



ANNUAL X-RAY INSPECTION REPORT 2014 RADIOLOGICAL HEALTH

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EXECUTIVE SUMMARY

A total of 83 x-ray facilities were inspected in 2014. Out of the 83 facilities 46 (55%) were in full compliance at the time of the inspection. Thirty-one (84%) of those facilities not in compliance came into compliance after the inspection. Overall, 77 out of 83 facilities (93%) were in compliance after the inspection.

The National Council on Radiation Protection and Measurements (NCRP) recommends that medical facilities (which includes chiropractic facilities) be inspected every two years. Dental and veterinary facilities are recommended to be inspected every 4 years. Podiatric facilities are inspected every 4 years since the x-ray machines are similar to dental x-ray machines.

The main area of concern is the lack of satisfactory lead aprons. Lead aprons are available in the facilities but some are cracked or torn. The facilities are encouraged to obtain new lead aprons and check them annually. Other non-compliance items are listed on pages 5 to 9.

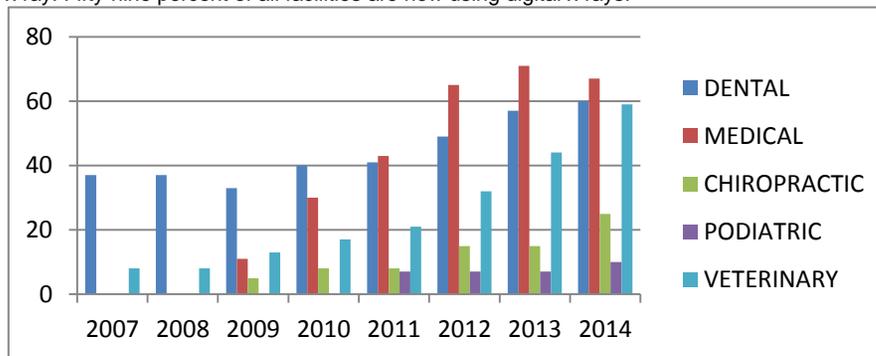
Annual dose rates to all operators of x-ray equipment of the facilities inspected were less than the maximum allowed limit of 5000 millirem, typically less than 1% of this limit. Annual dose rates to the public were less than the maximum allowed limits of 100 millirem.

Radiation doses to patients were less than the Vermont State maximum dose for all facilities. Please refer to the charts for each type of facility "Dose to Patients Per Exposure". Vermont State recommended doses and NCRP DRL's are shown for comparison and as goals for all facilities.

The dose to the patient and the dose to the operator is less for all x-ray facilities that use faster speed film. This can be observed most clearly for the dental facilities. As the speed of the film increases from "D" to "F" the average dose per exposure decreases from 0.38 to 0.31 millirem. It should also be noted that the use of digital x-ray again decreases the average dose per exposure from 0.31 millirem for "F" speed film to 0.17 millirem for direct digital x-rays. Doses from computed radiography (CR) are similar to doses from F speed film (0.34 and 0.31 millirem, respectively).

It is expected that as more digital x-rays are used we will see decreases in the total facility noncompliances because darkrooms, safelights, film, and processing are no longer needed. Sixty percent of dental, 59% of veterinary, 67% of medical, 10% of podiatric and 25% of chiropractic facilities are using digital x-ray. Fifty-nine percent of all facilities are now using digital x-rays.

**PERCENTAGE OF DIGITAL FACILITIES
BY PROFESSION AND YEAR**



OVERVIEW

To be conservative, exposures to the operator and public are measured at the configuration of highest exposure possible. Exposure to the public is performed by aiming the x-ray tube out of the exam room door from approximately the patient position for an x-ray exam and measuring the exposure at the doorway where the public passes by in the hall. Operator exposures are measured at the position the operator stands when making the exposure as indicated by the facility.

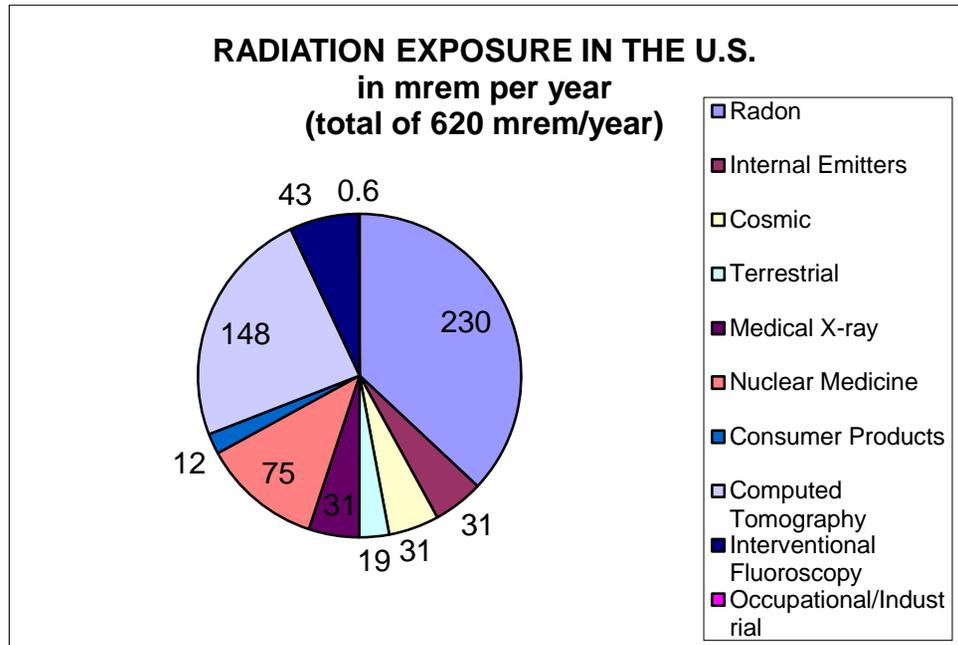
Operator and public exposures are measured in milliroentgen per hour using a Victoreen 471 ion chamber. The exposure per hour is converted to annual dose by converting hours to year and milliroentgen to rem using the number of x-rays the facility takes within a given period of time. 1 milliroentgen is equal 0.5 millirem (American National Standard Institute 6.1.1-1991) for whole body exposure from scattered radiation for the public and operators.

Patient exposures are measured in milliroentgen using an Unfors Xi. Patient exposures are converted from milliroentgen to millirem using the following factors based on the organ of greatest risk. Multiplication of the factor by the number of milliroentgen per exam results in the dose in millirem.

