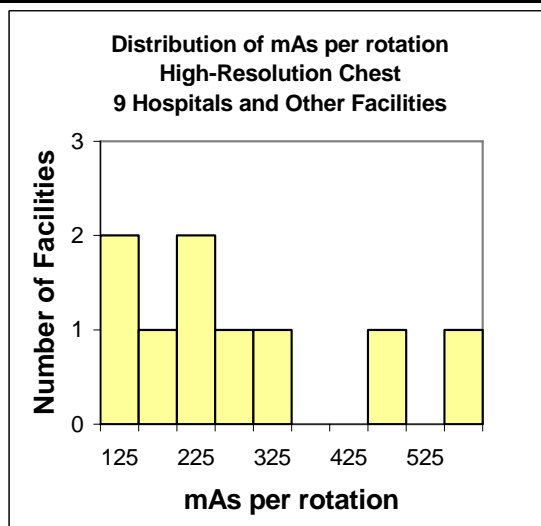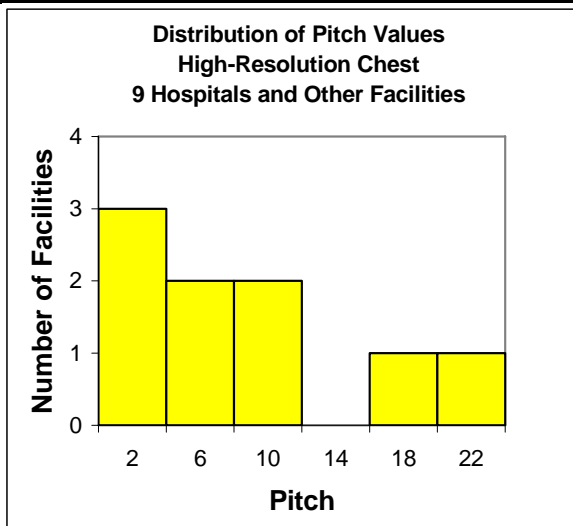
Table 1.94. High-resolution chest exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.7	5.5	3.2	0.5	0.5	0.5	0.5	5.3	9.1	10.0	3
Scouts per exam	1.33	0.58	0.33	1.00	1	1	1	2	2	2	3
f_{nc}	0.65	0.48	0.28	0.10	0.18	0.50	0.90	0.93	0.95	0.95	3
f_c	0.33	0.50	0.29	0.00	0.01	0.04	0.08	0.49	0.82	0.90	3
f_{cnc}	0.02	0.03	0.01	0.00	0.00	0.01	0.02	0.04	0.05	0.05	3
kVp	123.3	5.8	3.3	120.0	120	120	120	125	129	130	3
mA	220	75	44	150	156	180	210	255	291	300	3
Time (s) per rotation	1.24	0.68	0.39	0.71	0.74	0.85	1.00	1.50	1.90	2.00	3
mAs per rotation	299	260	150	148	148	149	150	375	555	600	3
Reconstruct. increm. (mm)	6.0	2.8	2.0	4.0	4	5	6	7	8	8	2
Slices per rotation (n)	1.00	0.00	0.00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3
Slice width (T, mm)	3.67	3.79	2.19	1.0	1.1	1.5	2.0	5.0	7.4	8.0	3
Table feed per rotation ($I_{helical}$, mm)	10.67	9.02	5.21	2.0	2.8	6.0	10.0	15.0	19.0	20.0	3
Pitch [$I_{helical}/(nT)$]	7.42	10.90	6.29	1.00	1.03	1.13	1.25	10.63	18.13	20.00	3
L (mm)	360	28	20	340	342	350	360	370	378	380	2
$CTDI_{free\ air}$ (mGy)	58	45	26	17	20	33	49	78	101	107	3
$CTDI_{vol}$ (mGy)	9	9	5	2	2	4	7	13	18	19	3
DLP (mGy-cm)	140	115	81	59	67	99	140	181	213	221	2
E (mSv)	2.4	1.8	1.3	1.1	1.2	1.8	2.4	3.1	3.6	3.7	2

Distribution of Pitch Values
High-Resolution Chest
3 Hospitals

Distribution of mAs per rotation
High-Resolution Chest
3 Hospitals

Distribution of CTDI$_{free\ air}$
High-Resolution Chest
3 Hospitals

Table 1.95. Radiation therapy treatment planning, axial scanning, hospitals and other facilities											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	3.3	3.4	1.1	0.5	0.7	1.0	2.0	5.0	8.6	11.0	9
Scouts per exam	1.50	0.53	0.19	1.00	1	1	2	2	2	2	8
f_{nc}	0.93	0.14	0.05	0.60	0.71	0.90	1.00	1.00	1.00	1.00	8
f_c	0.07	0.14	0.05	0.00	0.00	0.00	0.00	0.06	0.30	0.40	8
f_{cnc}	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.05	8
kVp	120.0	0.0	0.0	120.0	120	120	120	120	120	120	7
mA	183	43	16	120	126	155	200	200	235	250	7
Time (s) per rotation	1.43	0.53	0.20	1.00	1.00	1.00	1.00	2.00	2.00	2.00	7
mAs per rotation	263	126	47	120	144	200	200	310	452	500	7
Slices per contrast phase	36.1	32.0	14.3	4.0	9	27	30	30	78	90	5
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	8
Slice width (T, mm)	6.00	2.94	1.11	3.00	3.0	4.0	5.0	8.0	10.0	10.0	7
Table increment (I_{axial}, mm)	7.00	4.12	1.56	3.00	3.6	5.0	5.0	8.0	13.5	15.0	7
$I_{axial}/(nT)$	1.17	0.29	0.11	1.00	1.00	1.00	1.00	1.25	1.62	1.67	7
L (mm)	242	173	77	40	62	148	180	393	439	450	5
$CTDI_{free\ air}$ (mGy)	56	26	12	41	41	41	45	51	92	102	5
$CTDI_{vol}$ (mGy)	21	14	6	7	8	13	15	29	39	42	5
DLP (mGy-cm)	737	982	567	102	116	171	241	1055	1706	1869	3
E (mSv)	12.1	16.0	9.2	1.8	2.0	2.9	4.0	17.3	27.9	30.6	3

Distribution of Numbers of Slices per Contrast Phase
Treatment Planning
5 Hospitals and Other Facilities

Distribution of mAs per rotation
Treatment Planning
7 Hospitals and Other Facilities

Distribution of CTDI$_{free\ air}$
Treatment Planning
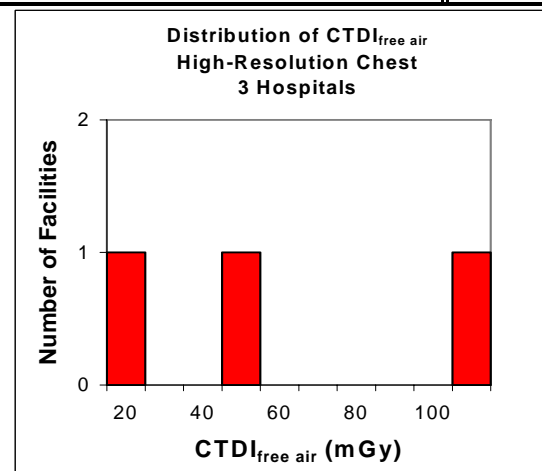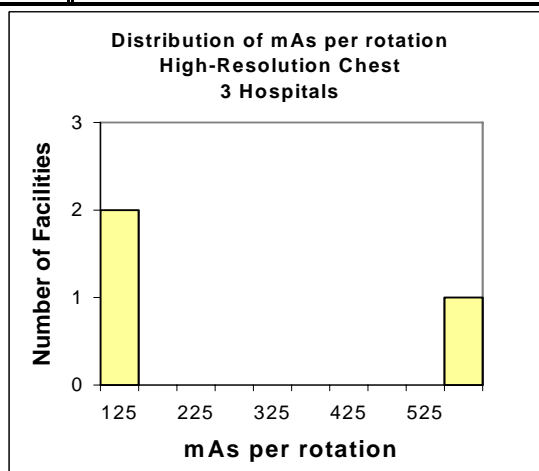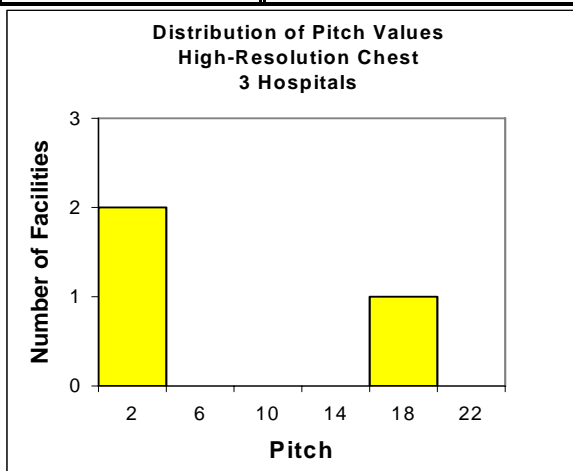5 Hospitals and Other Facilities
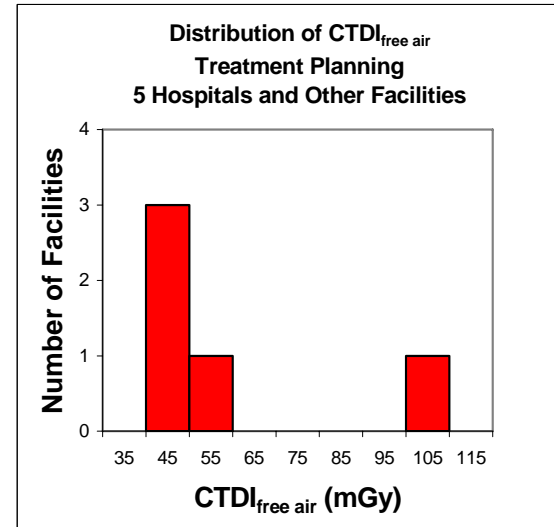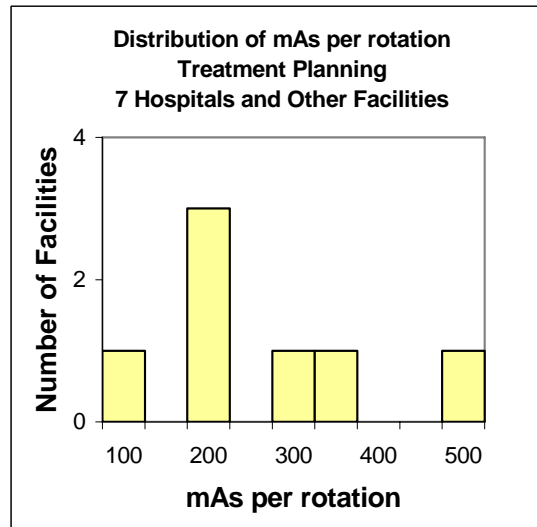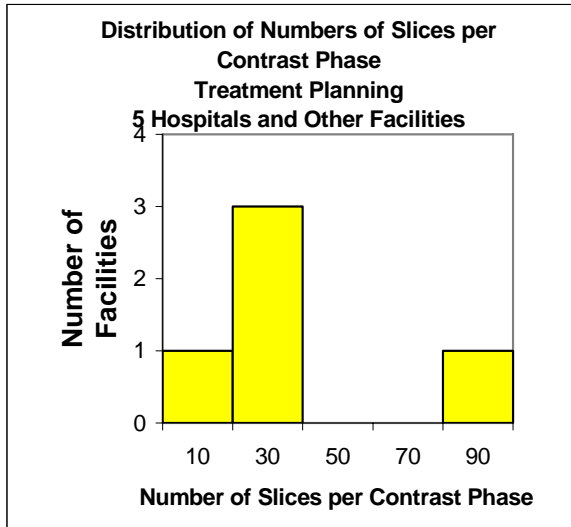
Table 1.96. Radiation therapy treatment planning, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	0.8	0.4	0.3	0.5	0.5	0.6	0.8	0.9	1.0	1.0	2
Scouts per exam	1.50	0.71	0.50	1.00	1	1	2	2	2	2	2
f_{nc}	0.77	0.40	0.23	0.30	0.37	0.65	1.00	1.00	1.00	1.00	3
f_c	0.23	0.40	0.23	0.00	0.00	0.00	0.00	0.35	0.63	0.70	3
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
kVp	120.0	0.0	0.0	120.0	120	120	120	120	120	120	2
mA	183	25	18	165	167	174	183	191	198	200	2
Time (s) per rotation	0.75	0.35	0.25	0.50	0.53	0.63	0.75	0.88	0.98	1.00	2
mAs per rotation	141	83	59	83	88	112	141	171	194	200	2
Reconstruct. increm. (mm)	5.0										1
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	2
Slice width (T, mm)	5.00	0.00	0.00	5.00	5.0	5.0	5.0	5.0	5.0	5.0	2
Table feed per rotation ($I_{helical}$, mm)	5.00										1
Pitch [$I_{helical}/(nT)$]	1.00										1
L (mm)											0
$CTDI_{free\ air}$ (mGy)	41										1
$CTDI_{vol}$ (mGy)	15										1
DLP (mGy-cm)											0
E (mSv)											0

Distribution of Fraction of Exams Done in Two Phases: No-contrast + Contrast Treatment Planning 3 Hospitals

Distribution of mAs per rotation Treatment Planning 2 Hospitals

Distribution of Slice Width Treatment Planning 2 Hospitals
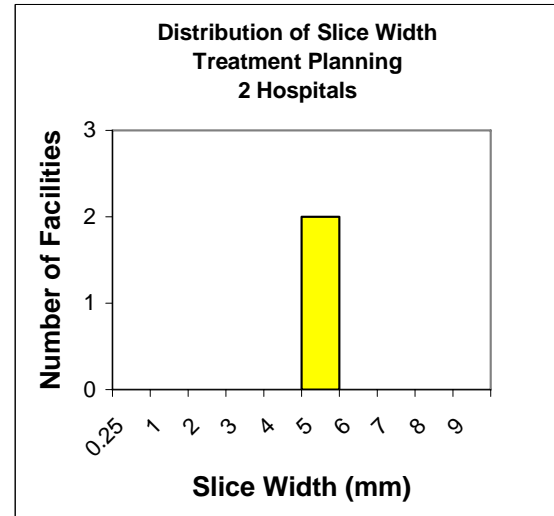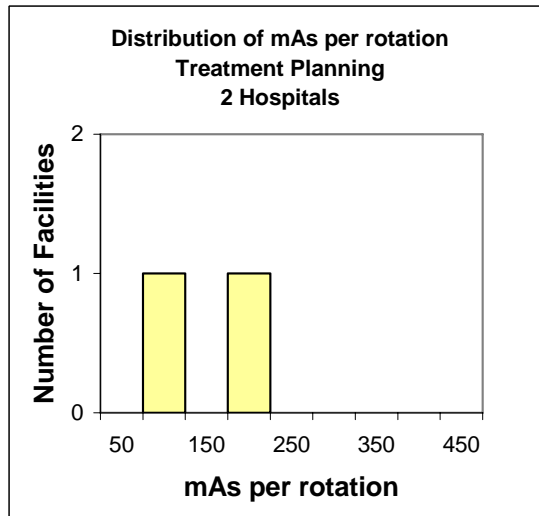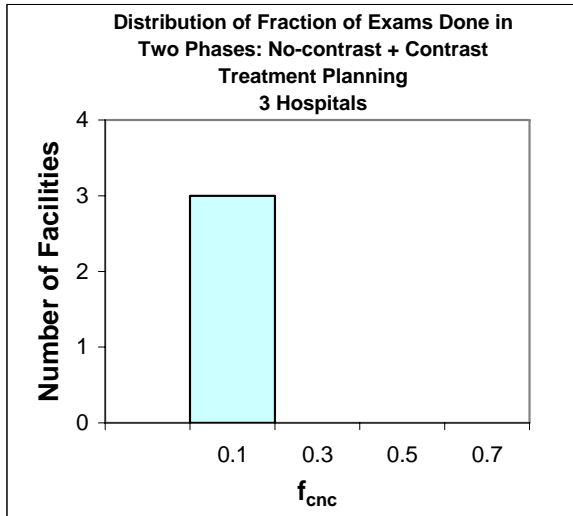
Table 1.97. Dental study, axial scanning, 1 facility other than a hospital											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5.0										1
Scouts per exam	1.00										1
f_{nc}	1.00										1
f_{c}	0.00										1
f_{cnc}	0.00										1
kVp	140										1
mA	70										1
Time (s) per rotation	2.00										1
mAs per rotation	140										1
Slices per contrast phase	50.0										1
Slices per rotation (n)	1										1
Slice width (T, mm)	1.50										1
Table increment (I_{axial}, mm)	1.00										1
$I_{axial}/(nT)$	0.67										1
L (mm)	51										1
$CTDI_{free\ air}$ (mGy)	29										1
$CTDI_{vol}$ (mGy)	27										1
DLP (mGy-cm)	134										1
E (mSv)	0.3										1