EXAM TYPE	FACTOR	ORGAN
Dental	0.0015	brain
PA Chest	0.1044	lung
AP Cervical Spine	0.0435	thyroid
AP Thoracic Spine	0.1044	lung
AP Lumbar Spine	0.1044	stomach/colon
AP Abdomen	0.1044	stomach/colon
AP Retrograde	0.1044	stomach/colon
Lateral Skull	0.0218	brain
Hand	0.0087	skin
Wrist	0.0087	skin
Arm	0.1044	bone marrow
Shoulder	0.1044	bone marrow
Leg	0.1044	bone marrow
Knee	0.1044	bone marrow
Ankle	0.0087	skin
DP Foot	0.0087	skin
Lateral Foot	0.0087	skin

Adapted from National Council on Radiation Protection and Measurements Report No. 116 tissue weighting factors and conversion factor from roentgen to rad of 0.87 rad/roentgen.

The average radiation dose from natural and man-made sources is 620 millirem per year. On average, about 300 millirem is from medical uses of radiation.



Adapted from NCRP Report No. 160, 2009, Ionizing Radiation Exposure of the Population of the United States.

INSPECTION ITEMS

The following boxed sections indicate the individual items that are specifically looked at during an inspection for the following general groups: film/screen, processing, darkroom/safelight, personnel monitoring, patient shielding, collimation, timer, kVp and filtration, patient entrance skin exposure criteria, public exposure criteria, operator conditions, and physical condition (x-ray unit, shielding, etc.)

Some inspection items may pertain only to specific types of facilities. For example, repeat rate analyses pertain only to chiropractic facilities, whereas panoramic units pertain only to dental facilities. There are also inspection items that cover all facilities (e.g., registration of all x-ray units).

New facilities are not cited for non-compliant items. However, they are given a period of approximately one month to correct any non-compliant items found in the initial inspection.

Film/screen	Dental film is less than E speed X-ray film speed is less than 400 Film is not protected from scatter radiation Film is not stored properly Film is exposed to chemicals Out of date film is used Film and screen types not matched No screen installation date is on outside of cassette Screen and cassettes are not of the same type or age Screen cleaning interval is inadequate Screen cleaning solution and lint free wipes are not used per manufacturer instructions Cassette check is inadequate Cassettes are not permanently identified for their type of use Film viewbox is not available Film viewbox is not cleaned periodically Viewbox bulbs are not of the same intensity and color Luminance of viewboxes is not similar Viewbox bulbs are not replaced annually Technique factors are not recorded in the patient log book Technique charts are not available or up to date Left/right markers are not used on clinical radiographs Clinical radiographs are not properly identified
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Processing	<p>Thermometer is not available for manual processing Timer is not available for manual processing Floating cover is not present for manual processing Sight devevelopment is used No evidence of daily log is kept Developing technique recommended by the manufacturer is not used Developer and fixer temperature are not maintained in limits Processor cleaning interval is inadequate Processor is not operating properly Processor cleaning date is not recorded Clean-up film for processing all x-ray films (except intra-oral) are not run</p>
Darkroom/Safelight	<p>Safelight bulb is greater than 15 W Safelight is too close to the work area Light leaks are detected in the safelight housing Light leaks are detected in the safelight lens Safelight is improperly filtered Darkroom is not light tight Darkroom is not free of dust and dirt Daylight processor arm cuffs are not acceptable Daylight processor is not light tight Darkroom temperature/humidity are not acceptable There are other light sources present in the dark room</p>
Personnel Monitoring	<p>Personnel monitoring devices are required Control dosimeters are not properly used or stored Employee dosimeters are not properly used Employee dosimeters are not properly stored No evidence of employee review of records Personnel monitoring records are incomplete No radiation safety officer is designated for large practices Evidence of personnel holding film during exposure</p>
Personnel/Patient Shielding	<p>Satisfactory lead aprons are unavailable Satisfactory thyroid shields are unavailable Satisfactory gonadal shields are unavailable Lead aprons are improperly stored Lead aprons are not checked annually for tears and holes (radiographically or visually) Individuals holding patients are not protected Mobile equipment exposure switch cord is less than 6 feet long Non-essential individuals are in the x-ray room during exposure</p>

Collimation
 X-ray beam is not restricted to the appropriate area
 X-ray beam is not restricted to the appropriate size
 Collimator light is not aligned with the x-ray field
 Collimation is not used in taking radiographs
 Collimator light is not bright enough under normal room lighting
 Collimator light problems (e.g. mirror broken, mirror obstructed)
 Inadequate collimation is used for clinical radiographs

Timer
 Timer does not terminate exposure
 Timer activates at zero
 Timer is inaccurate
 Timer repeatability is unacceptable
 No deadman switch is available

kVp and Filtration
 kVp is greater than 10% of set value
 kVp is non-repeatable
 Dental intra-oral x-ray unit is operating at less than 50 kVp or greater than 100 kVp.
 Filtration in beam is less than required

Patient entrance skin exposure criteria (ESEC)
 ESEC in milliroentgen for non-specialty radiographic examinations shall not be exceeded when technical factors for an average adult patient are utilized:

Examination	ESEC mR maximum	ESEC mR recommended	Body part thickness (cm)
PA Chest	30	15	23
AP Cervical Spine	250	175	13
AP Thoracic Spine	900	600	23
AP Lumbar Spine	1000	675	23
AP Abdomen	750	500	23
AP Retrograde Pyelogram	900	600	23
Lateral Skull	300	200	15
Dental (bitewing or periapical)	700	350	not applicable

OR

Examination	Dose mrem maximum	Dose mrem recommended	Body part thickness (cm)
PA Chest	3.13	1.57	23
AP Cervical Spine	10.88	7.61	13
AP Thoracic Spine	93.96	62.64	23
AP Lumbar Spine	104.4	70.47	23
AP Abdomen	78.3	52.2	23
AP Retrograde Pyelogram	93.96	62.64	23
Lateral Skull	6.54	4.36	15
Dental (bitewing or periapical)	1.05	0.53	not applicable

	<p>Technique factors are not adjusted for minimum patient exposure.</p> <p>ESE for all x-ray units in facility are not within 20 percent of one another.</p> <p>Typical exposure value for the x-ray unit is not posted</p> <p>Exposure reproducibility is greater than 5%</p>
Public exposure	<p>Public exposure exceeded - 100 millirem per year</p> <p>Public is not protected from scatter radiation</p>
Operator conditions	<p>Operator exposure exceeded - 5000 millirem per year</p> <p>Operator cannot observe patient during exposure</p> <p>Operator cannot monitor kVp, mA, time, mAs during exposure</p> <p>Operator is not protected during exposure</p> <p>Satisfactory lead gloves are not available</p> <p>Mobile or stationary exposure switch cord is less than 6 feet long</p> <p>Exposure switch not located to prevent x-ray activation when operator is outside of the control booth</p> <p>Untrained personnel are operating the x-ray machines</p> <p>Individuals less than 18 years old are holding animals and/or film-cassette assembly</p> <p>Veterinary operator holds x-ray tube during exposure</p> <p>Dental operator holds film in patient's mouth</p>
Physical condition (x-ray unit, shielding, etc.)	<p>Console does not indicate tubes for multiple setup</p> <p>Panoramic or 3D unit does not reset before restarting</p> <p>Motion of panoramic or 3D unit is not smooth or is impeded</p> <p>X-ray tube head locks into position for panoramic, cephalometric and or 3D unit</p> <p>Table locks, tube crane locks, bucky-cassette locks are not functioning</p> <p>Filters for soft tissue imaging for cephalometric imaging are not available</p> <p>Focal spot is not indicated on the x-ray tube</p> <p>Source to image distance is less than 7 7/8 inches for intra-oral x-ray tubes</p> <p>Source to image distance is less than 40 inches for medical and stationary veterinary x-ray machines</p> <p>Unit is inaccurate/not calibrated in terms of examination distance (source to image and source to skin distances)</p> <p>Tube head is unstable (drifts or bounces)</p> <p>Overhead crane does not move easily</p> <p>Exposure switch is not labeled</p> <p>Unit does not have visual indication of kVp, mA, time, or mAs</p> <p>Unit does not have audible/visual indication of exposure</p> <p>Angulation indicator on x-ray unit is not functioning</p> <p>Typical exposure for x-ray unit is not posted</p> <p>Structural shielding is inadequate</p> <p>Door interlock system is not functioning</p> <p>Condition of high voltage and other cables is inadequate</p>

X-ray head leaks oil
Wires are exposed on tube head
X-ray exposure button is missing or broken
Wires are exposed on exposure switch
Preventive maintenance records for x-ray machines and processor are not kept
No FDA or manufacturer label on the x-ray machine
Mechanical restraints/anesthesia not used for animals
X-ray warning signs not used for portable veterinary use
Bare sheet lead on walls/doors is not covered

X-ray unit is not registered

Vermont State licenses are not displayed

No documentation of LMP (chiropractic)

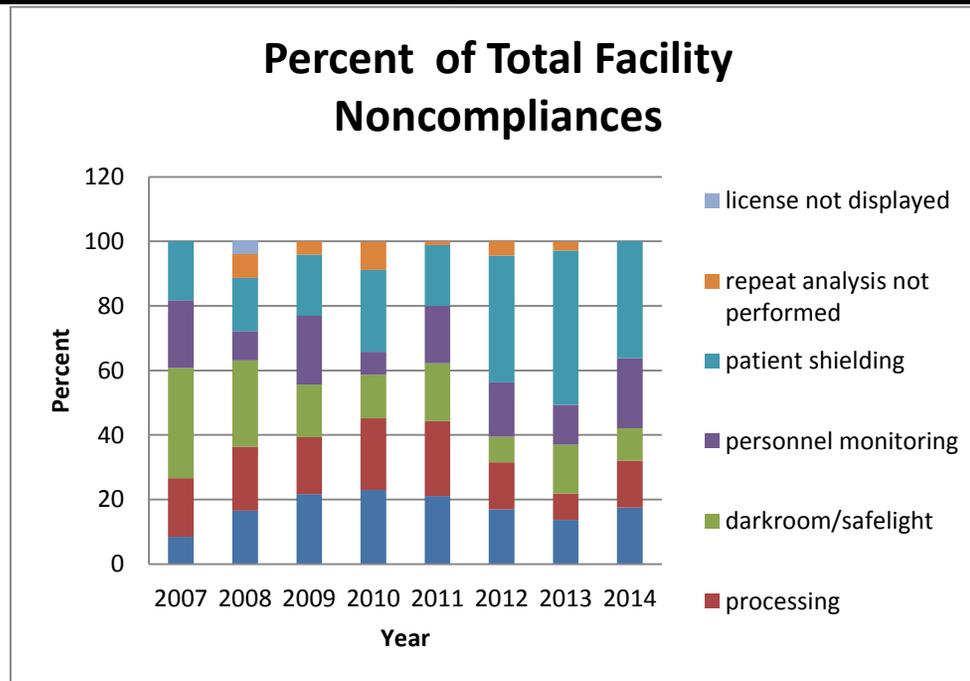
Repeat rate analysis is not performed (chiropractic)

SUMMARY OF ALL INSPECTIONS

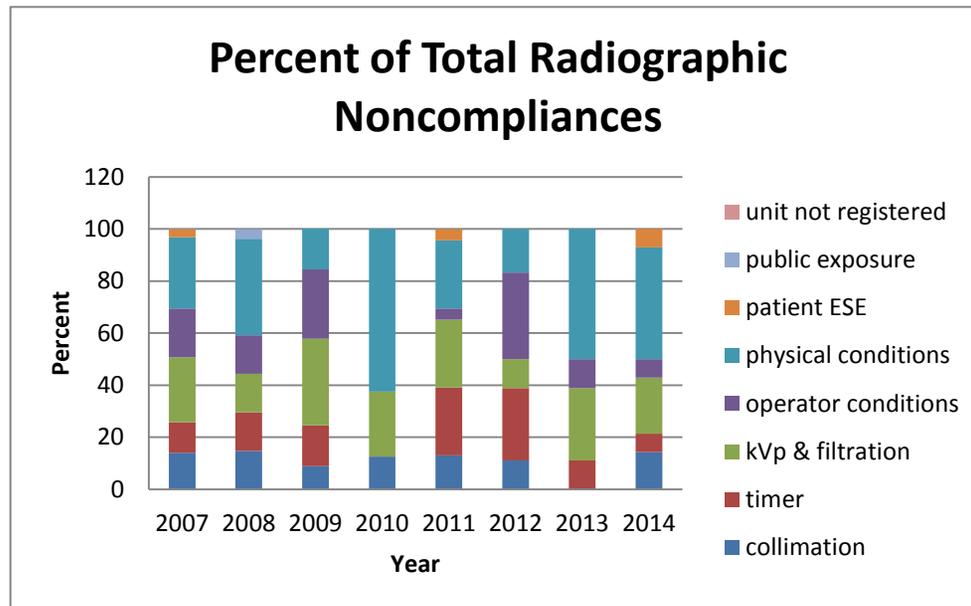
Total Number of Inspections Performed 83
Total Number of Facilities not in Compliance 37