Table 1.98. Dental study, helical scanning, 1 hospital and 2 other facilities

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.3	2.3	1.3	1.0	1.0	1.0	1.0	3.0	4.6	5.0	3
Scouts per exam	1.0	0.0	0.0	1	1	1	1	1	1	1	3
f_{nc}	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
kVp	116.7	5.8	3.3	110	111	115	120	120	120	120	3
mA	173	45	26	130	134	150	170	195	215	220	3
Time (s) per rotation	0.93	0.12	0.07	0.80	0.82	0.90	1.00	1.00	1.00	1.00	3
mAs per rotation	165	58	34	104	111	137	170	195	215	220	3
Reconstruct. increm. (mm)	0.8	0.3	0.2	0.5	1	1	1	1	1	1	3
Slices per rotation (n)	1.00	0.00	0.00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3
Slice width (T, mm)	1.00	0.00	0.00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3
Table feed per rotation ($I_{helical}$, mm)	1.23	0.25	0.15	1.0	1.0	1.1	1.2	1.4	1.5	1.5	3
Pitch [$I_{helical}/(nT)$]	1.23	0.25	0.15	1.00	1.02	1.10	1.20	1.35	1.47	1.50	3
L (mm)											0
$CTDI_{free\ air}$ (mGy)	26	7	5	21	22	23	26	28	30	30	2
$CTDI_{vol}$ (mGy)	17	5	3	14	14	15	17	19	20	21	2
DLP (mGy-cm)											0
E (mSv)											0

Distribution of Exams per Week
Dental Study
1 Hospital and 2 Other Facilities

Distribution of mAs per rotation
Dental Study
1 Hospital and 2 Other Facilities

Distribution of CTDI$_{free\ air}$
Dental Study
1 Hospital and 1 Other Facility
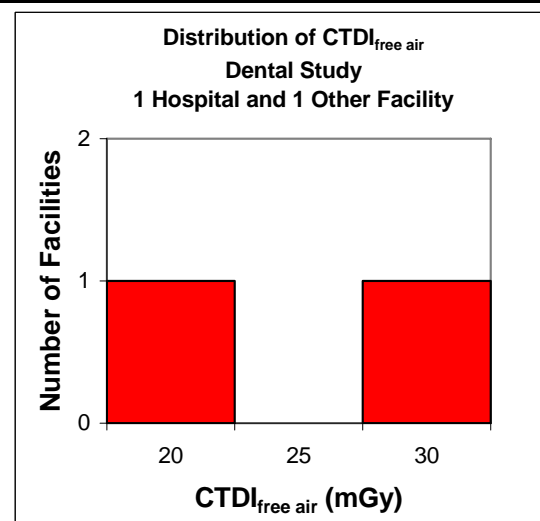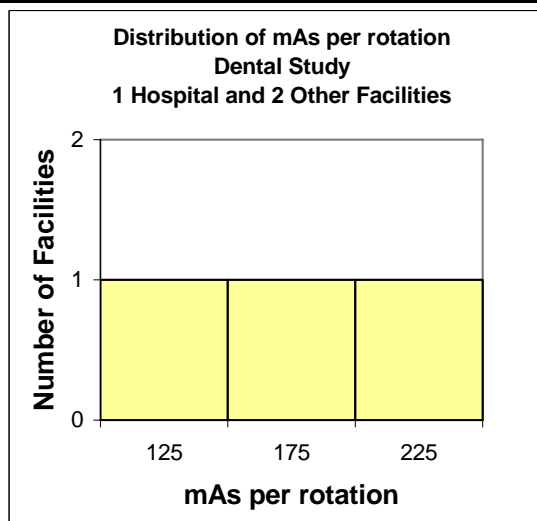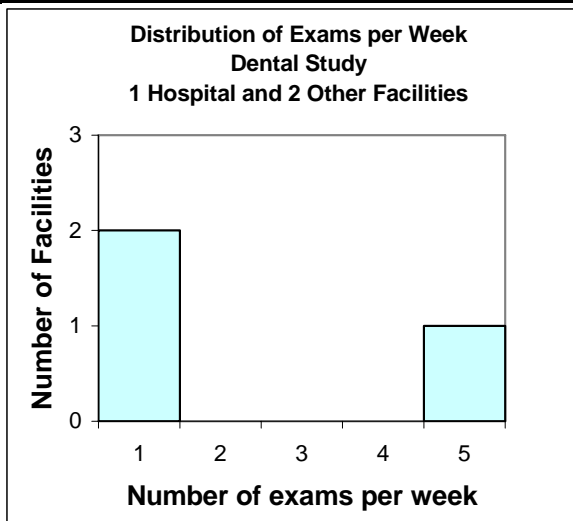
Table 1.99. Biopsy, axial scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.8	1.3	0.6	1.0	1.0	1.0	1.0	2.0	3.6	4.0	5
Scouts per exam	1.20	0.45	0.20	1.00	1	1	1	1	2	2	5
f_{nc}	0.84	0.36	0.16	0.20	0.36	1.00	1.00	1.00	1.00	1.00	5
f_c	0.16	0.36	0.16	0.00	0.00	0.00	0.00	0.00	0.64	0.80	5
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5
kVp	122.6	5.8	2.6	120.0	120	120	120	120	130	133	5
mA	225	24	12	200	202	208	225	243	249	250	4
Time (s) per rotation	1.80	0.45	0.20	1.00	1.20	2.00	2.00	2.00	2.00	2.00	5
mAs per rotation	388	98	49	250	273	363	410	435	471	480	4
Slices per contrast phase	31.7	24.7	14.2	15.0	16	18	20	40	56	60	3
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	5
Slice width (T, mm)	7.63	2.06	1.03	5.00	5.4	6.9	7.8	8.5	9.7	10.0	4
Table increment (I_{axial}, mm)	7.67	2.52	1.45	5.00	5.3	6.5	8.0	9.0	9.8	10.0	3
$I_{axial}/(nT)$	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3
L (mm)	278	282	163	75	84	118	160	380	556	600	3
$CTDI_{free\ air}$ (mGy)	45	7	5	40	40	42	45	47	49	49	2
$CTDI_{vol}$ (mGy)	20	4	3	17	18	19	20	22	23	23	2
DLP (mGy-cm)	250	168	119	131	143	190	250	309	357	369	2
E (mSv)	6.0										1

Distribution of Fraction of Procedures Done in One No-Contrast Phase
Biopsy
5 Hospitals

Distribution of mAs per rotation
Biopsy
4 Hospitals

Distribution of CTDI$_{free\ air}$
Biopsy
2 Hospitals
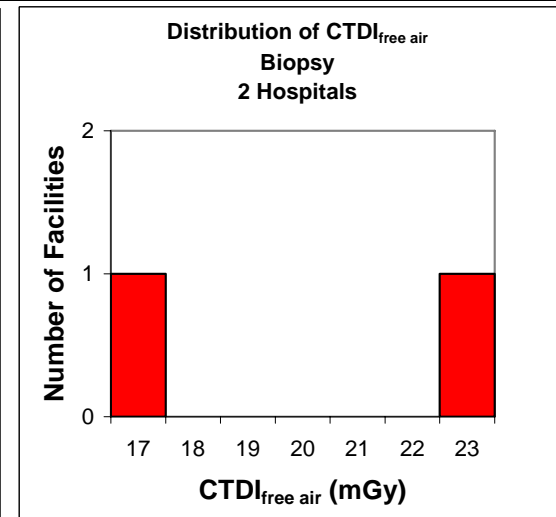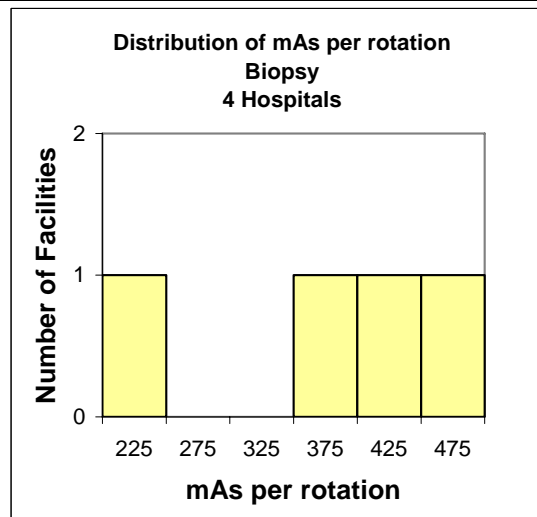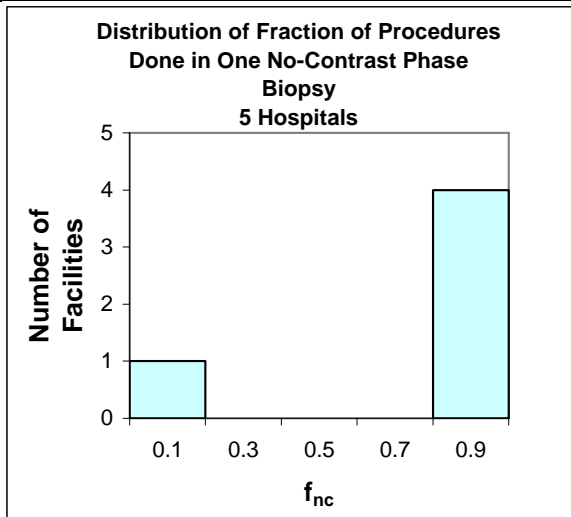
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Table 1.100. Biopsy, helical scanning, 1 hospital											
Exams per week	2.0										1
Scouts per exam	1.00										1
f_{nc}	1.00										1
f_c	0.00										1
f_{cnc}	0.00										1
kVp	120.0										1
mA	260										1
Time (s) per rotation	1.00										1
mAs per rotation	260										1
Reconstruct. increm. (mm)	5.0										1
Slices per rotation (n)	1.00										1
Slice width (T, mm)	5.00										1
Table feed per rotation ($I_{helical}$, mm)											0
Pitch [$I_{helical}/(nT)$]											0
L (mm)											0
$CTDI_{free\ air}$ (mGy)	45										1
$CTDI_{vol}$ (mGy)											0
DLP (mGy-cm)											0
E (mSv)											0

Table 1.101. Appendix exam, axial scanning, 1 hospital											
Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	5										1
Scouts per exam	1										1
f_{nc}	1.00										1
f_c	0.00										1
f_{cnc}	0.00										1
kVp	120										1
mA	200										1
Time (s) per rotation	1.00										1
mAs **per rotation**	200										1
Slices per contrast phase	40										1
Slices per rotation (n)	1										1
Slice width (T, mm)	5.00										1
Table increment (I_{axial}, mm)	5.00										1
$I_{axial}/(nT)$	1.00										1
L (mm)	200										1
$CTDI_{free\,air}$ (mGy)	67										1
$CTDI_{vol}$ (mGy)											0
DLP (mGy-cm)											0
E (mSv)	6.2										1

Table 1.102. Appendix exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.0	1.0	0.6	1.0	1.1	1.5	2.0	2.5	2.9	3.0	3
Scouts per exam	1.00	0.00	0.00	1.00	1	1	1	1	1	1	3
f_{nc}	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3
f_c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
kVp	123.3	5.8	3.3	120	120	120	120	125	129	130	3
mA	225	90	52	125	138	188	250	275	295	300	3
Time (s) per rotation	1.33	0.58	0.33	1.00	1.00	1.00	1.00	1.50	1.90	2.00	3
mAs per rotation	267	29	17	250	250	250	250	275	295	300	3
Reconstruct. increm. (mm)	5.0	0.0	0.0	5	5	5	5	5	5	5	3
Slices per rotation (n)	1.00	0.00	0.00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3
Slice width (T, mm)	5.00	0.00	0.00	5.0	5.0	5.0	5.0	5.0	5.0	5.0	3
Table feed per rotation ($I_{helical}$, mm)	8.33	2.89	1.67	5.0	5.5	7.5	10.0	10.0	10.0	10.0	3
Pitch [$I_{helical}/(nT)$]	1.67	0.58	0.33	1.00	1.10	1.50	2.00	2.00	2.00	2.00	3
L (mm)	300										1
$CTDI_{free\ air}$ (mGy)	71	31	18	36	41	59	82	88	93	95	3
$CTDI_{vol}$ (mGy)	18	14	8	9	9	10	12	23	32	34	3
DLP (mGy-cm)	356										1
E (mSv)	6.6										1

Distribution of Exams per Week
Appendix
3 Hospitals

Distribution of mAs per rotation
Appendix
3 Hospitals

Distribution of CTDI$_{free\ air}$
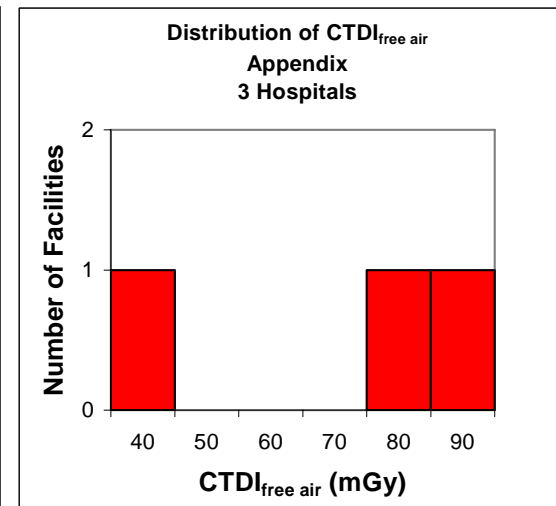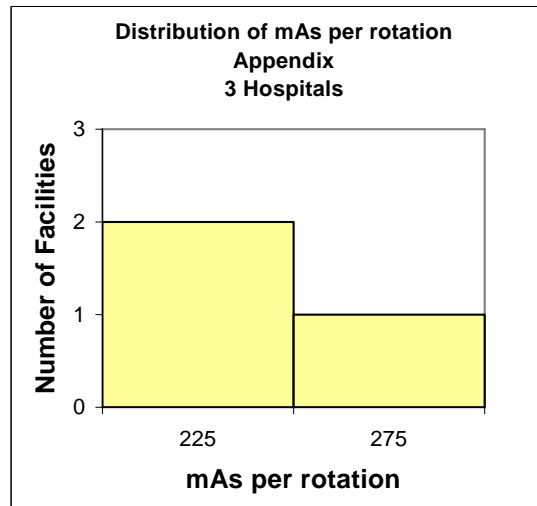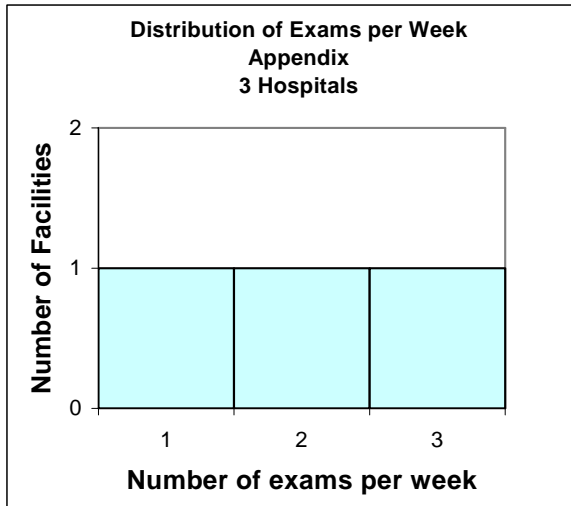Appendix
3 Hospitals

Table 1.103. Shoulder exam, axial scanning, 1 hospital and 1 other facility

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	1.5	0.7	0.5	1.0	1.1	1.3	1.5	1.8	2.0	2.0	2
Scouts per exam	1.50	0.71	0.50	1.00	1	1	2	2	2	2	2
f_{nc}	0.28	0.32	0.23	0.05	0.07	0.16	0.28	0.39	0.48	0.50	2
f_c	0.73	0.32	0.23	0.50	0.52	0.61	0.73	0.84	0.93	0.95	2
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2
kVp	120.0	0.0	0.0	120.0	120	120	120	120	120	120	2
mA	250	71	50	200	205	225	250	275	295	300	2
Time (s) per rotation	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2
mAs per rotation	250	71	50	200	205	225	250	275	295	300	2
Slices per contrast phase	20.0	0.0	0.0	20.0	20	20	20	20	20	20	2
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	2
Slice width (T, mm)	4.00	1.41	1.00	3.00	3.1	3.5	4.0	4.5	4.9	5.0	2
Table increment (I_{axial}, mm)	3.00	1.41	1.00	2.00	2.1	2.5	3.0	3.5	3.9	4.0	2
$I_{axial}/(nT)$	0.73	0.09	0.07	0.67	0.67	0.70	0.73	0.77	0.79	0.80	2
L (mm)	61	28	20	41	43	51	61	71	79	81	2
$CTDI_{free\ air}$ (mGy)	59	7	5	54	55	57	59	61	63	64	2
$CTDI_{vol}$ (mGy)	30	4	3	27	27	28	30	31	32	33	2
DLP (mGy-cm)	175	58	41	134	138	155	175	196	212	216	2
E (mSv)	1.2	0.1	0.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	2