TOTAL NONCOMPLIANCES	83
Average noncompliances per noncompliant facility	2.24
Range of number of noncompliances/facility	0 - 8

TOTAL FACILITY NONCOMPLIANCES		PERCENTAGE OF TOTAL FACILITY NONCOMPLIANCES
1 Film/Screen	12	17.4
2 Processing	10	14.5
3 Darkroom/Safelight	7	10.1
4 Personnel Monitoring	15	21.8
5 Patient Shielding	25	36.2
6 License Not Displayed	0	0.0
7 Repeat Analysis Not Performed	0	0.0



TOTAL RADIOGRAPHIC NONCOMPLIANCES	14	PERCENTAGE OF TOTAL RADIOGRAPHIC NONCOMPLIANCES
1 Collimation	2	14.3
2 Timer	1	7.1
3 kVp & Filtration	3	21.4
4 Patient entrance skin exposure	1	7.1
5 Public exposure	0	0.0
6 Operator conditions	1	7.1
7 Physical condition (x-ray unit, shielding)	6	43.0
8 Unit not registered	0	0.0



Annual Dose to Occupational Worker			
Type of Facility	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Dental	2.8	0 - 92	5000
Medical	0.18	0.01 - 0.41	5000
Chiropractic	0.06	0.0003 - 0.22	5000
Podiatric	na	na	5000
Veterinary	0.12	0.002 - 0.58	5000

Annual Dose to Public			
Type of Facility	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Dental	8.7	0.005 - 79	100
Medical	2	0.03 - 3.8	100
Chiropractic	0.26	0.014 - 1.2	100
Podiatric	na	na	100
Veterinary	0.11	0.0002 - 0.45	100

DENTAL INSPECTIONS

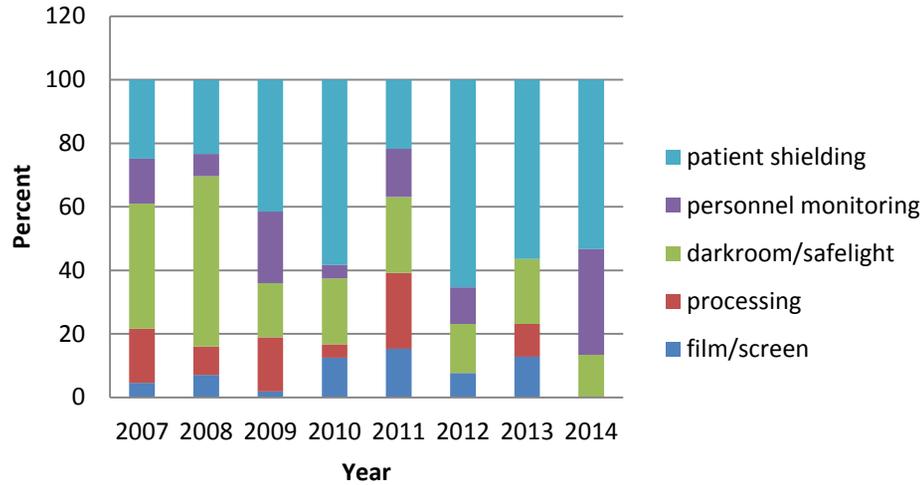
Total Number of Inspections Performed 33
Total Number of Facilities not in Compliance 12
Non-compliance Items

TOTAL NONCOMPLIANCES	20
Average noncompliances per noncompliant facility	1.67
Range of number of noncompliances	0-5

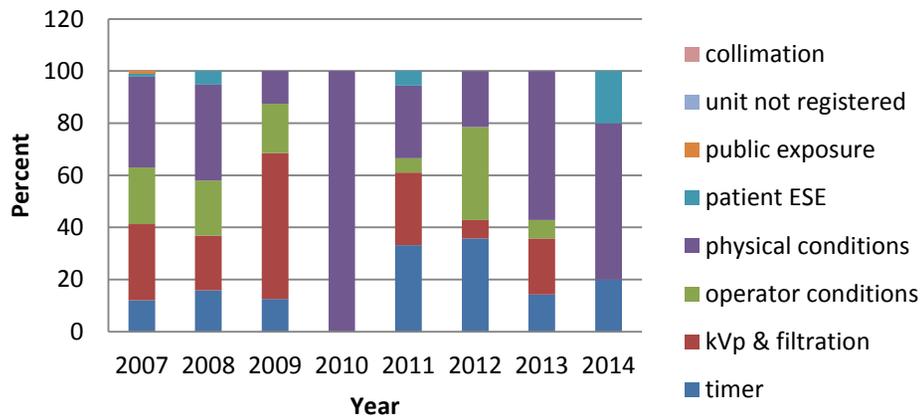
TOTAL FACILITY NONCOMPLIANCES	15	PERCENTAGE OF TOTAL FACILITY NONCOMPLIANCES
Film/Screen	0	0.0
Processing	0	0.0
Darkroom/Safelight	2	13.3
Personnel Monitoring	5	33.3
Patient Shielding	8	53.4

TOTAL RADIOGRAPHIC NONCOMPLIANCES	5	PERCENTAGE OF TOTAL RADIOGRAPHIC NONCOMPLIANCES
Collimation	0	0.0
Timer	1	20.0
kVp & Filtration	0	0.0
Patient entrance skin exposure	1	20.0
Public exposure	0	0.0
Operator conditions	0	0.0
Physical condition (x-ray unit, shielding)	3	60.0
Unit not registered	0	0.0

Percent of Total Dental Facility Noncompliances



Percent of Total Dental Radiographic Noncompliances



Dose to Patients Per Exposure

Exam Type	Average millirem per exposure	Range millirem per exposure	Vermont State maximum dose millirem (1)	Vermont State recommended dose millirem (2)	NCRP DRL* millirem (3)
Intra-oral D speed film	0.38	0.33 - 0.50	1.05	0.53	0.28
Intra-oral E speed film	na(4)	na	1.05	0.53	0.28
Intra-oral F speed film	0.31	0.17 - 0.56	1.05	0.53	0.28
Intra-oral Portable digital	0.16	0.06 - 0.25	1.05	0.53	0.28
Intra-oral CR digital	0.34	0.11 - 0.78	1.05	0.53	0.28
Intra-oral DR digital	0.17	0.08 - 0.37	1.05	0.53	0.28
Panoramic film	0.99	0.42 - 3.0	NONE	NONE	NONE
Panoramic digital	0.89	0.04 - 1.6	NONE	NONE	NONE
Cephalometric	0.02	0.012 - 0.028	NONE	NONE	0.024
Cephalometric digital	0.021	na	NONE	NONE	0.024
Cephalometric scanner	0.014	na	NONE	NONE	0.024
3 Dimensional	0.25	0.23 - 0.3	NONE	NONE	NONE

(1) Calculated from the Radiological Health Part 5. Chapter 3. regulations maximum entrance skin exposure criteria of 700 milliroentgens per radiograph (700 x 0.0015) for the brain as the organ of greatest risk.

(2) Calculated from the Radiological Health Part 5. Chapter 3. regulations recommended entrance skin exposure criteria of 350 milliroentgens per radiograph (350 x 0.0015) for the brain as the organ of greatest risk.

(3) DRL = Diagnostic Reference Level (derived from NEXT data) adjusted to millirem, NCRP Report 145, 2003

(4) na = not applicable

Annual Dose to Occupational Worker

Exam Type	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Intra-oral D speed film	3.5	2.4 - 5.4	5000
Intra-oral E speed film	na	na	5000
Intra-oral F speed film	2.2	0.03 - 11	5000
Intra-oral Portable digital	0.89	0.20 - 1.6	5000
Intra-oral CR digital	7.4	0.004 - 92	5000
Intra-oral DR digital	1.7	0.002 - 21	5000
Panoramic film	1.7	0.02 - 8.9	5000
Panoramic digital	3.5	0.03 - 23	5000
Cephalometric	0.0002	0 - 0.0004	5000
Cephalometric digital	0.66	na	5000
Cephalometric scanner	0.11	na	5000
3 Dimensional	1.7	0.14 - 5.9	5000

Annual Dose to Public

Exam Type	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Intra-oral D speed film	8.3	5.4 - 13	100
Intra-oral E speed film	na	na	100
Intra-oral F speed film	13	2.0 - 48	100
Intra-oral Portable CR digital	2	0.8 - 3.3	100
Intra-oral CR digital	15	0.04 - 66	100
Intra-oral DR digital	7	0.2 - 77	100
Panoramic film	6.3	0.09 - 24	100
Panoramic digital	8.8	0.02 - 79	100
Cephalometric	0.002	0.0005 - 0.0036	100
Cephalometric digital	13	na	100
Cephalometric scanner	0.12	na	100
3 Dimensional	2.4	0.53 - 4.2	100

MEDICAL INSPECTIONS

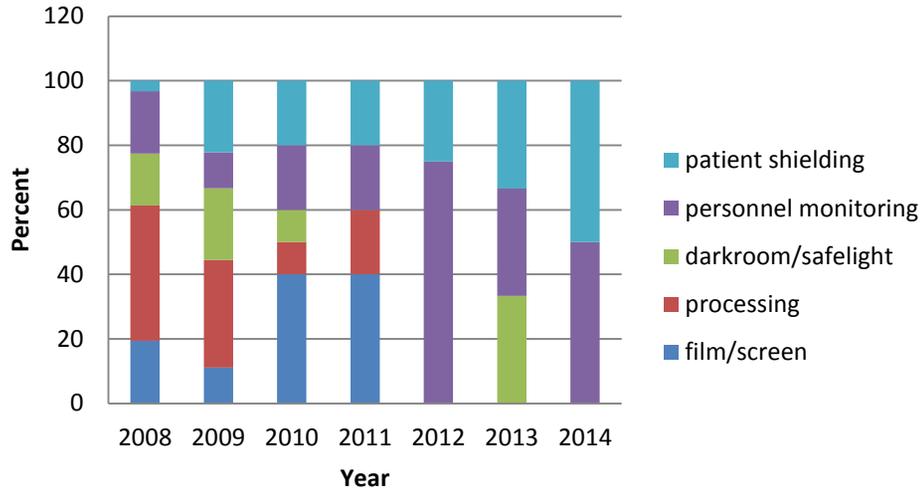
Total Number of Inspections Performed 10
Total Number of Facilities not in Compliance 4
Non-compliance Items

TOTAL NONCOMPLIANCES	6
Average noncompliances per noncompliant facility	1.5
Range of number of noncompliances	0-3

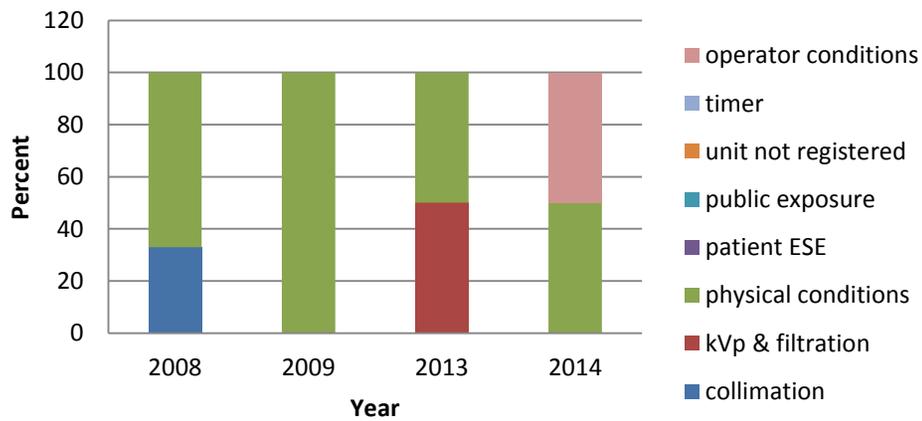
TOTAL FACILITY NONCOMPLIANCES	4	PERCENTAGE OF TOTAL FACILITY NONCOMPLIANCES
Film/Screen	0	0
Processing	0	0
Darkroom/Safelight	0	0.0
Personnel Monitoring	2	50.0
Patient Shielding	2	50.0

TOTAL RADIOGRAPHIC NONCOMPLIANCES	2	PERCENTAGE OF TOTAL RADIOGRAPHIC NONCOMPLIANCES
Collimation	0	0
Timer	0	0
kVp & Filtration	0	50
Patient entrance skin exposure	0	0
Public exposure	0	0
Operator conditions	1	0
Physical condition (x-ray unit, shielding)	1	50
Unit not registered	0	0