Distribution of Pitch Values
Shoulder
1 Hospital and 1 Other Facility

Distribution of mAs per rotation
Shoulder
1 Hospital and 1 Other Facility

Distribution of CTDI$_{vol}$
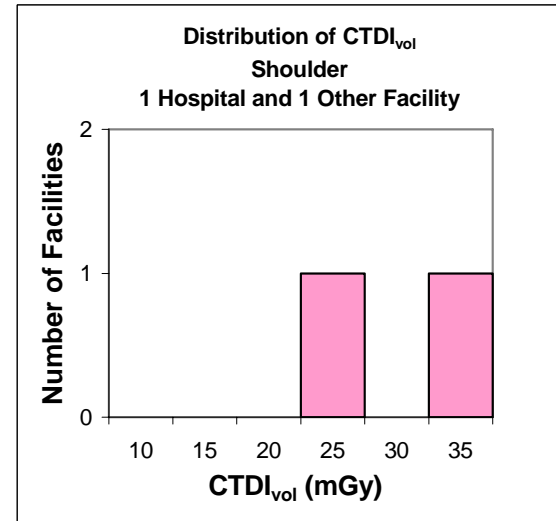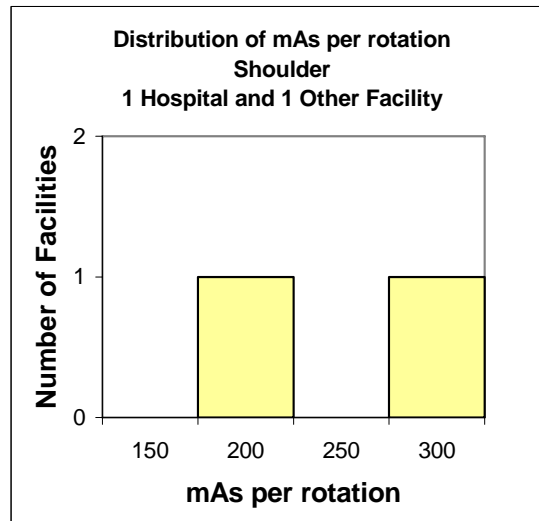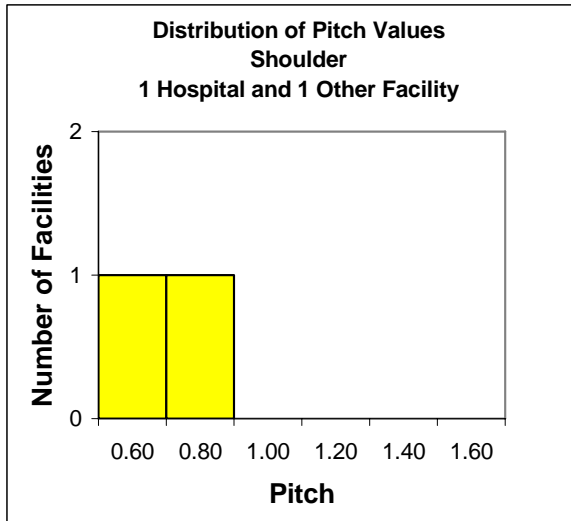Shoulder
1 Hospital and 1 Other Facility

Table 1.104. Shoulder exam, helical scanning, hospitals only

Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.5	2.1	1.5	1.0	1.2	1.8	2.5	3.3	3.9	4.0	2
Scouts per exam	1.33	0.58	0.33	1.00	1	1	1	2	2	2	3
f_{nc}	0.95	0.07	0.05	0.90	0.91	0.93	0.95	0.98	1.00	1.00	2
f_c	0.03	0.04	0.03	0.00	0.00	0.01	0.03	0.04	0.05	0.05	2
f_{cnc}	0.03	0.04	0.03	0.00	0.00	0.01	0.03	0.04	0.05	0.05	2
kVp	123.3	15.3	8.8	110.0	111	115	120	130	138	140	3
mA	195	101	59	83	97	153	223	252	274	280	3
Time (s) per rotation	1.30	0.52	0.30	1.00	1.00	1.00	1.00	1.45	1.81	1.90	3
mAs per rotation	220	61	35	158	164	190	223	252	274	280	3
Reconstruct. increm. (mm)	2.5	0.7	0.5	2.0	2	2	3	3	3	3	2
Slices per rotation (n)	1.00	0.00	0.00	1.00	1.0	1.0	1.0	1.0	1.0	1.0	3
Slice width (T, mm)	3.00	0.00	0.00	3.00	3.0	3.0	3.0	3.0	3.0	3.0	3
Table feed per rotation ($I_{helical}$, mm)	3.50	0.87	0.50	3.00	3.0	3.0	3.0	3.8	4.4	4.5	3
Pitch [$I_{helical}/(nT)$]	1.17	0.29	0.17	1.00	1.00	1.00	1.00	1.25	1.45	1.50	3
L (mm)	135										1
CTDI$_{free\ air}$ (mGy)	53	2	1	52	52	53	53	54	54	54	2
CTDI$_{vol}$ (mGy)	17	9	6	11	11	14	17	21	23	24	2
DLP (mGy-cm)											0
E (mSv)											0

Distribution of Pitch Values
Shoulder
3 Hospitals

Distribution of mAs per rotation
Shoulder
3 Hospitals

Distribution of CTDI$_{vol}$
Shoulder
2 Hospitals
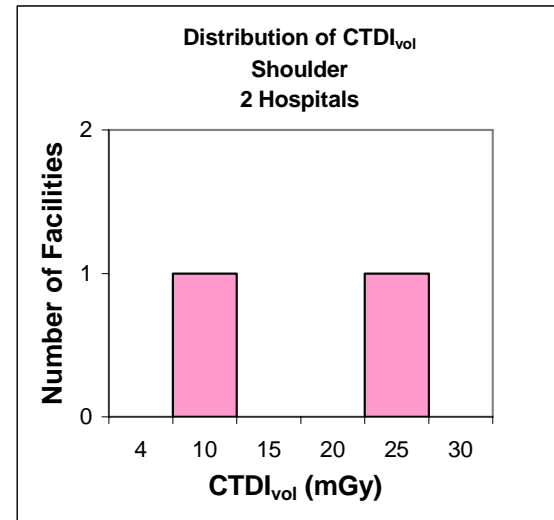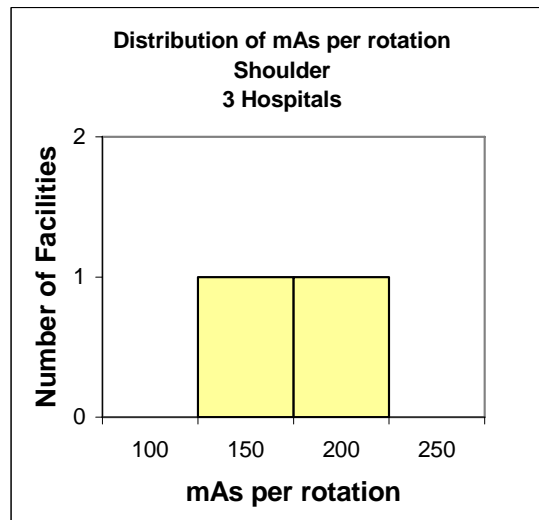
Table 1.105. Chest exam for pulmonary embolism, helical scanning, hospitals only

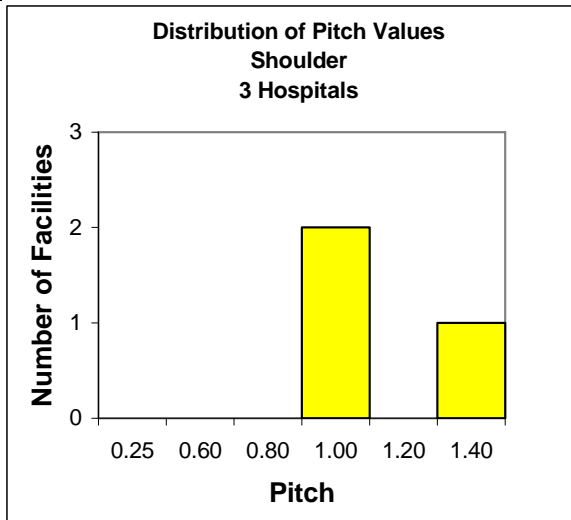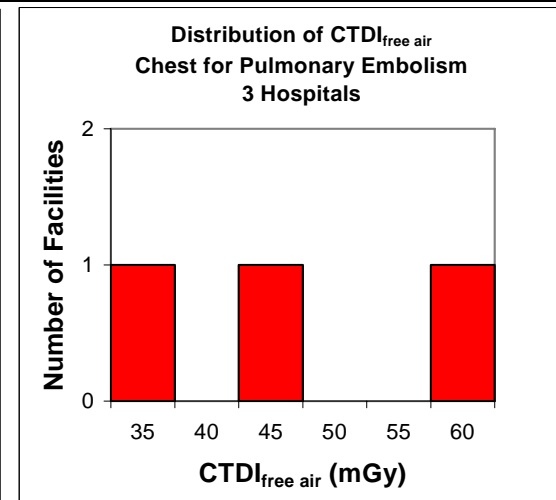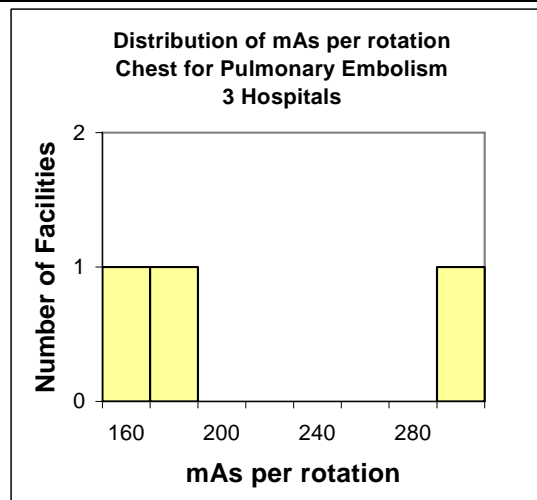| Variable	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Exams per week	2.7	1.5	0.9	1.0	1.2	2.0	3.0	3.5	3.9	4.0	3
Scouts per exam	1.00	0.00	0.00	1	1	1	1	1	1	1	3
f_{nc}	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	3
f_c	1.00	0.01	0.00	0.99	0.99	1.00	1.00	1.00	1.00	1.00	3
f_{cnc}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
kVp	126.7	5.8	3.3	120	121	125	130	130	130	130	3
mA	188	109	63	83	93	132	180	240	288	300	3
Time (s) per rotation	1.30	0.52	0.30	1.00	1.00	1.00	1.00	1.45	1.81	1.90	3
mAs per rotation	213	77	44	158	160	169	180	240	288	300	3
Reconstruct. increm. (mm)	2.5	0.9	0.5	1.5	2	2	3	3	3	3	3
Slices per rotation (n)	1.00	0.00	0.00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3
Slice width (T, mm)	5.33	2.52	1.45	3.0	3.2	4.0	5.0	6.5	7.7	8.0	3
Table feed per rotation ($I_{helical}$, mm)	6.60	2.95	1.70	4.8	4.8	4.9	5.0	7.5	9.5	10.0	3
Pitch [$I_{helical}/(nT)$]	1.41	0.71	0.41	0.63	0.72	1.11	1.60	1.80	1.96	2.00	3
L (mm)	130										1
$CTDI_{free\ air}$ (mGy)	46	11	7	36	37	40	44	51	57	58	3
$CTDI_{vol}$ (mGy)	18	16	9	7	7	9	11	24	34	37	3
DLP (mGy-cm)	92										1
E (mSv)	2.2										1

Distribution of Pitch Values
Chest for Pulmonary Embolism
3 Hospitals

Distribution of mAs per rotation
Chest for Pulmonary Embolism
3 Hospitals

Distribution of CTDI$_{free\ air}$
Chest for Pulmonary Embolism
3 Hospitals
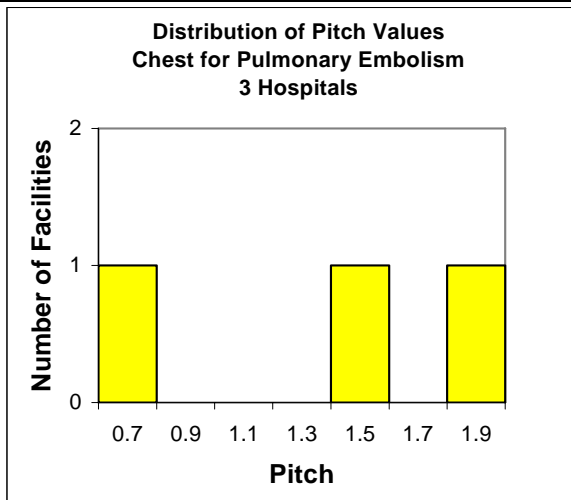
PART 2.
POPULATION-BASED COMPARISONS OF WORKLOAD, COLLECTIVE EFFECTIVE DOSE, AND NUMBERS OF CT FACILITIES

Numbers of examinations *versus* collective dose

Statistics are provided on the weekly numbers of adult examinations **normalized** per *most frequently used CT unit* per facility, respectively for strata of hospitals and other facilities (Table 2.1), hospitals only (Table 2.2), and facilities other than hospitals (Table 2.3). For each category of exam, the weekly number of exams per most frequently used CT unit per facility (N_n) is the sum of axial-scanning $(N_{n,axial})$ and helical-scanning $(N_{n,helical})$ contributions:

$$N_n = N_{n,axial} + N_{n,helical}. \qquad \text{(Equation 2.1)}$$

$N_{n,axial}$ (and similarly for $N_{n,helical}$) is the weekly number of axial-scanning exams (and similarly for helical-scanning exams) of that category totaled for all facilities reporting workload data divided by the number of reporting facilities. *If an individual facility reports zero exams for any one particular category, that zero contribution is included in the total reported, and that facility is counted in the divisor.* As there is one most frequently used CT unit per facility, for any particular category of examination, $N_{n,axial}$ (similarly for $N_{n,helical}$) represents the average weekly number of axial-scanning (helical-scanning) exams of that category per most frequently used CT unit per facility.

Tables 2.4 through 2.6 are similarly stratified for adult-exam statistics covering the weekly collective effective dose (ICRP 1991). The weekly **normalized** collective effective dose is the weekly collective effective dose *per most frequently used CT unit* per facility (S_n). For a particular examination category, S_n is evaluated as follows:

$$S_n = N_{n,axial} \times <E>_{axial} + N_{n,helical} \times <E>_{helical}. \qquad \text{(Equation 2.2)}$$

N_n refers to the weekly number of exams (of that category) **normalized** per most frequently used CT unit per facility; $<E>$ refers to the mean value of the effective dose associated with that exam category as evaluated in Part 1 of this report; and subscripts "axial" and "helical" refer respectively to axial-scanning mode and helical-scanning mode.

We find that whereas the head exam is the most frequently done (Table 2.1), it ranks only fifth in its contribution to normalized collective dose; the largest contributor to normalized collective effective dose is the abdomen+pelvis exam (Table 2.4; see also the Executive Summary graphs.) Results for the nation as a whole may be inferred by multiplying the normalized workload and collective-dose values of Tables 2.1 through 2.6 by the numbers U.S. facilities tabulated in Table 2.14. For example, the weekly collective effective dose S associated with **all** of the most frequently used CT units for **all** adult examinations in hospitals is 4.1 (S.E. 0.3) thousand person-Sv, and in facilities other than hospitals is 1.1 (S.E. 0.2) thousand person-Sv; hence the overall collective dose is the sum, 5.2 (S.E. 0.4) thousand person-Sv.[7]

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[7] Note that the value for the **sum** of hospital (4.1 thousand person-Sv) and non-hospital (1.1 thousand person-Sv) contributions to the weekly adult collective dose, S = 5.2 thousand person-Sv (S.E. 0.4 thousand person-Sv), is consistent with the value S = 5.3 thousand person-Sv (S.E. 0.4 thousand person-Sv) obtained as the product of S_n = 0.756 person-Sv per CT unit (Table 2.4) × 7.07 thousand most-frequently used CT units (Table 2.14).

Table 2.1. Number of routine adult examinations per week per most frequently used CT unit per facility (N_n, hospitals and other facilities)

Exam Region	Percentage of Total N_n	N_n (number per week per CT unit per facility)[1]	Standard Error (per week per CT unit per facility)	Axial-Scanning Percentage of N_n[1]	Helical-Scanning Percentage of N_n[1]
Head (brain+posterior fossa)[2]	33%	32	2	87%	9%
Abdomen+pelvis	22%	22	1	19%	81%
Chest	11%	11	1	20%	80%
Abdomen	7.6%	7.5	0.6	16%	84%
Simple sinus	6.0%	5.9	0.5	76%	24%
Pelvis	4.0%	3.9	0.5	20%	80%
Spine (cervical, thoracic, or lumbosacral)	3.8%	3.8	0.3	67%	33%
Chest+abdomen+pelvis	3.8%	3.7	0.4	15%	85%
Skull (facial bones, orbits, sella turcica, or complex sinuses)	3.1%	3.1	0.3	65%	35%
Kidney	1.6%	1.6	0.2	14%	86%
Liver	1.0%	1.0	0.2	12%	88%
Pancreas	0.83%	0.81	0.2	16%	84%
Neck (soft tissue)	0.37%	0.36	0.06	13%	87%
Extremities	0.34%	0.34	0.05	51%	49%
Bone mineral densitometry	0.24%	0.23	0.05	77%	23%
Urography[3]	0.23%	0.23	0.1		
High-resolution chest	0.15%	0.15	0.05	67%	33%
Radiation therapy treament planning	0.14%	0.14	0.05	95%	5%
Dental study	0.055%	0.05	0.02	42%	58%
Biopsy	0.051%	0.05	0.01	82%	18%
Appendix	0.050%	0.05	0.01	46%	54%
Shoulder	0.037%	0.04	0.01	38%	62%
Chest for pulmonary emobolism[3]	0.036%	0.04	0.01	0%	100%
Cardiac CT angiography[3]	0.027%	0.03	0.02	0%	100%
Total[4]	100%	**98**	2.8		

[1]Except for head exams (see note 2 below), each value of N_n is the sum of axial-scanning plus helical-scanning contributions, each contribution representing the average over its respective sample of responding facilities. The axial-scanning contribution (see the axial-scanning percentage column) is based on the responses of 218 hospitals and other facilities doing axial scanning in all kinds of CT examinations; the helical-scanning contribution (see the helical-scanning percentage column) is based on the responses of 225 hospitals and other facilities doing helical scanning in all kinds of CT examinations.

[2]For head exams, the N_n is comprised of axial- and helical-scanning contributions *plus an additional term* (whose value is 1.3 exams per week per most frequently used CT unit). This additional term represents the number of head exams performed by hosptials and other facilities using **both** scanning modes for the routine head exam, i.e., axial scanning for the brain plus helical scanning for the posterior fossa. Approximately 4% of head exams are done by hospitals and other facilities using axial scanning for the brain plus helical scanning for the posterior fossa.

[3]For this exam category, no estimates were obtained for the axial-scanning contribution to the number of exams per week per most frequently used CT unit. N_n is made up of only the helical-scanning contribution.

[4]Totals refer to the exam categories listed; categories of exams which were not reported in the survey are not listed. The value of the standard error for the total number of exams per week per most frequently used CT unit is the root quadrature sum of the standard errors associated with the numbers of exams for the respective examination categories.

Table 2.2. Number of routine adult examinations per week per most frequently used CT unit per hospital (N_n)

Exam Region	Percentage of Total N_n	N_n (number per week per CT unit per facility)[1]	Standard Error (per week per CT unit per facility)	Axial-Scanning Percentage of N_n[1]	Helical-Scanning Percentage of N_n[1]
Head (brain+posterior fossa)[2]	34%	38	2	87%	8%
Abdomen+pelvis	23%	26	2	16%	84%
Chest	11%	13	1	17%	83%
Abdomen	8.0%	9.0	0.8	13%	87%
Simple sinus	4.6%	5.2	0.4	76%	24%
Pelvis	4.3%	4.9	0.7	19%	81%
Spine (cervical, thoracic, or lumbosacral)	3.9%	4.4	0.4	66%	34%
Chest+abdomen+pelvis	3.6%	4.1	0.5	11%	89%
Skull (facial bones, orbits, sella turcica, or complex sinuses)	2.9%	3.3	0.3	61%	39%
Kidney	1.5%	1.7	0.3	14%	86%
Liver	1.0%	1.1	0.3	9%	91%
Pancreas	0.68%	0.8	0.2	14%	86%
Neck (soft tissue)	0.33%	0.37	0.06	9%	91%
Urography[3]	0.28%	0.31	0.15	0%	100%
Extremities	0.26%	0.29	0.04	36%	64%
Bone mineral densitometry	0.15%	0.17	0.06	85%	15%
High-resolution chest	0.15%	0.16	0.06	59%	41%
Radiation therapy treatment planning	0.066%	0.07	0.03	88%	12%
Biopsy	0.061%	0.07	0.02	82%	18%
Appendix	0.061%	0.07	0.02	46%	54%
Chest for pulmonary emobolism[3]	0.044%	0.05	0.02	0%	100%
Shoulder	0.038%	0.04	0.02	29%	71%
Cardiac CT angiography[3]	0.027%	0.03	0.01	0%	100%
Dental study[3]	0.005%	0.01	0.01	0%	100%
Total[4]	100%	**112.8**	3.5		

[1]Except for head exams (see note 2 below), each value of N_n is the sum of axial-scanning plus helical-scanning contributions, each contribution representing the average over its respective sample of responding facilities. The axial-scanning contribution (see the axial-scanning percentage column) is based on the responses of 160 hospitals doing axial scanning in all kinds of CT examinations; the helical-scanning contribution (see the helical-scanning percentage column) is based on the responses of 162 hospitals doing helical scanning in all kinds of CT examinations.

[2]For head exams, N_n is comprised of axial- and helical-scanning contributions *plus an additional term* (whose value is 1.8 exams per week per most frequently used CT unit). This additional term represents the number of head exams performed by hosptials using **both** scanning modes for the routine head exam, i.e., axial scanning for the brain plus helical scanning for the posterior fossa. Approximately 5% of head exams are done by hospitals using axial scanning for the brain plus helical scanning for the posterior fossa.

[3]For this exam category, no estimates were obtained for the axial-scanning contribution to the number of exams per week per most frequently used CT unit. N_n is made up of only the helical-scanning contribution.

[4]Totals refer to the exam categories listed; categories of exams which were not reported in the survey are not listed. The value of the standard error for the total number of exams per week per most frequently used CT unit is the root quadrature sum of the standard errors associated with the numbers of exams for the respective examination categories.

Table 2.3. Number of routine adult examinations per week per most frequently used CT unit per facility other than a hospital (N_n)

Exam Region	Percentage of Total N_n	N_n (number per week per CT unit per facility)[1]	Standard Error (per week per CT unit per facility)	Axial-Scanning Percentage of N_n[1]	Helical-Scanning Percentage of N_n[1]
Head (brain+posterior fossa)[2]	28%	17	3	86%	13%
Abdomen+pelvis	19%	12	2	32%	68%
Simple sinus	13%	7.6	1	77%	23%
Chest	12%	7.4	1	32%	68%
Abdomen	6.0%	3.7	0.5	31%	69%
Chest+abdomen+pelvis	4.5%	2.7	0.5	33%	67%
Skull (facial bones, orbits, sella turcica, or complex sinuses)	3.9%	2.4	0.5	80%	20%
Spine (cervical, thoracic, or lumbosacral)	3.3%	2.0	0.3	71%	29%
Pelvis	2.4%	1.5	0.3	29%	71%
Kidney	1.9%	1.1	0.3	14%	86%
Pancreas	1.6%	0.9	0.3	18%	82%
Liver	1.1%	0.6	0.2	24%	76%
Extremities	0.75%	0.5	0.1	76%	24%
Bone mineral densitometry	0.68%	0.4	0.1	69%	31%
Neck (soft tissue)	0.54%	0.3	0.1	26%	74%
Radiation therapy treament planning[3]	0.54%	0.3	0.1	100%	0%
Dental study	0.30%	0.18	0.07	48%	52%
High-resolution chest[3]	0.17%	0.10	0.07	100%	0%
Shoulder	0.028%	0.02	0.02	100%	0%
Cardiac CT angiography[4]	0.026%	0.02	0.02	0%	100%
Appendix[5]					
Biopsy[5]					
Chest for pulmonary emobolism[5]					
Urography[5]					
Total[6]	100%	**60.8**	3.8		

[1] Except for head exams (see note 2 below), each value of N_n is the sum of axial-scanning plus helical-scanning contributions, each contribution representing the average over its respective sample of responding facilities. The axial-scanning contribution (see the axial-scanning percentage column) is based on the responses of 58 facilities other than hospitals doing axial scanning in all kinds of CT examinations; the helical-scanning contribution (see the helical-scanning percentage column) is based on the responses of 63 facilities other than hospitals doing helical scanning in all kinds of CT examinations.

[2] For head exams, N_n is comprised of axial- and helical-scanning contributions *plus an additional term* (whose value is 0.15 exams per week per most frequently used CT unit). This additional term represents the number of head exams performed by facilities other than hosptials using **both** scanning modes for the routine head exam, i.e., axial scanning for the brain plus helical scanning for the posterior fossa. Approximately 1% of head exams are done by facilities other than hospitals using axial scanning for the brain plus helical scanning for the posterior fossa.

[3] For this exam category, no estimates were obtained for the helical-scanning contribution to the number of exams per week per most frequently used CT unit. N_n is made up of only the axial-scanning contribution.

[4] For this exam category, no estimates were obtained for the axial-scanning contribution to the number of exams per week per most frequently used CT unit. N_n is made up of only the helical-scanning contribution.

[5] For this exam category, no estimates were obtained for either the axial-scanning or helical-scanning contribution to N_n.

[6] Totals refer to the exam categories listed; categories of exams which were not reported in the survey are not listed. The value of the standard error for the total number of exams per week per most frequently used CT unit is the root quadrature sum of the standard errors associated with the numbers of exams for the respective examination categories.

Table 2.4. Adult collective effective dose per week per most frequently used CT unit per facility (S_n, hospitals and other facilities)

Exam Region	Percentage of Total S_n	S_n (person-mSv per week per CT unit per facility)[1]	Standard Error (person-mSv per week per CT unit per facility)	Axial-Scanning Percentage[1] of S_n	Helical-Scanning Percentage[1] of S_n
Abdomen+pelvis	44%	333	32	27%	73%
Chest	15%	114	12	26%	74%
Chest+abdomen+pelvis	10%	76	10	26%	74%
Abdomen	9.5%	72	9	19%	81%
Head (brain+posterior fossa)[2]	8.8%	67	5	87%	10%
Pelvis	3.5%	26	4	26%	74%
Spine (cervical, thoracic, or lumbosacral)[3]	3.3%	25	3	60%	40%
Kidney	1.9%	14	3	16%	84%
Liver	1.1%	8	2	13%	87%
Pancreas	0.93%	7	2	14%	86%
Simple sinus	0.69%	5.2	0.5	81%	19%
Skull (facial bones, orbits, sella turcica, or complex sinuses)	0.49%	3.7	0.5	67%	33%
Neck (soft tissue)	0.22%	1.7	0.5	11%	89%
Radiation therapy treament planning[4]	0.22%	1.6	1.4	100%	0%
Urography[5]	0.22%	1.6	1.0	0%	100%
Bone mineral densitometry	0.05%	0.37	0.2	15%	85%
Appendix	0.04%	0.32	0.1	45%	55%
High-resolution chest	0.035%	0.27	0.1	56%	44%
Biopsy[4]	0.033%	0.25	0.1	100%	0%
Chest for pulmonary emobolism	0.011%	0.08	0.06	0%	100%
Shoulder[4]	0.002%	0.02	0.01	100%	0%
Dental study[4]	0.001%	0.01	0.01	100%	0%
Extremities[6]					
Cardiac CT angiography[6]					
Total[7]	100%	**756**	38		

[1]Except for head exams (see note 2 below), $S_n = N_{n,axial} \times <E>_{axial} + N_{n,helical} \times <E>_{helical}$, where N_n refers to the weekly number of exams normalized per most frequently used CT unit per facility (hospitals and other facilities, Table 2.1, footnote 1), where $<E>$ refers to the mean effective dose associated with that particular exam (cf. Part 1 of this report), and where subscripts "axial" and "helical" refer to contributions respectively from axial scanning and helical scanning. See the axial and helical scanning percentages of S_n for the respective contributions from axial and helical scanning.

[2]For head exams, S_n is comprised of axial- and helical-scanning contributions *plus an additional term* (whose value is 2.4 person-mSv per week per most frequently used CT unit). This additional term represents the contribution from head exams performed by hosptials and other facilities using **both** scanning modes for the routine head exam, i.e., axial scanning for the brain plus helical scanning for the posterior fossa. Approximately 3.5% of head-exam S_n is contributed by hospitals and other facilities using axial scanning for the brain plus helical scanning for the posterior fossa.

[3]In evaluating S_n for exams of the spine, the mean value $<E>$ was determined as the average of mean values associated with the spine's three regions, $<E>_{cervical}$, $<E>_{thoracic}$, $<E>_{lumbosacral}$ for axial scanning and for helical scanning respectively.

[4]For this exam category, no estimates were obtained for the helical-scanning contribution to S_n. S_n is made up of only the axial-scanning contribution.

[5]For this exam category, no estimates were obtained for the axial-scanning contribution to S_n. S_n is made up of only the helical-scanning contribution.

[6]For this exam category, no estimates were obtained for either the axial-scanning or helical-scanning contribution to S_n.

[7]Totals refer to the exam categories listed; categories of exams which were not reported in the survey are not listed. The value of the standard error for the total S_n is the root quadrature sum of the standard errors associated with the S_n values of the respective examination categories.

Table 2.5. Adult collective effective dose per week per most frequently used CT unit per hospital (S_n)					
Exam Region	**Percentage of Total S_n**	**S_n** (person-mSv per week per CT unit per facility)[1]	**Standard Error** (person-mSv per week per CT unit per facility)	**Axial-Scanning Percentage**[1] **of S_n**	**Helical-Scanning Percentage**[1] **of S_n**
Abdomen+pelvis	44%	349	37	25%	75%
Chest	16%	124	16	21%	79%
Abdomen	10%	79	12	18%	82%
Head (brain+posterior fossa)[2]	9.7%	77	7	87%	9%
Chest+abdomen+pelvis	8.1%	64	10	21%	79%
Pelvis	3.8%	30	5	29%	71%
Spine (cervical, thoracic, or lumbosacral)[3]	3.5%	28	4	61%	39%
Kidney	1.8%	14	3	11%	89%
Liver	1.1%	9	2	8%	92%
Pancreas	0.81%	6	2	7%	93%
Simple sinus	0.56%	4.4	0.5	79%	21%
Skull (facial bones, orbits, sella turcica, or complex sinuses)	0.48%	3.8	0.6	63%	37%
Urography[4]	0.28%	2.3	1.4	0%	100%
Radiation therapy treament planning[5]	0.25%	2.0	0.9	100%	0%
Neck (soft tissue)	0.23%	1.8	0.6	11%	89%
Appendix	0.05%	0.4	0.2	44%	56%
Biopsy[5]	0.04%	0.3	0.3	100%	0%
High-resolution chest	0.04%	0.3	0.2	47%	53%
Chest for pulmonary emobolism[4]	0.01%	0.11	0.08	0%	100%
Bone mineral densitometry[5]	0.005%	0.04	0.08	100%	0%
Shoulder[5]	0.002%	0.02	0.02	100%	0%
Cardiac CT angiography[6]					
Dental study[6]					
Extremities[6]					
Total[7]	100%	**796**	45		

[1]Except for head exams (see note 2 below), $S_n = N_{n,axial} \times <E>_{axial} + N_{n,helical} \times <E>_{helical}$, where N_n refers to the weekly number of exams normalized per most frequently used CT unit per hospital (Table 2.2, footnote 1), where $<E>$ refers to the mean effective dose associated with that particular exam (cf. Part 1 of this report), and where subscripts "axial" and "helical" refer to contributions respectively from axial scanning and helical scanning. See the axial and helical scanning percentages of S_n for the respective contributions from axial and helical scanning.

[2]For head exams, S_n is comprised of axial- and helical-scanning contributions *plus an additional term* (whose value is 3.0 person-mSv per week per most frequently used CT unit). This additional term represents the contribution from head exams performed by hosptials using **both** scanning modes for the routine head exam, i.e., axial scanning for the brain plus helical scanning for the posterior fossa. Approximately 3.9% of head-exam S_n is contributed by hospitals using axial scanning for the brain plus helical scanning for the posterior fossa.

[3]In evaluating S_n for exams of the spine, the mean value $<E>$ was determined as the average of mean values associated with the spine's three regions, $<E>_{cervical}$, $<E>_{thoracic}$, $<E>_{lumbosacral}$ for axial scanning and for helical scanning respectively.

[4]For this exam category, no estimates were obtained for the axial-scanning contribution to S_n. S_n is made up of only the helical-scanning contribution.

[5]For this exam category, no estimates were obtained for the helical-scanning contribution to S_n. S_n is made up of only the axial-scanning contribution.

[6]For this exam category, no estimates were obtained for either the axial-scanning or helical-scanning contribution to S_n.

[7]Totals refer to the exam categories listed; categories of exams which were not reported in the survey are not listed. The value of the standard error for the total S_n is the root quadrature sum of the standard errors associated with the S_n values of the respective examination categories.