Percent of Total Medical Facility Noncompliances



Percent of Total Medical Radiographic Noncompliances



Dose to Patients Per Exposure

Type of Exam	Average millirem per exposure	Range millirem per exposure	Vermont State maximum dose millirem (1)	Vermont State recommended dose millirem (2)	NCRP DRL millirem (3)
PA Chest	1.6	0.43 - 2.7	3.13	1.57	1.8
AP Cervical Spine	1.6	na(4)	10.88	7.61	NONE
AP Thoracic Spine	15	na	93.96	62.64	NONE
AP Lumbar Spine	29	13 - 43	104.4	70.47	50
AP Abdomen	na	na	78.3	52.2	41
AP Retrograde	na	na	93.96	62.64	NONE
Lateral Skull	na	na	6.54	4.36	NONE
Hand	0.11	0.07 - 0.13	NONE	NONE	NONE
Wrist	0.05	0.04 - 0.05	NONE	NONE	NONE
Arm	na	na	NONE	NONE	NONE
Shoulder	3.3	2.7 - 3.9	NONE	NONE	NONE
Leg	na	na	NONE	NONE	NONE
Knee	4.1	2.0 - 6.5	NONE	NONE	NONE
Ankle	0.15	0.08 - 0.21	NONE	NONE	NONE
DP Foot	0.15	na	NONE	NONE	NONE
Lateral Foot	na	na	NONE	NONE	NONE
Fluoroscopy			NONE	NONE	NONE
Arm	na	na	NONE	NONE	NONE
Knee	na	na	NONE	NONE	NONE
Ankle	na	na	NONE	NONE	NONE
AP Cervical	97	na	NONE	NONE	NONE
AP Lumbar	160	38 - 350	NONE	NONE	NONE
Fluoroscopy Spot Film	na	na	NONE	NONE	NONE
Sinus	na	na	NONE	NONE	NONE

(1) Calculated from the Radiological Health Part 5, Chapter 3, regulations maximum entrance skin exposure criteria per radiograph example: For a PA chest exam the lung is the organ of greatest risk so the maximum dose would be (30 x 0.0015) mrem.

(2) Calculated from the Radiological Health Part 5, Chapter 3, regulations recommended entrance skin exposure criteria per radiograph example: For a PA chest exam the lung is the organ of greatest risk so the recommended dose would be (15 x 0.0015) mrem.

(3) DRL = Diagnostic Reference Level (derived from NEXT data) adjusted to millirem, NCRP Report 172, 2012

(4) na = not applicable

Annual Dose to Occupational Worker

Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
0.18	0.01 - 0.41	5000

Annual Dose to Public

Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
2	0.03 - 3.8	100

CHIROPRACTIC INSPECTIONS

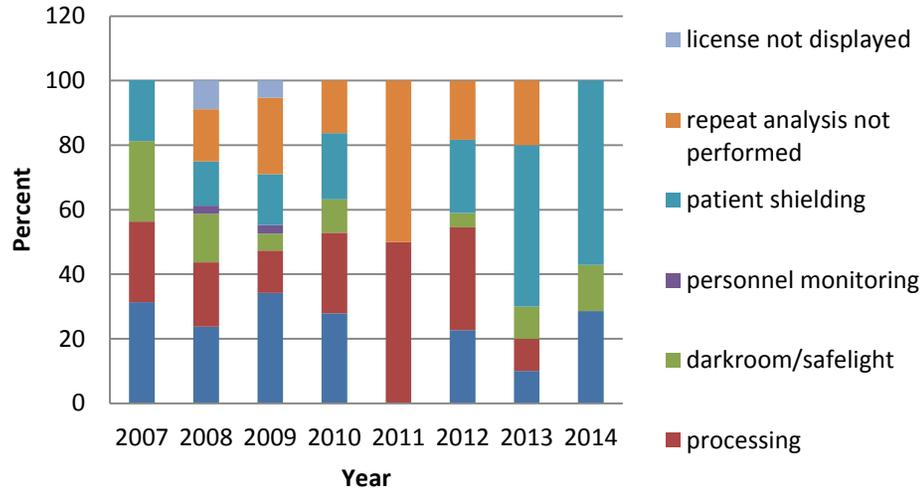
Total Number of Inspections Performed 11
Total Number of Facilities not in Compliance 4
Non-compliance Items

TOTAL NONCOMPLIANCES	8
Average noncompliances per noncompliant facility	2
Range of number of noncompliances	0-4

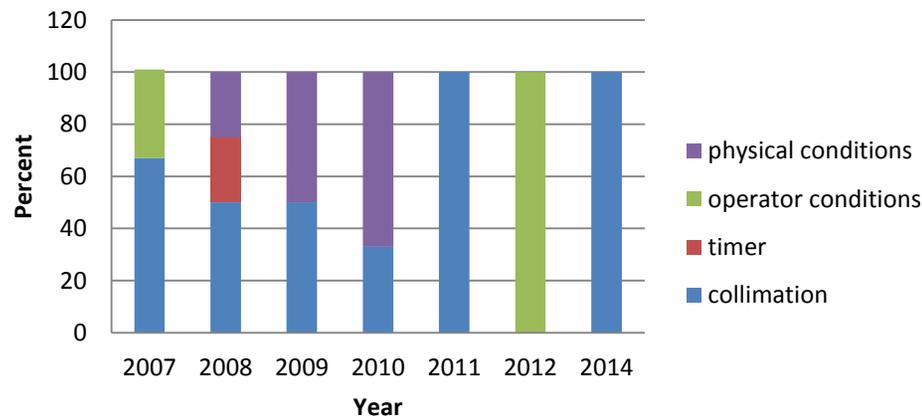
TOTAL FACILITY NONCOMPLIANCES	7	PERCENTAGE OF TOTAL FACILITY NONCOMPLIANCES
Film/Screen	2	28.6
Processing	0	0.0
Darkroom/Safelight	1	14.3
Personnel Monitoring	0	0.0
Patient Shielding	4	57.1
License Displayed	0	0.0
Repeat Analysis	0	0.0

TOTAL RADIOGRAPHIC NONCOMPLIANCES	1	PERCENTAGE OF TOTAL RADIOGRAPHIC NONCOMPLIANCES
Collimation	1	100.0
Timer	0	0.0
kVp & Filtration	0	0.0
Patient entrance skin exposure	0	0.0
Public exposure	0	0.0
Operator conditions	1	0.0
Physical condition (x-ray unit, shielding)	0	0.0
Unit not registered	0	0.0