Table 2.6. Adult collective effective dose per week per most frequently used CT unit per facility other than a hospital (S_n)

Exam Region	Percentage of Total S_n	S_n (person-mSv per week per CT unit per facility)[1]	Standard Error (person-mSv per week per CT unit per facility)	Axial-Scanning Percentage[1] of S_n	Helical-Scanning Percentage[1] of S_n
Abdomen+pelvis	43%	242	47	35%	65%
Chest+abdomen+pelvis	16%	88	19	42%	58%
Chest	15%	84	13	40%	60%
Abdomen	8.0%	45	11	30%	70%
Head (brain+posterior fossa)[2]	6.6%	37	8	84%	15%
Spine (cervical, thoracic, or lumbosacral)[3]	2.6%	14	4	59%	41%
Pelvis	2.3%	13	4	26%	74%
Kidney	2.2%	12	4	18%	82%
Pancreas	1.4%	8	4	24%	76%
Simple sinus	1.4%	8	1	85%	15%
Liver	0.90%	5	2	37%	63%
Skull (facial bones, orbits, sella turcica, or complex sinuses)	0.56%	3.1	0.8	80%	20%
Radiation therapy treament planning[4]	0.17%	1.0	0.5	100%	0%
Bone mineral densitometry[5]	0.13%	0.7	0.2	0%	100%
Neck (soft tissue)[4]	0.039%	0.2	0.2	100%	0%
Dental study[4]	0.004%	0.02	0.05	100%	0%
Shoulder[4]	0.003%	0.02	0.03	100%	0%
Extremities[6]					
High-resolution chest[6]					
Cardiac CT angiography[6]					
Appendix[6]					
Biopsy[6]					
Chest for pulmonary emobolism[6]					
Urography[6]					
Total[7]	100%	**561**	55		

[1]Except for head exams (see note 2 below), $S_n = N_{n,axial} \times <E>_{axial} + N_{n,helical} \times <E>_{helical}$, where N_n refers to the weekly number of exams normalized per most frequently used CT unit per facility other than a hospital (Table 2.3, footnote 1), where $<E>$ refers to the mean effective dose associated with that particular exam (cf. Part 1 of this report), and where subscripts "axial" and "helical" refer to contributions respectively from axial scanning and helical scanning. See the axial and helical scanning percentages of S_n for the respective contributions from axial and helical scanning.

[2]For head exams, S_n is comprised of axial- and helical-scanning contributions *plus an additional term* (whose value is 0.3 person-mSv per week per most frequently used CT unit). This additional term represents the contribution from head exams performed by facilities other than hosptials using **both** scanning modes for the routine head exam, i.e., axial scanning for the brain plus helical scanning for the posterior fossa. Approximately 0.8% of head-exam S_n is contributed by facilities other than hospitals using axial scanning for the brain plus helical scanning for the posterior fossa.

[3]In evaluating S_n for exams of the spine, the mean value $<E>$ was determined as the average of mean values associated with the spine's three regions, $<E>_{cervical}$, $<E>_{thoracic}$, $<E>_{lumbosacral}$ for axial scanning and for helical scanning respectively.

[4]For this exam category, no estimates were obtained for the helical-scanning contribution to S_n. S_n is made up of only the axial-scanning contribution.

[5]For this exam category, no estimates were obtained for the axial-scanning contribution to S_n. S_n is made up of only the helical-scanning contribution.

[6]For this exam category, no estimates were obtained for either the axial-scanning or helical-scanning contribution to S_n.

[7]Totals refer to the exam categories listed; categories of exams which were not reported in the survey are not listed. The value of the standard error for the total S_n is the root quadrature sum of the standard errors associated with the S_n values of the respective examination categories.

Numbers of adult *versus* pediatric examinations

Facility respondents were asked to estimate separately for adult and pediatric patients the weekly workloads in several broad categories of exams and procedures done with the most frequently used CT unit of the facility. These CT examinations or procedures were explicitly pre-identified in the facility questionnaire (Stern et al. 2000) in groups related to application type and region of the body:

(1) "neuroradiological" exams, exemplified by exams of the head, brain, orbits, sinus, neurospine, i.e., covering the head and neck;

(2) "general-purpose radiological" exams, exemplified by exams of the chest, abdomen, pelvis, orthopedic spine, i.e., covering the trunk;

(3) "interventional" procedures, exemplified by biopsy and drainage;

(4) "radiotherapy treatment planning" procedures.

Results are presented in Tables 2.7 through 2.12.

Numbers of examinations of *all* kinds on *all* CT units of facilities

Facility respondents were asked, "On average, approximately what's the *total number* of CT adult *and* pediatric patient examinations or procedures (*complete* exams of *any* type — head exams *or* body exams) done *weekly* on *all* CT units at the facility?" These results are ***not*** restricted to the most frequently used CT unit of each facility, and they are presented in Table 2.13.

Table 2.7. Number of adult examinations per week per most frequently used CT unit per facility (hospitals and other facilities)[1]

Group of Exams or Procedures	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Neuroradiological[2]	35.1	29.5	1.9	2	5	15	26	50	85	183	242
General-purpose radiological[3]	47.8	40.6	2.6	0	5	16	35	73	121	205	240
Interventional[4]	1.37	2.41	0.16	0	0.0	0.0	0.3	2	6	21	233
Radiotherapy Treatment Planning	1.30	3.38	0.22	0	0.0	0.0	0.0	1	7	30	231
Total[5]	86.0	67.4	4.4	3	12	33	66	130	217	388	239

[1] Irrespective of mode of scanning, axial or helical. Excludes data of two pediatric hospitals selected in the random sampling of all CT facilities.

[2] Exemplified by exams of the head, brain, orbits, sinus, neurospine, etc.

[3] Exemplified by exams of the chest, abdomen, pelvis, liver, orthopedic spine, etc.

[4] Exemplified by procedures involving biopsy or drainage.

[5] The total value was estimated by facility respondents independently of the sum of values of the groups listed, and therefore the mean value of the total does not necessarily precisely equal the sum of the mean values of those groups.

Table 2.8. Number of pediatric examinations per week per most frequently used CT unit per facility (hospitals and other facilities)[1]

Group of Exams or Procedures	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Neuroradiological[2]	3.87	7.90	0.55	0	0.0	1	2	4	10	75	204
General-purpose radiological[3]	1.99	6.22	0.45	0	0.0	0.0	1	2	6	75	191
Interventional[4]	0.024	0.204	0.015	0	0.0	0.0	0.0	0.0	0.0	3	182
Radiotherapy Treatment Planning	0.044	0.407	0.030	0	0.0	0.0	0.0	0.0	0.0	5	180
Total[5]	5.6	13.6	0.9	0	0	1	2	5	19	150	212

[1] Irrespective of mode of scanning, axial or helical. Includes data of two pediatric hospitals selected in the random sampling of all CT facilities.

[2] Exemplified by exams of the head, brain, orbits, sinus, neurospine, etc.

[3] Exemplified by exams of the chest, abdomen, pelvis, liver, orthopedic spine, etc.

[4] Exemplified by procedures involving biopsy or drainage.

[5] The total value was estimated by facility respondents independently of the sum of values of the groups listed, and therefore the mean value of the total does not necessarily precisely equal the sum of the mean values of those groups.

Table 2.9. Number of adult examinations per week per most frequently used CT unit per hospital[1]

Group of Exams or Procedures	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Neuroradiological[2]	40.4	31.0	2.3	2	7	19	30	56	99	183	179
General-purpose radiological[3]	53.5	42.4	3.2	1	7	20	45	78	137	205	177
Interventional[4]	1.81	2.65	0.20	0	0.0	0.0	1	2	6	21	172
Radiotherapy Treatment Planning	1.59	3.75	0.29	0	0.0	0.0	0.0	1	9	30	170
Total[5]	98.6	70.1	5.3	3	14	42	83	147	235	388	175

[1]Irrespective of mode of scanning, axial or helical. Excludes data of two pediatric hospitals selected in the random sampling of all CT facilities.

[2]Exemplified by exams of the head, brain, orbits, sinus, neurospine, etc.

[3]Exemplified by exams of the chest, abdomen, pelvis, liver, orthopedic spine, etc.

[4]Exemplified by procedures involving biopsy or drainage.

[5]The total value was estimated by facility respondents independently of the sum of values of the groups listed, and therefore the mean value of the total does not necessarily precisely equal the sum of the mean values of those groups.

Table 2.10. Number of pediatric examinations per week per most frequently used CT unit per hospital[1]

Group of Exams or Procedures	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Neuroradiological[2]	4.42	8.96	0.73	0	0.0	1	2	5	12	75	151
General-purpose radiological[3]	2.52	7.19	0.61	0	0.0	0.0	1	2	8	75	139
Interventional[4]	0.03	0.24	0.02	0	0.0	0.0	0.0	0.0	0.0	3	127
Radiotherapy Treatment Planning	0.06	0.49	0.04	0	0.0	0.0	0.0	0.0	0.9	5	126
Total[5]	6.5	15.6	1.2	0	0	1	3	5	20	150	156

[1]Irrespective of mode of scanning, axial or helical. Includes data of two pediatric hospitals selected in the random sampling of all CT facilities.

[2]Exemplified by exams of the head, brain, orbits, sinus, neurospine, etc.

[3]Exemplified by exams of the chest, abdomen, pelvis, liver, orthopedic spine, etc.

[4]Exemplified by procedures involving biopsy or drainage.

[5]The total value was estimated by facility respondents independently of the sum of values of the groups listed, and therefore the mean value of the total does not necessarily precisely equal the sum of the mean values of those groups.

Table 2.11. Number of adult examinations per week per most frequently used CT unit per facility other than a hospital[1]

Group of Exams or Procedures	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Neuroradiological[2]	19.9	17.4	2.2	2	4	8	16	23	60	84	63
General-purpose radiological[3]	31.6	30.0	3.8	0	2	10	23	40	87	153	63
Interventional[4]	0.14	0.46	0.06	0	0.0	0.0	0	0	1	2	61
Radiotherapy Treatment Planning	0.49	1.82	0.23	0	0.0	0.0	0.0	0	3	12	61
Total[5]	51.6	44.0	5.5	5	9	24	40	60	130	237	64

[1] Irrespective of mode of scanning, axial or helical.

[2] Exemplified by exams of the head, brain, orbits, sinus, neurospine, etc.

[3] Exemplified by exams of the chest, abdomen, pelvis, liver, orthopedic spine, etc.

[4] Exemplified by procedures involving biopsy or drainage.

[5] The total value was estimated by facility respondents independently of the sum of values of the groups listed, and therefore the mean value of the total does not necessarily precisely equal the sum of the mean values of those groups.

Table 2.12. Number of pediatric examinations per week per most frequently used CT unit per facility other than a hospital[1]

Group of Exams or Procedures	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Neuroradiological[2]	2.31	2.99	0.41	0	0.0	0.3	1	3	7	15	53
General-purpose radiological[3]	0.55	1.14	0.16	0	0.0	0.0	0.0	1	3	5	52
Interventional[4]	0.00	0.00	0.00	0	0.0	0.0	0.0	0.0	0.0	0	55
Radiotherapy Treatment Planning	0.00	0.00	0.00	0	0.0	0.0	0.0	0.0	0.0	0	54
Total[5]	2.8	3.9	0.5	0	0	0	1	4	9	20	56

[1] Irrespective of mode of scanning, axial or helical.

[2] Exemplified by exams of the head, brain, orbits, sinus, neurospine, etc.

[3] Exemplified by exams of the chest, abdomen, pelvis, liver, orthopedic spine, etc.

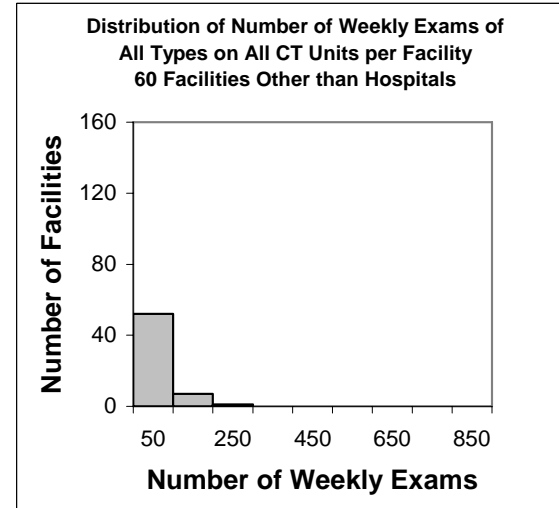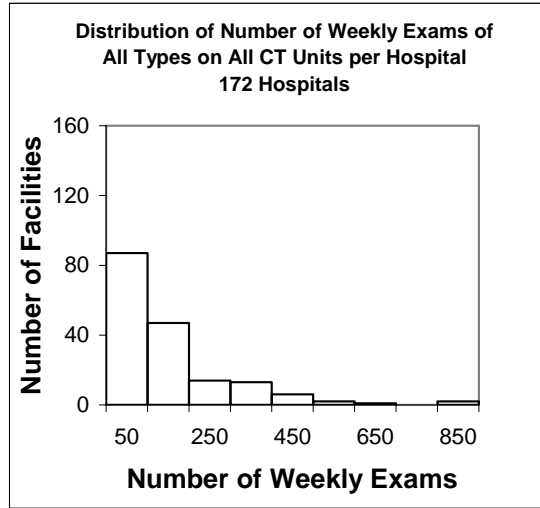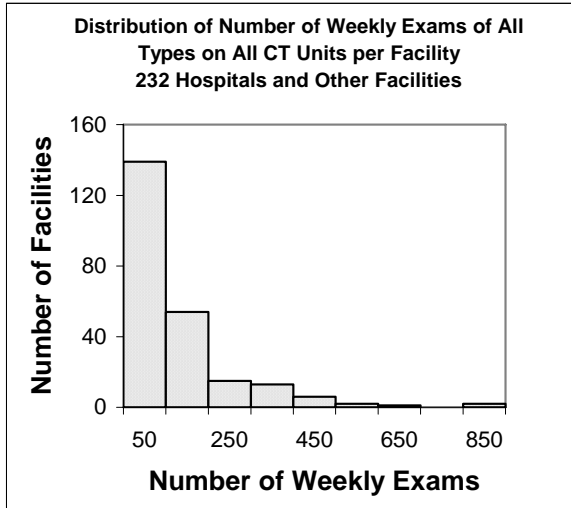[4] Exemplified by procedures involving biopsy or drainage.

[5] The total value was estimated by facility respondents independently of the sum of values of the groups listed, and therefore the mean value of the total does not necessarily precisely equal the sum of the mean values of those groups.

Table 2.13. Number of examinations per week with *all* CT units per facility[1]											
Facility Type	**Mean**	**Standard Deviation**	**Standard Error**	**Minimum**	**5th Percentile**	**25th Percentile**	**Median**	**75th Percentile**	**95th Percentile**	**Maximum**	**Sample Size (N)**
Hospitals[2] and Other Facilities	124	141	9	4	12	35	72	156	385	900	232
Hospitals[2] Only	149	154	12	4	14	45	100	193	473	900	172
Facilities Other than Hospitals	53	46	6	5	9	25	39	66	138	250	60

[1]Includes procedures of *all* types, axial- or helical-scanning, adult and pediatric. Values estimated for *all* CT units at each facility, *not* restricted to the most frequently used CT unit.

[2]Includes data of two pediatric hospitals selected in the random sampling of all CT facilities.

Distribution of Number of Weekly Exams of All Types on All CT Units per Facility
232 Hospitals and Other Facilities

Distribution of Number of Weekly Exams of All Types on All CT Units per Hospital
172 Hospitals

Distribution of Number of Weekly Exams of All Types on All CT Units per Facility
60 Facilities Other than Hospitals

Numbers of CT facilities and annual CT procedure workload in the U.S.

The numbers and types of CT facilities and the annual CT procedure workload in the U.S. were inferred from 2000-2001 *NEXT* CT survey statistics and from data published in the 2000-2001 edition of the *AHA Guide^{TM} to the Health Care Field* (AHA 2000). While the *AHA Guide^{TM}* identifies hospitals reporting a CT facility, its definition of hospital CT facility is broader than that used in the *NEXT* survey: The *AHA Guide^{TM}* definition of hospital CT facility includes a location with at least one CT unit either (1) on-site at the hospital, or (2) somewhere else within the hospital's health care system or network, or (3) ***off-site at the location of another provider (through a formal arrangement) in the hospital's local community***. The *NEXT* definition of hospital CT facility is limited to the location on-site at the hospital (or possibly in an outpatient department) with at least one CT unit. Locations with at least one CT unit elsewhere (e.g., offices of private practitioners — single-specialty, multi-specialty, or mobile-unit practices — and free-standing imaging centers) all would be categorized as facilities ***other*** than hospitals in the *NEXT* survey. The following model is used to estimate the numbers and distribution of types of CT facility in a way consistent with *NEXT* survey conventions:

•**First**, it's assumed that the nationwide ratio of CT facilities other than hospitals to CT facilities at hospitals is equal to the corresponding ratio *observed* in the *NEXT* random sample:

$$N_o/N_h = n_o/n_h = 0.38; \text{(S.E.} = 0.05).$$ (Equation 2.3)

Here

N_o represents the number of CT facilities in the U.S. *other* than hospitals

N_h represents the number of U.S. hospitals with at least one CT unit on-site (including outpatient departments or outpatient centers affiliated with hospitals)

$n_o (= 73)$ is the number of CT facilities (i.e., locations with at least one CT unit on-site) in the *NEXT* random sample *other* than hospitals

$n_h (= 192)$ is the number of hospitals in the *NEXT* random sample with at least one CT unit on-site (including outpatient departments or outpatient centers affiliated with hospitals).

•**Second**, it's assumed that the number of hospital CT facilities (as the *AHA Guide^{TM}* defines a hospital CT facility) is comprised of two terms, namely, the number of hospitals with at least one CT unit on-site (including outpatient departments or centers affiliated with hospitals), plus the number of facilities other than hospitals having formal arrangements with those hospitals to provide CT services:

$$N_{CT} = N_h + fN_o,$$ (Equation 2.4)

where

N_{CT} (= 5244; S.E. 28) is the number (inferred from the *AHA Guide*[TM]) of U.S. hospitals with a CT facility as the *AHA Guide*[TM] defines CT facility;

f is the fraction of N_o (facilities other than hospitals) that have formal arrangements with hospitals to provide CT services for those hospitals.

•**Third**, it's assumed that the CT procedures that would need to be done by hospitals *without* any CT facility (as the *AHA Guide*[TM] defines CT facility) are actually performed by those facilities other than hospitals that have *no* formal arrangements with hospitals to provide CT services for hospitals:

$$h(N_T - N_{CT}) = (1 - f)(oth)N_o, \qquad \text{(Equation 2.5)}$$

where

N_T (= 5895) is the total number of U.S. hospitals listed in the *AHA Guide*[TM] 2000-2001 edition (AHA 2000);

h (= 149; S.E. 12) refers to the number of CT procedures per week on-site in hospitals or in outpatient departments or outpatient centers affiliated with hospitals (*cf.* Table 2.13);

oth (= 53; S.E. 6) refers to the number of CT procedures per week in facilities other than hospitals (cf. Table 2.13).

Equations 2.3 through 2.5 are solved for the unknowns N_o, N_h, and *f*, and they yield the following values:

$$N_o = 1950 \text{ (S.E. 290) CT facilities other than hospitals;} \qquad \text{(Equation 2.6)}$$

$$N_h = 5130 \text{ (S.E. 270) hospitals with at least 1 CT unit;} \qquad \text{(Equation 2.7)}$$

$$f = 0.06 \text{ (S.E. 0.14).} \qquad \text{(Equation 2.8)}$$

While the value for *f* is not statistically significant, the estimates are robust for the numbers of CT facilities in hospitals and those not in hospitals. This analysis is extended to various types of CT facilities, and the results are tabulated in Table 2.14.

Table 2.14. Number of CT facilities in the U.S.[1]

CT Facility Type	Percentage of Sample (N=265)	Thousands of CT Facilities	Standard Error (Thousands of CT Facilities)
Hospital	72.5%	5.13	0.27
Single-specialty Practice	23.8%	1.68	0.22
Multi-specialty Practice	3.0%	0.21	0.08
Mobile Practice[2]	0.4%	0.03	0.03
Other	0.4%	0.03	0.03
Total[3]	100%	7.07	0.36

[1]Inferred from 2000-2001 *NEXT* CT survey statistics and from percentage of hospitals in 50 States and D.C. reporting CT availability in the *AHA Guide*^{TM} 2000-2001 edition.

[2]One mobile CT unit temporarily located at a hospital was observed in the sample.

[3]The standard error of the total is approximated as the root quadrature sum of the standard errors (added independently) associated with the sub-categories.
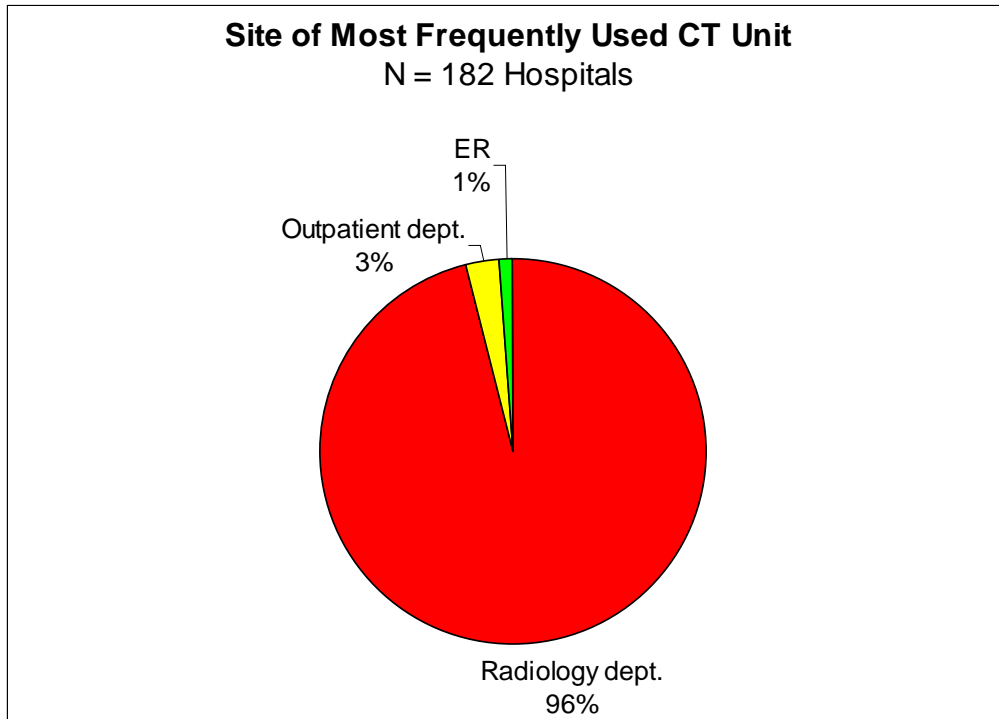

Site of Most Frequently Used CT Unit
N = 182 Hospitals

ER 1%
Outpatient dept. 3%
Radiology dept. 96%

Figure 3. Site of Most Frequently Used CT Unit

Practice Specialty for Most Frequently Used CT Unit
N = 73 Facilities Other than Hospitals

1%
1%
1%
3%
11%
83%

- Radiology
- Multiple Specialty
- Otolaryngology
- Orthopedics
- General Practice
- Mobile Practice
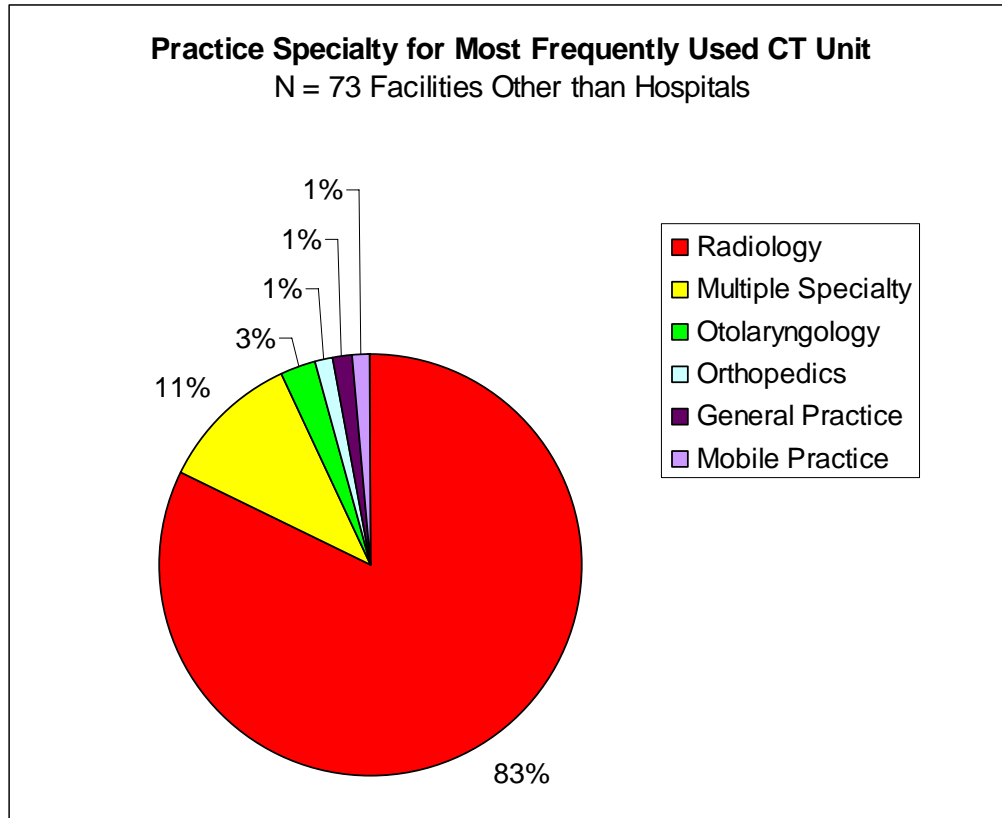
Figure 4. Practice Specialty for Most Frequently Used CT Units

Finally, the annual number of CT procedures in the U.S. is estimated in Table 2.15 from the results presented in Tables 2.13 and 2.14.

Table 2.15. Annual number of CT procedures in the U.S. procedures of all types, adult and pediatric, on all CT units			
CT Facility Type	**Percentage of Total**	**Millions of CT Procedures**	**Standard Error** (Millions of Procedures)
Hospitals[1]	88.1%	39.8	3.8
Facilities Other than Hospitals[2]	11.9%	5.4	0.9
Total	100%	45.1	3.9

[1]Values for hospitals are estimated from the product of 5130 hospitals (Table 2.14) times 149 CT procedures per week per hospital (Table 2.13).

[2]Values for facilities other than hospitals are estimated from the product of 1950 facilities other than hospitals (Table 2.14) times 53 CT procedures per week per non-hospital facility (Table 2.13).

The 95% confidence interval for the total annual number of CT procedures in the U.S. (37.3 – 52.9 million CT procedures) includes the value 39.6 million estimated independently in the 2001 IMV census of U.S. hospital and non-hospital sites (IMV 2002).

PART 3. DISTRIBUTION OF CT UNITS AND MODELS VERSUS SCANNING CAPABILITIES AND RADIATION OUTPUT PER TUBE CURRENT-TIME PRODUCT

Table 3.1. Number of CT units per facility (hospitals and other facilities)[1]											
Scanning Capability[2]	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Axial (non-helical) only	0.32	0.48	0.03	0	0	0	0	1	1	2	249
Helical (spiral), single slice	0.66	0.69	0.04	0	0	0	1	1	2	4	246
Helical (spiral), multi-slice	0.29	0.60	0.04	0	0	0	0	0	1	4	248
Electron-beam CT	0.02	0.13	0.01	0	0	0	0	0	0	1	248
Total Number of CT Units per Facility	1.28	0.76	0.05	1	1	1	1	1	2	6	252

[1]Excludes data of two pediatric hospitals selected in the random sampling of all CT facilities.

[2]CT systems in all of the categories (except for electron-beam CT) are capable of operating in an axial-scanning (non-helical) mode.

Figure 5. CT Unit Scanning Capabilities

Figure 6. CT Fluoroscopy Capability?

Table 3.2. Number of CT units per facility (hospitals)[1]

Scanning Capability[2]	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Axial (non-helical) only	0.26	0.45	0.03	0	0	0	0	1	1	2	183
Helical (spiral), single slice	0.75	0.73	0.05	0	0	0	1	1	2	4	180
Helical (spiral), multi-slice	0.34	0.65	0.05	0	0	0	0	1	1	4	181
Electron-beam CT	0.02	0.15	0.01	0	0	0	0	0	0	1	182
Total Number of CT Units per Facility	1.37	0.86	0.06	1	1	1	1	1	3	6	184

[1]Excludes data of two pediatric hospitals selected in the random sampling of all CT facilities.

[2]CT systems in all of the categories (except for electron-beam CT) are capable of operating in an axial-scanning (non-helical) mode.
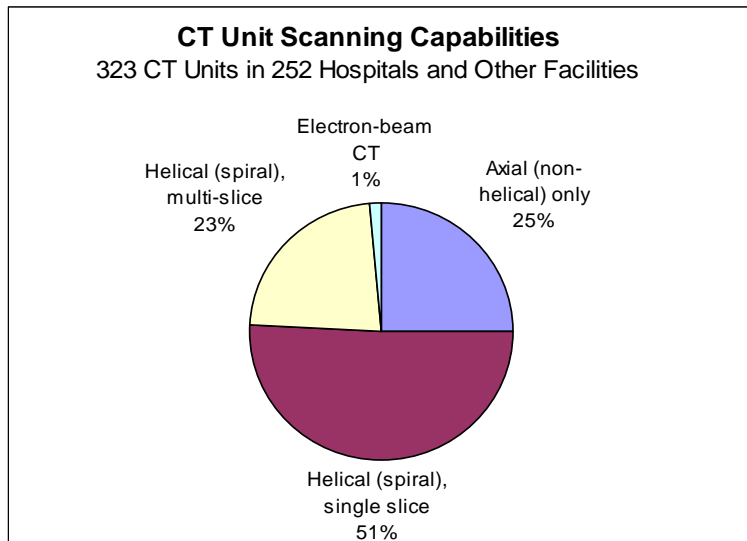

Figure 7. CT Unit Scanning Capabilities

Figure 8. CT Fluoroscopy Capability?

Table 3.3. Number of CT units per facility (facilities other than hospitals)

Scanning Capability[1]	Mean	Standard Deviation	Standard Error	Minimum	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	Maximum	Sample Size (N)
Axial (non-helical) only	0.48	0.53	0.07	0	0	0	0	1	1	2	66
Helical (spiral), single slice	0.41	0.50	0.06	0	0	0	0	1	1	1	66
Helical (spiral), multi-slice	0.16	0.37	0.05	0	0	0	0	0	1	1	67
Electron-beam CT	0.00	0.00	0.00	0	0	0	0	0	0	0	66
Total Number of CT Units per Facility	1.04	0.21	0.03	1	1	1	1	1	1	2	68

[1]CT systems in all of the categories (except for electron-beam CT) are capable of operating in an axial-scanning (non-helical) mode.