Percent of Total Chiropractic Facility Noncompliances



Percent of Total Chiropractic Radiographic Noncompliances



Dose to Patients Per Exposure

Type of Exam	Average millirem per exposure	Range millirem per exposure	Vermont State maximum dose millirem (1)	Vermont State recommended dose millirem (2)	NCRP DRL millirem (3)
PA Chest	na(4)	na	3.13	1.57	1.8
AP Cervical Spine	2.3	0.57 - 5.5	10.88	7.61	NONE
AP Thoracic Spine	21	12 - 34	93.96	62.64	NONE
AP Lumbar Spine	33	8.2 - 57	104.4	70.47	50
AP Abdomen	na	na	78.3	52.2	41
AP Retrograde	na	na	93.96	62.64	NONE
Lateral Skull	na	na	6.54	4.36	NONE

Type of Exam	Average millirem per exposure	Range millirem per exposure	Vermont State maximum dose millirem	Vermont State recommended dose millirem	NCRP *DRL millirem
Hand	na	na	NONE	NONE	NONE
Wrist	na	na	NONE	NONE	NONE
Arm	na	na	NONE	NONE	NONE
Shoulder	na	na	NONE	NONE	NONE
Leg	na	na	NONE	NONE	NONE
Knee	na	na	NONE	NONE	NONE
Ankle	na	na	NONE	NONE	NONE
DP Foot	na	na	NONE	NONE	NONE
Lateral Foot	na	na	NONE	NONE	NONE

(1) Calculated from the Radiological Health Part 5. Chapter 3. regulations maximum entrance skin exposure criteria per radiograph example: For a PA chest exam the lung is the organ of greatest risk so the maximum dose would be (30 x 0.0015) mrem.

(2) Calculated from the Radiological Health Part 5. Chapter 3. regulations recommended entrance skin exposure criteria per radiograph example: For a PA chest exam the lung is the organ of greatest risk so the recommended dose would be (15 x 0.0015) mrem.

(3) DRL = Diagnostic Reference Level (derived from NEXT data) adjusted to millirem, NCRP Report 172, 2012

(4) na = not applicable

Annual Dose to Occupational Worker

Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
0.057	0.0003 - 0.22	5000

Annual Dose to Public

Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
0.26	0.014 - 1.22	100

PODIATRIC INSPECTIONS

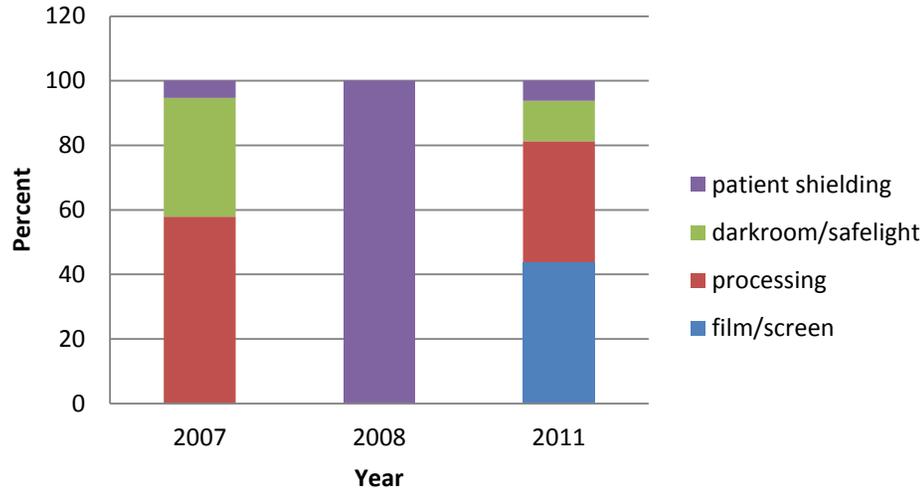
Total Number of Inspections Performed 0
Total Number of Facilities not in Compliance 0
Non-compliance Items

TOTAL NONCOMPLIANCES	0
Average number noncompliances per facility	0
Range of number of noncompliances	0

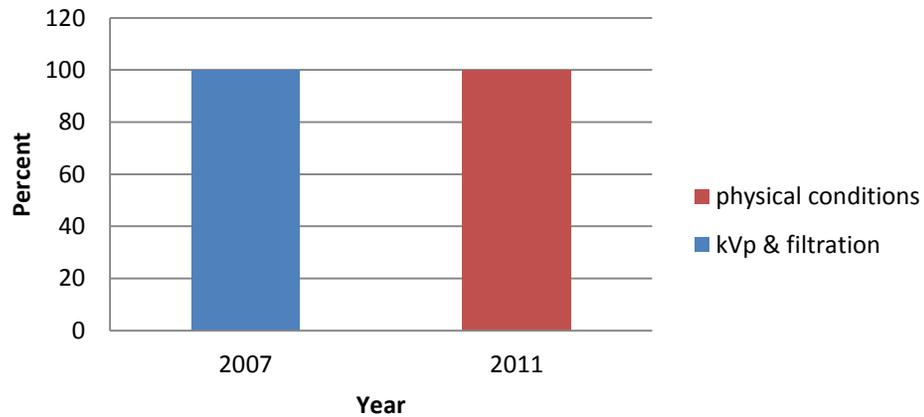
TOTAL FACILITY NONCOMPLIANCES	0	PERCENTAGE OF TOTAL FACILITY NONCOMPLIANCES
Film/Screen	0	0.0
Processing	0	0.0
Darkroom/Safelight	0	0.0
Personnel Monitoring	0	0.0
Patient Shielding	0	0.0

TOTAL RADIOGRAPHIC NONCOMPLIANCES	0	PERCENTAGE OF TOTAL RADIOGRAPHIC NONCOMPLIANCES
Collimation	0	0.0
Timer	0	0.0
kVp & Filtration	0	0.0
Patient entrance skin exposure	0	0.0
Public exposure	0	0.0
Operator conditions	0	0.0
Physical condition (x-ray unit, shielding)	0	0.0
Unit not registered	0	0.0

Percent of Total Podiatric Facility Noncompliances



Percent of Total Podiatric Radiographic Noncompliances



Dose to Patients Per Exposure

Type of Exam	Average millirem per exposure	Range millirem per exposure	Vermont State maximum dose millirem	Vermont State recommended dose millirem	NCRP *DRL millirem
DP Foot	na	na	NONE	NONE	NONE
Lateral Foot	na	na	NONE	NONE	NONE