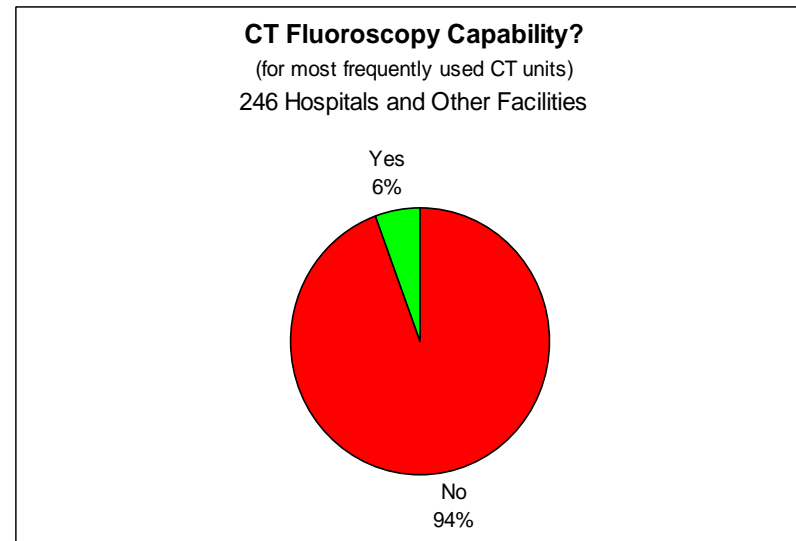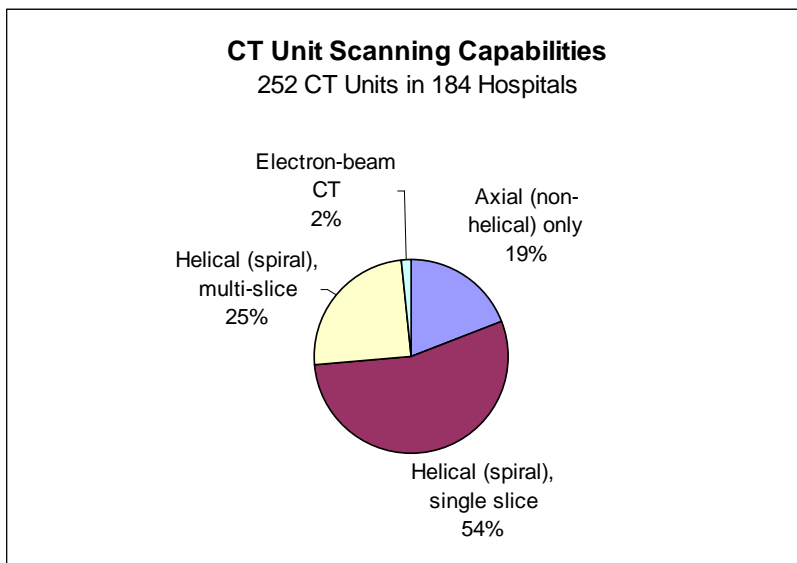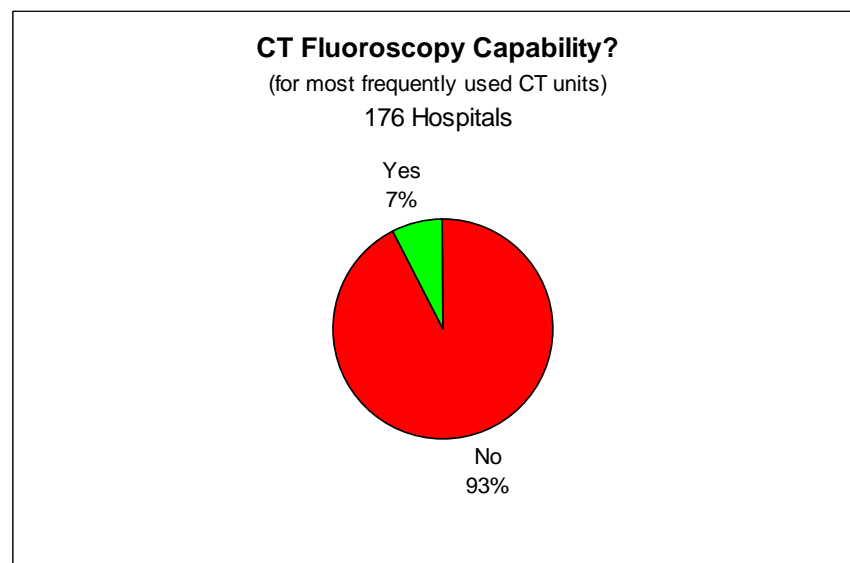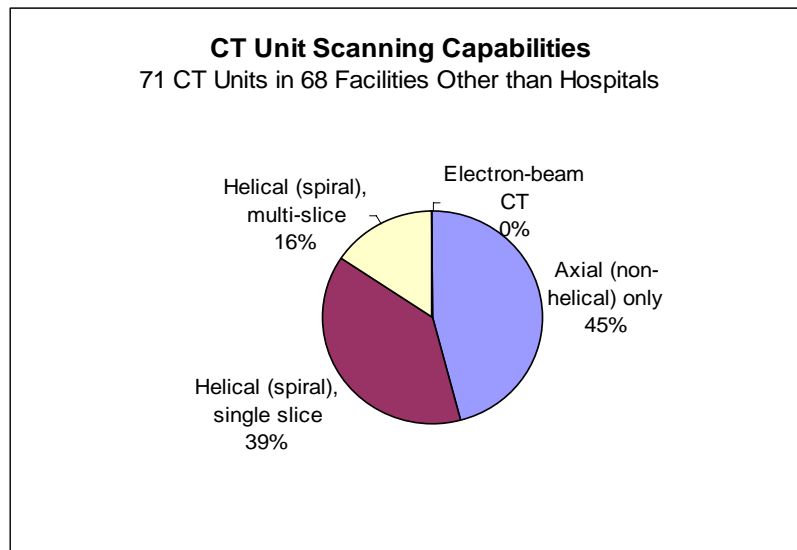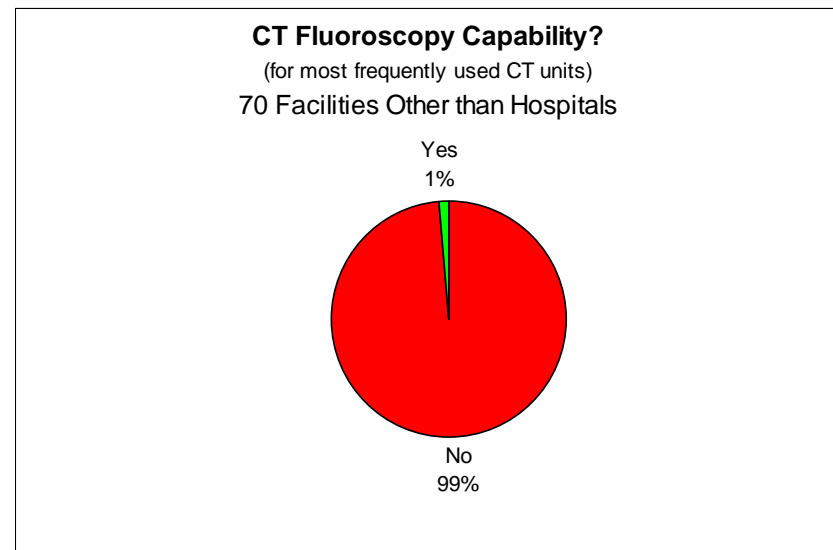Figure 9. CT Unit Scanning Capabilities

Figure 10. CT Fluoroscopy Capability?

Table 3.4. Models identified in the *NEXT* survey sample

CT Manufacturer and Model Group[1]	Number of CT Units[2]	Percentage of Total	Standard Error[3]
GE HiSpeed; HiSpeed Advantage; CT/i (without "SmartBeam")	39	15%	2%
GE ProSpeed; ProSpeed Plus; ProSpeed S; ProSpeed SX; ProSpeed SX Advantage; ProSpeed SX Power	29	11%	2%
Picker PQ CT; PQS; PQ SA; PQ 2000; PQ 2000S; PQ 5000; PQ 6000	24	9%	2%
GE 9800; 9800 Quick; 9800 HiLight Advantage	22	9%	2%
GE HiSpeed CT/i (with "SmartBeam"); DX/i	20	8%	2%
Siemens Somatom Plus 4	20	8%	2%
GE Pace; Sytec; Sytec SRi; Sytec 2000; 2000i; 3000; 3000i; 4000	14	5%	1%
GE LightSpeed; LightSpeed QX/i	11	4%	1%
Philips Tomoscan AVP; AVP-1; AV Expander; LX; LXC; LXI; LX Expander Plus; SR 7000	10	4%	1%
Picker IQ/TC; IQ Xtra; IQ Premier	7	3%	1%
GE HiSpeed FX/i; LX/i	6	2%	1%
Siemens Somatom Emotion; Balance	6	2%	1%
Toshiba Xpress; Xpress/GX	5	2%	1%
Picker/Marconi Mx 8000	4	2%	1%
Elscint Twin; Twin Flash; Helicat Flash	3	1.2%	0.7%
Siemens Somatom AR.C; AR.SP; AR.T	3	1.2%	0.7%
Siemens Somatom AR.HP; AR.HP Spiral	3	1.2%	0.7%
Siemens Somatom Plus 4 Volume Zoom	3	1.2%	0.7%
Elscint Exel 1800	2	0.8%	0.6%
Picker/Marconi Ultra Z	2	0.8%	0.6%
Shimadzu Intellect SCT-4800TE; SCT-6800TXL	2	0.8%	0.6%
Siemens Somatom AR.Star; AR.Star 40 s	2	0.8%	0.6%
Siemens Somatom Hi Q	2	0.8%	0.6%
Siemens Somatom Plus	2	0.8%	0.6%
Technicare Quantum; Quantum 3001	2	0.8%	0.6%
Toshiba 900S; TCT-600HQ	2	0.8%	0.6%
Toshiba Xpeed; Xpeed TSX-001A	2	0.8%	0.6%
Toshiba Xvision/GX; EX	2	0.8%	0.6%
Elscint 2400 Elite	1	0.4%	0.4%
GE Synergy Plus	1	0.4%	0.4%
Philips 60/TX	1	0.4%	0.4%
Picker Mx Twin	1	0.4%	0.4%
Toshiba Aquilion MS TSX-101A	1	0.4%	0.4%
Toshiba TCT-500S	1	0.4%	0.4%
Toshiba Xpress HS-1	1	0.4%	0.4%
Toshiba Xpress SX	1	0.4%	0.4%
Total Identified	**257**	**100%**	

[1] Insofar as possible, CT models identified in the *NEXT* survey are grouped according to *ImPACT* categories (ImPACT 2005). Each category is presumed to correspond to an irradiation geometry and source-filtration configuration unique for the purpose of dose evaluation. Some CT models identified in the *NEXT* survey could not be readily assigned to an *ImPACT* category.

[2] In this table the only CT units counted are those identified at each facility as the most frequently used CT unit.

[3] The standard error (S.E.) of each CT model percentage of the total is estimated from Poisson statistics as the CT model percentage of the total divided by the square root of the number of CT units of that model identified in the sample.

Table 3.5. Normalized $CTDI_{free\ air}$ (mGy/100 mAs, head filtration) measured in the NEXT survey sample[1]						
CT Manufacturer and Model Group[2]	ImPACT Classification Code[2,3]	kVp	Mean	Standard Deviation	Standard Error	Sample Size (N)
Elscint Exel 1800		120	15.9	0.3	0.2	2
Elscint 2400 Elite	EL.a	120	18.3			1
Elscint Twin; Twin Flash; Helicat Flash	EL.b	120	21.4	6.4	4.5	2
GE 9800; 9800 Quick; 9800 HiLight Advantage	GE.b	120	16.7	4.9	1.2	16
		140	27.0	3.5	1.8	4
GE HiSpeed; HiSpeed Advantage; CT/i (without "SmartBeam")	GE.c	120	17.9	3.8	0.8	23
		140	23.4	5.6	1.7	11
GE HiSpeed CT/i (with "SmartBeam"); DX/i	GE.d	120	18.6	2.3	0.8	9
		140	26.8	9.1	2.9	10
GE HiSpeed FX/i; LX/i	GE.h	120	29.5			1
		140	32.3	10.9	5.4	4
GE LightSpeed; LightSpeed QX/i	GE.i	120	31.9	7.4	3.3	5
		140	34.0	6.0	3.0	4
GE Pace; Sytec; Sytec SRi; Sytec 2000; 2000i; 3000; 3000i; 4000	GE.f	120	32.4	6.4	1.9	12
		135	43.5			1
GE ProSpeed; ProSpeed Plus; ProSpeed S; ProSpeed SX; ProSpeed SX Advantage; ProSpeed SX Power	GE.g	120	36.1	5.9	1.3	19
		140	42.5	5.4	2.1	7
GE Synergy Plus		120	66.9			1
Philips 60/TX	PH.j	120	18.5			1
Philips Tomoscan AVP; AVP-1; AV Expander; LX; LXC; LXI; LX Expander Plus; SR 7000	PH.e	120	18.0	1.3	0.5	8
Picker IQ/TC; IQ Xtra; IQ Premier		130	30.5	7.6	3.4	5
Picker Mx Twin		120	16.8			1
Picker PQ CT; PQS; PQ SA; PQ 2000; PQ 2000S; PQ 5000; PQ 6000	PI.b	120	29.2	4.3	1.4	9
		130	27.5	8.0	2.8	8
Picker/Marconi Mx 8000	PI.d	120	22.2	7.6	4.4	3
Picker/Marconi Ultra Z	PI.c	130	33.6			1
Shimadzu Intellect SCT-4800TE; SCT-6800TXL	SH.a	130	20.9	11.4	8.1	2
Siemens Somatom AR.C; AR.SP; AR.T	SI.e	130	36.0	4.5	2.6	3
Siemens Somatom AR.HP; AR.HP Spiral	SI.f	130	26.4	14.7	10.4	2
Siemens Somatom AR.Star; AR.Star 40 s		130	33.9	1.3	0.9	2
Siemens Somatom Emotion; Balance	SI.i	130	31.1	2.6	1.2	5
Siemens Somatom Hi Q	SI.h	133	18.2			1
Siemens Somatom Plus	SI.g	120	11.2	0.2	0.1	2
Siemens Somatom Plus 4	SI.d	120	14.0	4.6	2.6	3
		140	23.1	4.6	1.2	14
Siemens Somatom Plus 4 Volume Zoom	SI.j	120	22.6	1.3	0.9	2
		140	33.8			1
Technicare Quantum; Quantum 3001		120	16.9			1
Toshiba 900S; TCT-600HQ	TO.a	120	15.0	0.03	0.02	2
Toshiba Aquilion MS TSX-101A	TO.h	135	49.0			1
Toshiba TCT-500S		120	18.5			1
Toshiba Xpeed; Xpeed TSX-001A	TO.b	120	22.3			1
Toshiba Xpress HS-1	TO.e	130				0
Toshiba Xpress SX		120	35.5			1
Toshiba Xpress; Xpress/GX	TO.c	120	23.2	5.8	4.1	2
		130	28.0	1.0	0.7	2
		135	38.8			1
Toshiba Xvision/GX; EX	TO.d	120	32.0	4.9	3.4	2
Total						219

[1]Measured with filtration selected for head examination. See Part 1 for a more detailed description of $CTDI_{free\ air}$. Tabulated values are normalized to 100 mAs.

[2]Insofar as possible, CT models identified in the NEXT survey are grouped according to ImPACT categories (ImPACT 2005). Each category is presumed to correspond to an irradiation geometry and source-filtration configuration unique for the purpose of dose evaluation. Some CT models identified in the NEXT survey could not be readily assigned to an ImPACT category.

[3]Each code identifies a group of CT models presumed to share a common irradiation geometry and source-filtration configuration for which independent measurements of $CTDI_{free\ air}$, $CTDI_{100,c}$, and $CTDI_{100,p}$ (each variable normalized to the current-time product) are available (ImPACT 2005) as a function of kVp. The codes are provided in this table to facilitate comparisons of NEXT normalized CTDI results to those of the ImPACT survey.

Table 3.6. Normalized $CTDI_{free\ air}$ (mGy/100 mAs, body filtration) measured in the NEXT survey sample[1]						
CT Manufacturer and Model Group[2]	ImPACT Classification Code[2,3]	kVp	Mean	Standard Deviation	Standard Error	Sample Size (N)
Elscint Exel 1800		120	19.7	2.3	1.6	2
Elscint 2400 Elite	EL.a	120	19.0			1
Elscint Twin; Twin Flash; Helicat Flash	EL.b	120	25.7	11.0	7.8	2
GE 9800; 9800 Quick; 9800 HiLight Advantage	GE.b	120	18.1	5.8	1.7	12
		140	24.7	5.1	2.6	4
GE HiSpeed; HiSpeed Advantage; CT/i (without "SmartBeam")	GE.c	120	18.5	4.9	1.1	21
		140	23.6	5.7	1.8	10
GE HiSpeed CT/i (with "SmartBeam"); DX/i	GE.d	120	19.7	2.9	1.0	9
		140	27.3	8.5	3.0	8
GE HiSpeed FX/i; LX/i	GE.h	120	22.6	9.8	6.9	2
		140	39.2	6.3	6.3	1
GE LightSpeed; LightSpeed QX/i	GE.i	120	41.1	5.5	3.1	3
		140	46.5	15.7	9.1	3
GE Pace; Sytec; Sytec SRi; Sytec 2000; 2000i; 3000; 3000i; 4000	GE.f	120	32.2	5.9	1.8	11
		135	44.0			1
GE ProSpeed; ProSpeed Plus; ProSpeed S; ProSpeed SX; ProSpeed SX Advantage; ProSpeed SX Power	GE.g	120	37.5	7.6	1.8	17
		140	44.7	3.6	1.4	7
GE Synergy Plus		120	67.1			1
Philips 60/TX	PH.j	120	18.9			1
Philips Tomoscan AVP; AVP-1; AV Expander; LX; LXC; LXI; LX Expander Plus; SR 7000	PH.e	120	16.6	3.2	1.4	5
Picker IQ/TC; IQ Xtra; IQ Premier		130	26.3	8.6	3.8	5
Picker Mx Twin		120	18.1			1
Picker PQ CT; PQS; PQ SA; PQ 2000; PQ 2000S; PQ 5000; PQ 6000	PI.b	120	27.0	7.2	2.4	9
		130	29.5	8.2	2.9	8
Picker/Marconi Mx 8000	PI.d	120				0
Picker/Marconi Ultra Z	PI.c	130				0
Shimadzu Intellect SCT-4800TE; SCT-6800TXL	SH.a	130	19.6	10.4	7.4	2
Siemens Somatom AR.C; AR.SP; AR.T	SI.e	130	29.7	13.8	9.7	2
Siemens Somatom AR.HP; AR.HP Spiral	SI.f	130	21.6	8.8	6.2	2
Siemens Somatom AR.Star; AR.Star 40 s		130	33.4			1
Siemens Somatom Emotion; Balance	SI.i	130	29.1	6.3	2.8	5
Siemens Somatom Hi Q	SI.h	133	18.2			1
Siemens Somatom Plus	SI.g	120	11.7	0.005	0.004	2
Siemens Somatom Plus 4	SI.d	120	14.8	3.5	2.0	3
		140	21.3	5.0	1.4	12
Siemens Somatom Plus 4 Volume Zoom	SI.j	120				0
		140				0
Technicare Quantum; Quantum 3001		120	19.0			1
Toshiba 900S; TCT-600HQ	TO.a	120	11.5	2.2	1.5	2
Toshiba Aquilion MS TSX-101A	TO.h	135				0
Toshiba TCT-500S		120	18.6			1
Toshiba Xpeed; Xpeed TSX-001A	TO.b	120	21.7			1
Toshiba Xpress HS-1	TO.e	130				0
Toshiba Xpress SX		120	35.4			1
Toshiba Xpress; Xpress/GX	TO.c	120	23.9	6.0	4.2	2
		130	27.9	2.4	1.7	2
		135	38.6			1
Toshiba Xvision/GX; EX	TO.d	120	33.6			1
Total						186

[1] Measured with filtration selected for body examination. See Part 1 for a more detailed description of $CTDI_{free\ air}$. Tabulated values are normalized to 100 mAs.