Annual Dose to Occupational Worker

Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
na	na	5000

Annual Dose to Public

Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
na	na	100

VETERINARIAN INSPECTIONS

Total Number of Inspections Performed 29

Total Number of Facilities not in Compliance 17

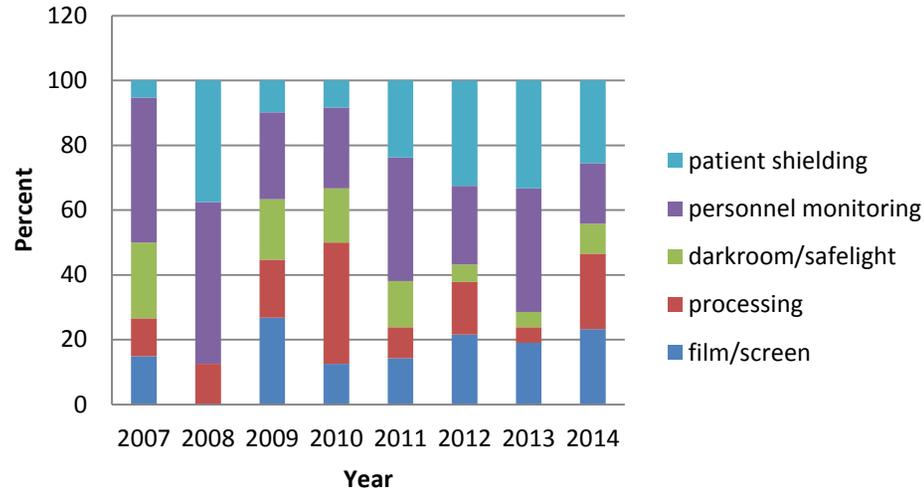
Non-compliance Items

TOTAL NONCOMPLIANCES	49
Average number noncompliances per facility	2.90
Range of number of noncompliances	0 - 8

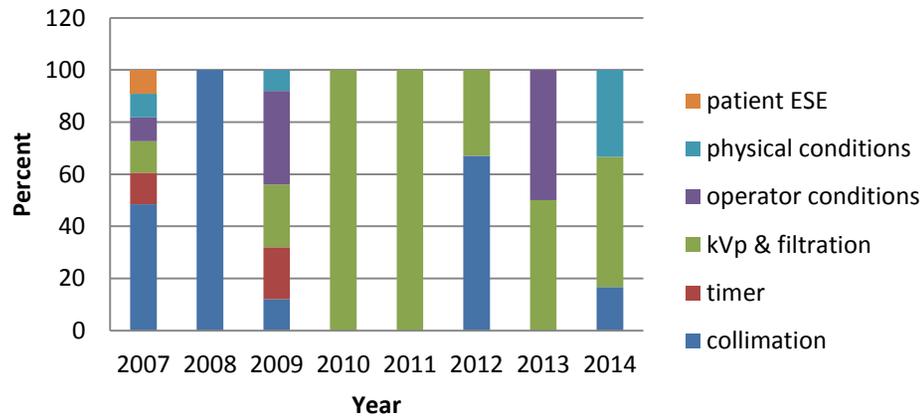
TOTAL FACILITY NONCOMPLIANCES	43	PERCENTAGE OF TOTAL FACILITY NONCOMPLIANCES
Film/Screen	10	23.3
Processing	10	23.3
Darkroom/Safelight	4	9.3
Personnel Monitoring	8	18.6
Patient Shielding	11	25.5

TOTAL RADIOGRAPHIC NONCOMPLIANCES	6	PERCENTAGE OF TOTAL RADIOGRAPHIC NONCOMPLIANCES
Collimation	1	16.7
Timer	0	0.0
kVp & Filtration	3	50.0
Patient entrance skin exposure	0	0.0
Public exposure	0	0.0
Operator conditions	0	0.0
Physical condition (x-ray unit, shielding)	2	33.3
Unit not registered	0	0.0

Percent of Total Veterinary Facility Noncompliances



Percent of Total Veterinary Radiographic Noncompliances



Exposure to Patient Per Exposure

Type of Exam	Average milliroentgen per exposure	Range milliroentgen per exposure
Dog chest	35	4.6 - 129
Dog abdomen	49	3.7 - 160
Dog extremity	8.8	1.1 - 27
Dog dental	122	30 - 294
Cat o-gram	20	1.2 - 67
Cat chest/abdomen	na	na
Cat extremity	8.5	1.1 - 27
Cat dental	98	30 - 294
Horse hoof	22	16 - 27
Horse navicular	16	na
Horse fetlock/pastern/ankle	16	na
Horse carpus/knee	16	na
Horse hock	16	na
Horse gaskin/forearm	16	na
Horse canon	16	na
Horse stifle/hip	16	na
Horse spine	67	16 - 117

Annual Dose to Occupational Worker

STATIONARY X-RAY Position of Operator	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Operator exposure at edge of table	11	0.09 - 42	5000
Operator exposure at opposite ends of table	6.3	0.06 - 39	5000
Operator exposure 3 feet from x-ray unit	4	0.04 - 13	5000
Operator exposure 6 feet from x-ray unit	1.4	0.01 - 9	5000
Operator exposure behind shield, wall, or door	0.13	0.003 - 0.58	5000
Extremity exposure	25	0.42 - 66	50,000

PORTABLE X-RAY Position of Operator	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Operator exposure holding unit	0.45	0.18 - 0.72	5000
Operator exposure 3 feet from x-ray unit	0.04	0.01 - 0.07	5000
Operator exposure 6 feet from x-ray unit	0.02	0.01 - 0.03	5000
Operator exposure 9 feet from x-ray unit	na	na	5000
Operator exposure at end of exposure cord	0.01	0.003 - 0.024	5000
Operator exposure behind shield, wall, or door	na	na	5000
Extremity exposure	1	0.4 - 1.6	50,000

DENTAL X-RAY Position of Operator	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Operator exposure at edge of table	0.95	0.08 - 1.4	5000
Operator exposure 6 feet from x-ray unit	0.17	0.001 - 0.61	5000
Operator exposure at end of exposure cord	na	na	5000
Operator exposure behind shield, wall, or door	0.002	0.0019 - 0.0021	5000
Extremity exposure	7.4	0.38 - 15	50,000

Annual Dose to Public

	Average millirem per year	Range millirem per year	Maximum Allowable millirem/yr
Stationary X-Ray	0.14	0.003 - 0.45	100
Portable X-Ray	0.003	0.0012 - 0.0048	100
Dental X-Ray	0.016	0.0002 - 0.04	100