[2] Insofar as possible, CT models identified in the NEXT survey are grouped according to ImPACT categories (ImPACT 2005). Each category is presumed to correspond to an irradiation geometry and source-filtration configuration unique for the purpose of dose evaluation. Some CT models identified in the NEXT survey could not be readily assigned to an ImPACT category.

[3] Each code identifies a group of CT models presumed to share a common irradiation geometry and source-filtration configuration for which independent measurements of $CTDI_{free\ air}$, $CTDI_{100,c}$, and $CTDI_{100,p}$ (each variable normalized to the current-time product) are available (ImPACT 2005) as a function of kVp. The codes are provided in this table to facilitate comparisons of NEXT normalized CTDI results to those of the ImPACT survey.

Table 3.7. Normalized $CTDI_{100,central}$ (mGy/100 mAs, head filtration) measured in the *NEXT* survey sample[1]

CT Manufacturer and Model Group[2]	*ImPACT* Classification Code[2,3]	kVp	Mean	Standard Deviation	Standard Error	Sample Size (N)
Elscint Exel 1800		120	9.6			1
Elscint 2400 Elite	EL.a	120	13.3			1
Elscint Twin; Twin Flash; Helicat Flash	EL.b	120	13.4			1
GE 9800; 9800 Quick; 9800 HiLight Advantage	GE.b	120	10.9	2.3	0.6	16
		140	17.2	0.9	0.5	4
GE HiSpeed; HiSpeed Advantage; CT/i (without "SmartBeam")	GE.c	120	11.4	1.6	0.3	23
		140	16.0	3.7	1.1	12
GE HiSpeed CT/i (with "SmartBeam"); DX/i	GE.d	120	12.4	1.5	0.5	9
		140	18.7	4.5	1.5	9
GE HiSpeed FX/i; LX/i	GE.h	120	21.0			1
		140	19.1	6.3	3.6	3
GE LightSpeed; LightSpeed QX/i	GE.i	120	17.6	2.1	1.0	4
		140	22.4	3.4	2.4	2
GE Pace; Sytec; Sytec SRi; Sytec 2000; 2000i; 3000; 3000i; 4000	GE.f	120	19.6	4.0	1.1	13
		135	24.1			1
GE ProSpeed; ProSpeed Plus; ProSpeed S; ProSpeed SX; ProSpeed SX Advantage; ProSpeed SX Power	GE.g	120	19.6	3.8	0.9	17
		140	25.5	3.7	1.5	6
GE Synergy Plus		120	20.0			1
Philips 60/TX	PH.j	120				0
Philips Tomoscan AVP; AVP-1; AV Expander; LX; LXC; LXI; LX Expander Plus; SR 7000	PH.e	120	12.8	0.8	0.3	8
Picker IQ/TC; IQ Xtra; IQ Premier		130	15.8	3.3	1.2	7
Picker Mx Twin		120	11.3			1
Picker PQ CT; PQS; PQ SA; PQ 2000; PQ 2000S; PQ 5000; PQ 6000	PI.b	120	14.0	2.3	0.8	9
		130	16.7	2.9	0.9	11
Picker/Marconi Mx 8000	PI.d	120	14.9	7.3	4.2	3
Picker/Marconi Ultra Z	PI.c	130	19.0			1
Shimadzu Intellect SCT-4800TE; SCT-6800TXL	SH.a	130	16.4	4.8	3.4	2
Siemens Somatom AR.C; AR.SP; AR.T	SI.e	130	19.2	7.5	4.4	3
Siemens Somatom AR.HP; AR.HP Spiral	SI.f	130	17.2	8.7	6.1	2
Siemens Somatom AR.Star; AR.Star 40 s		130	24.1	1.3	0.9	2
Siemens Somatom Emotion; Balance	SI.i	130	21.1	1.2	0.5	5
Siemens Somatom Hi Q	SI.h	133				0
Siemens Somatom Plus	SI.g	120	9.2	0.6	0.4	2
Siemens Somatom Plus 4	SI.d	120	12.8	0.2	0.1	3
		140	17.6	4.2	1.1	14
Siemens Somatom Plus 4 Volume Zoom	SI.j	120	16.7	0.8	0.6	2
		140	24.8			1
Technicare Quantum; Quantum 3001		120	10.1			1
Toshiba 900S; TCT-600HQ	TO.a	120	10.9	0.9	0.6	2
Toshiba Aquilion MS TSX-101A	TO.h	135	30.7			1
Toshiba TCT-500S		120	12.6			1
Toshiba Xpeed; Xpeed TSX-001A	TO.b	120	16.1			1
Toshiba Xpress HS-1	TO.e	130				0
Toshiba Xpress SX		120	20.0			1
Toshiba Xpress; Xpress/GX	TO.c	120	16.4	3.2	2.3	2
		130	17.2	4.1	2.9	2
		135	25.0			1
Toshiba Xvision/GX; EX	TO.d	120	18.6	0.4	0.3	2
Total						214

[1]$CTDI_{100}$ values were measured ***in the head phantom only***. See Part 1 for a more detailed description of $CTDI_{100,c}$. Tabulated values are normalized to 100 mAs.

[2]Insofar as possible, CT models identified in the *NEXT* survey are grouped according to *ImPACT* categories (ImPACT 2005). Each category is presumed to correspond to an irradiation geometry and source-filtration configuration unique for the purpose of dose evaluation. Some CT models identified in the *NEXT* survey could not be readily assigned to an *ImPACT* category.

[3]Each code identifies a group of CT models presumed to share a common irradiation geometry and source-filtration configuration for which independent measurements of $CTDI_{free\ air}$, $CTDI_{100,c}$, and $CTDI_{100,p}$ (each variable normalized to the current-time product) are available (ImPACT 2005) as a function of kVp. The codes are provided in this table to facilitate comparisons of *NEXT* normalized CTDI results to those of the *ImPACT* survey.

Table 3.8. Normalized $CTDI_{100,peripheral}$ (mGy/100 mAs, head filtration) measured in the NEXT survey sample[1]						
CT Manufacturer and Model Group[2]	ImPACT Classification Code[2,3]	kVp	Mean	Standard Deviation	Standard Error	Sample Size (N)
Elscint Exel 1800		120	13.6	0.7	0.5	2
Elscint 2400 Elite	EL.a	120	17.1			1
Elscint Twin; Twin Flash; Helicat Flash	EL.b	120	14.7	5.3	3.1	3
GE 9800; 9800 Quick; 9800 HiLight Advantage	GE.b	120	11.8	3.0	0.8	16
		140	17.3	0.9	0.5	4
GE HiSpeed; HiSpeed Advantage; CT/i (without "SmartBeam")	GE.c	120	12.8	1.8	0.4	23
		140	17.3	4.1	1.2	11
GE HiSpeed CT/i (with "SmartBeam"); DX/i	GE.d	120	13.6	1.9	0.6	9
		140	20.2	4.4	1.3	11
GE HiSpeed FX/i; LX/i	GE.h	120	20.9			1
		140	21.7	7.3	4.2	3
GE LightSpeed; LightSpeed QX/i	GE.i	120	19.8	3.5	1.7	4
		140	20.1	3.5	1.8	4
GE Pace; Sytec; Sytec SRi; Sytec 2000; 2000i; 3000; 3000i; 4000	GE.f	120	21.7	4.6	1.3	13
		135	28.8			1
GE ProSpeed; ProSpeed Plus; ProSpeed S; ProSpeed SX; ProSpeed SX Advantage; ProSpeed SX Power	GE.g	120	23.7	5.5	1.3	19
		140	28.3	4.1	1.7	6
GE Synergy Plus		120	40.4			1
Philips 60/TX	PH.j	120				0
Philips Tomoscan AVP; AVP-1; AV Expander; LX; LXC; LXI; LX Expander Plus; SR 7000	PH.e	120	14.7	1.3	0.4	8
Picker IQ/TC; IQ Xtra; IQ Premier		130	16.1	3.1	1.2	7
Picker Mx Twin		120	11.2			1
Picker PQ CT; PQS; PQ SA; PQ 2000; PQ 2000S; PQ 5000; PQ 6000	PI.b	120	15.2	2.7	0.9	9
		130	17.0	3.5	1.0	12
Picker/Marconi Mx 8000	PI.d	120	15.5	5.3	2.6	4
Picker/Marconi Ultra Z	PI.c	130	17.8			1
Shimadzu Intellect SCT-4800TE; SCT-6800TXL	SH.a	130	19.2	6.5	4.6	2
Siemens Somatom AR.C; AR.SP; AR.T	SI.e	130	25.0	7.9	4.6	3
Siemens Somatom AR.HP; AR.HP Spiral	SI.f	130	14.9	1.6	1.1	2
Siemens Somatom AR.Star; AR.Star 40 s		130	26.5	0.3	0.2	2
Siemens Somatom Emotion; Balance	SI.i	130	24.1	1.8	0.8	5
Siemens Somatom Hi Q	SI.h	133	15.9			1
Siemens Somatom Plus	SI.g	120	10.6	0.2	0.1	2
Siemens Somatom Plus 4	SI.d	120	14.3	0.1	0.1	2
		140	18.5	3.3	0.9	13
Siemens Somatom Plus 4 Volume Zoom	SI.j	120	20.2	1.3	0.9	2
		140	29.5			1
Technicare Quantum; Quantum 3001		120	13.7			1
Toshiba 900S; TCT-600HQ	TO.a	120	12.4	0.6	0.4	2
Toshiba Aquilion MS TSX-101A	TO.h	135	34.5			1
Toshiba TCT-500S		120	14.7			1
Toshiba Xpeed; Xpeed TSX-001A	TO.b	120	19.1			1
Toshiba Xpress HS-1	TO.e	130				0
Toshiba Xpress SX		120	24.5			1
Toshiba Xpress; Xpress/GX	TO.c	120	18.3	3.9	2.7	2
		130	20.5	6.9	4.9	2
		135	18.9			1
Toshiba Xvision/GX; EX	TO.d	120	19.3	1.5	1.1	2
Total						223

[1]$CTDI_{100}$ values were measured **in the head phantom only**. Peripheral values were measured at only one peripheral location (i.e., the "top" hole of the phantom) and are **not** means of results from four peripheral holes separated by 90° each. See Part 1 for a more detailed description of $CTDI_{100,p}$. Tabulated values are normalized to 100 mAs.

[2]Insofar as possible, CT models identified in the NEXT survey are grouped according to ImPACT categories (ImPACT 2005). Each category is presumed to correspond to an irradiation geometry and source-filtration configuration unique for the purpose of dose evaluation. Some CT models identified in the NEXT survey could not be readily assigned to an ImPACT category.

[3]Each code identifies a group of CT models presumed to share a common irradiation geometry and source-filtration configuration for which independent measurements of $CTDI_{free\ air}$, $CTDI_{100,c}$, and $CTDI_{100,p}$ (each variable normalized to the current-time product) are available (ImPACT 2005) as a function of kVp. The codes are provided in this table to facilitate comparisons of NEXT normalized CTDI results to those of the ImPACT survey.

PART 4: QUALITY ASSURANCE PRACTICE FOR THE MOST FREQUENTLY USED CT UNIT

Table 4.1. Provision of service and maintenance

Provider	Number of CT Units	Percentage of Total	Standard Error[1]
Manufacturer (comprehensive)	174	70%	5%
Third-party vendor (comprehensive)	24	10%	2%
As needed / no regular service	18	7%	2%
In-house (comprehensive)	14	6%	2%
Manufacturer (partial)	13	5%	1%
Unknown	3	1%	1%
Third-party vendor (partial)	2	0.8%	0.6%
Total	248	100%	

[1]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.2. Frequency of medical physicist testing

Frequency	Number of CT Units	Percentage of Total	Standard Error[1]
Annually	192	78%	6%
As needed / no periodic testing	19	8%	2%
Semi-annually	14	6%	2%
Quarterly	9	4%	1%
Unknown	7	3%	1%
Other period[2]	4	2%	1%
Monthly	1	0.4%	0.4%
Total	246	100%	

[1]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

[2]Three facilities report biennial testing; one facility reports bi-weekly testing.

Table 4.3. Noise test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	56	27%	4%
Quarterly	42	20%	3%
Daily	32	16%	3%
Annually	31	15%	3%
Weekly	26	13%	2%
Semi-annually	9	4%	1%
Unknown	4	2%	1%
Other period	3	1%	1%
Not done	2	1%	1%
As needed	1	0.5%	0.5%
Total	206	100%	

[1]Standard deviation of CT numbers associated with reference material. Test done by physicists (19%), service engineers (49%), x-ray technologists (32%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.4. Reproducibility test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	54	26%	4%
Quarterly	41	20%	3%
Annually	38	18%	3%
Daily	28	13%	3%
Weekly	24	11%	2%
Semi-annually	7	3%	1%
As needed	5	2%	1%
Unknown	5	2%	1%
Not done	4	2%	1%
Other period	3	1%	0.8%
Total	209	100%	

[1]Consistency of mean CT numbers associated with reference material. Test done by physicists (25%), service engineers (46%), x-ray technologists (28%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.5. Uniformity test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	57	28%	4%
Annually	44	21%	3%
Quarterly	39	19%	3%
Daily	23	11%	2%
Weekly	20	10%	2%
Semi-annually	7	3%	1%
Unknown	5	2%	1%
Other period	4	2%	1%
Not done	4	2%	1%
As needed	2	1%	1%
Total	205	100%	

[1]Variation of mean CT numbers across the scan field of view associated with reference material. Test done by physicists (25%), service engineers (49%), x-ray technologists (26%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.6. Contrast-scale test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	62	29%	4%
Annually	43	20%	3%
Quarterly	41	19%	3%
Weekly	21	10%	2%
Daily	17	8%	2%
Semi-annually	14	7%	2%
Unknown	5	2%	1%
Other period	4	2%	1%
As needed	4	2%	1%
Not done	2	1%	1%
Total	213	100%	

[1]Variations in the differences between mean CT numbers associated with various reference materials. Test done by physicists (25%), service engineers (53%), x-ray technologists (22%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.7. Resolution test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	60	28%	4%
Quarterly	51	24%	3%
Annually	47	22%	3%
Weekly	16	8%	2%
Semi-annually	12	6%	2%
Daily	10	5%	1%
Other period	5	2%	1%
Unknown	5	2%	1%
As needed	4	2%	1%
Not done	2	1%	1%
Total	212	100%	

[1]Spatial resolution at high-contrast level. Test done by physicists (27%), service engineers (58%), x-ray technologists (15%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.8. Sensitivity test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	60	28%	4%
Annually	53	25%	3%
Quarterly	47	22%	3%
Weekly	15	7%	2%
Daily	10	5%	1%
Semi-annually	10	5%	1%
Unknown	7	3%	1%
Other period	6	3%	1%
As needed	4	2%	1%
Not done	2	1%	1%
Total	214	100%	

[1]Smallest detectable low-contrast object. Test done by physicists (29%), service engineers (57%), x-ray technologists (14%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.9. Artifacts test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	47	23%	3%
Quarterly	39	19%	3%
Daily	36	17%	3%
Annually	36	17%	3%
Weekly	16	8%	2%
As needed	14	7%	2%
Semi-annually	7	3%	1%
Unknown	6	3%	1%
Not done	4	2%	1%
Other period	3	1%	1%
Total	208	100%	

[1]Presence or absence of streak artifacts. Test done by physicists (21%), service engineers (48%), x-ray technologists (30%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.10. Alignment test[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Monthly	60	28%	4%
Quarterly	56	26%	3%
Annually	45	21%	3%
Weekly	15	7%	2%
Semi-annually	11	5%	2%
As needed	9	4%	1%
Daily	6	3%	1%
Unknown	6	3%	1%
Other period	4	2%	1%
Not done	3	1%	1%
Total	215	100%	

[1]Accuracy of scan-alignment lights. Test done by physicists (25%), service engineers (65%), x-ray technologists (10%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.11. CTDI measurement[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Annually	125	57%	5%
Monthly	25	11%	2%
Quarterly	20	9%	2%
Unknown	12	5%	2%
Semi-annually	11	5%	2%
Not done	8	4%	1%
As needed	6	3%	1%
Daily	5	2%	1%
Other period	5	2%	1%
Weekly	3	1%	1%
Total	220	100%	

[1]Measurement of the computed tomography dose index in head or body dosimetry phantom. Test done by physicists (74%), service engineers (23%), x-ray technologists (4%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

Table 4.12. Exposure measurement[1] frequency

Frequency	Number of CT Units	Percentage of Total	Standard Error[2]
Annually	88	46%	5%
Monthly	28	15%	3%
Quarterly	22	11%	2%
Daily	12	6%	2%
Not done	11	6%	2%
Unknown	11	6%	2%
Semi-annually	9	5%	2%
As needed	5	3%	1%
Weekly	3	2%	1%
Other period	3	2%	1%
Total	192	100%	

[1]Measurement of the exposure free-in-air on the axis of rotation. Test done by physicists (60%), service engineers (33%), x-ray technologists (7%).

[2]The standard error of each category percentage of the total is estimated from Poisson statistics as the category percentage of the total divided by the square root of the number of CT units of that category of the sample.

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