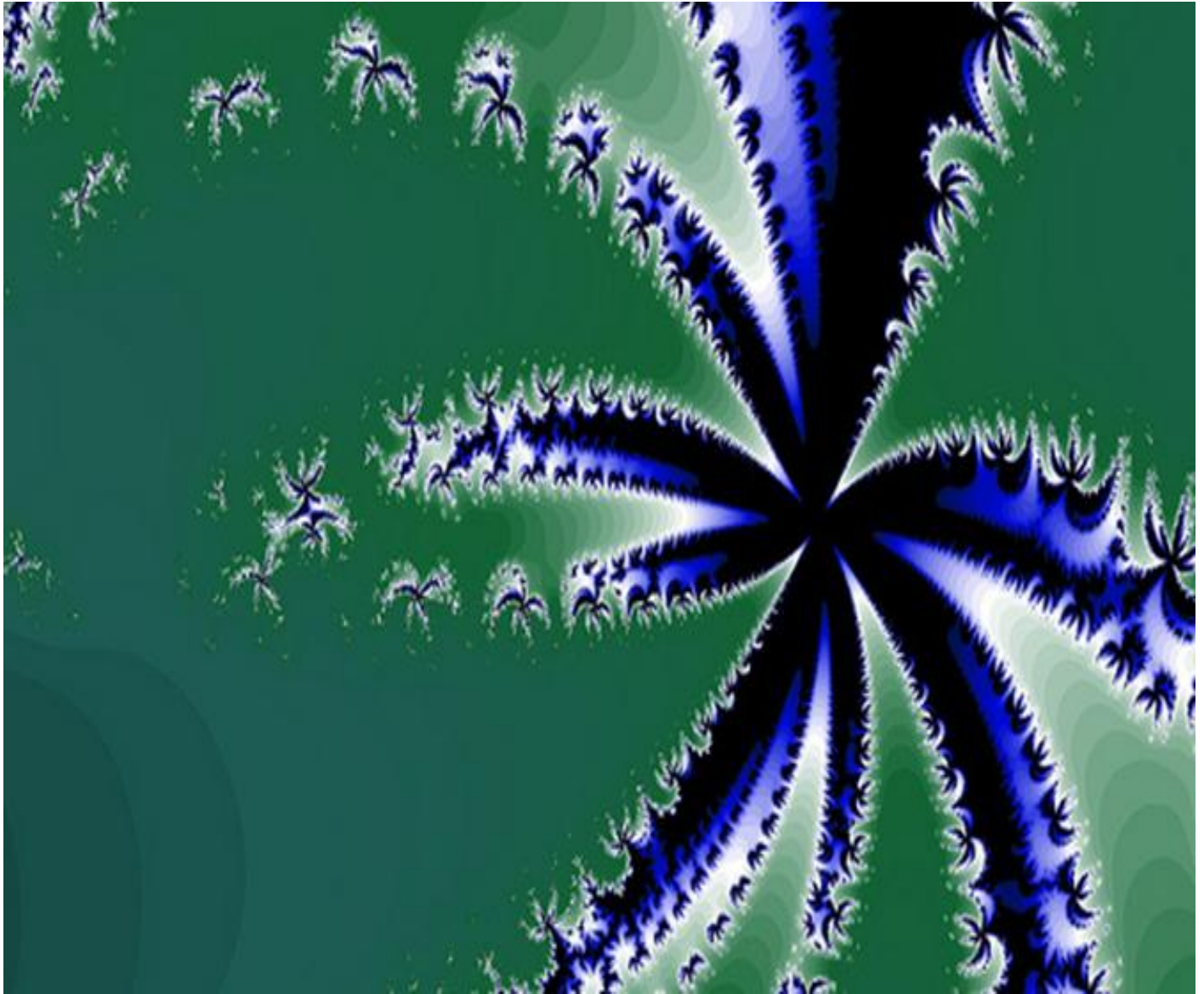


Radiation Therapy Staffing & Workplace Survey 2012

A Nationwide Survey of Radiation Therapy Managers Conducted by the American Society of Radiologic Technologists

November 2012



asrt
American Society of Radiologic Technologists

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Appendix A. Survey Instruments and Invitation Letter (Please contact the ASRT for a copy.)

Appendix B. Verbatim responses (Please contact the ASRT for a copy.)

*On the Cover: Courtesy of the Fractal Foundation
Fractalfoundation.org*

Executive Summary

The Radiation Therapy Staffing and Workplace Survey 2012 was e-mailed on August 22, 2012, to 3,165 managers of U.S. radiation therapy facilities. At the close of the survey on October 26, 2012, a total of 503 completed questionnaires had been submitted resulting in a response rate of 15.9%.

The sample size of 503 yields a margin of error for overall percentages of a maximum $\pm 4.4\%$ (at the 95% confidence interval).

To keep the report at a minimal length, responses to open-ended questions were not included, but are available upon request.

Staffing of the Facilities

The mean number of budgeted full-time equivalents (FTEs) across all facilities was:

- 7.4 for radiation therapists
- 2.5 for medical dosimetrists

An estimation of the percent of unfilled positions was made using the number of budgeted FTEs along with figures on vacant and recruiting positions.

- In radiation therapy, an estimated 2.1% of FTE positions are unfilled.
- In medical dosimetry, an estimated 5.1% of FTE positions are unfilled.
- Overall mean percentages of unfilled positions (combining both therapy and dosimetry) were highest in the East North Central region (4.9%) and lowest in New England (0.4%).

Longitudinal Staffing Changes in the Profession

- There was no change in the average number of FTE therapists per facility between 2011 and 2012; since 2004 the average number of FTE therapists has risen by 1.4 from 6.0 in 2004 to 7.4 in 2011/2012.
- Since 2004 the number of FTE dosimetrists per facility has grown by 0.9, from 1.6 per facility in 2004 to 2.5 per facility in 2012; between 2011 and 2012, the number of FTE dosimetrists per facility grew by 0.4 from 2.1 to 2.5. This increase was statistically significant.
- The estimated vacancy rate for FTE positions in radiation therapy has dropped in most years since 2004. In 2004, the vacancy rate was 7.9%; in

2012 it was 2.1%. The estimated vacancy rate also fell by 1.0% in the short-term, as well, dropping from 3.1% in 2011 to 2.1% in 2012.

- The estimated vacancy rate for FTE positions in dosimetry has fluctuated more noticeably since 2004. In 2004 the vacancy rate was 8.0%, hitting an 8-year high of 9.3% in 2006. It fell to an 8-year low of 3.6% in 2010 and has since rebounded to 5.1% in 2012.

Facility Demographics

The average respondent to the survey works at a facility that offers 12.1 radiation therapy and related services and sees 51.6 patients per day. The most commonly offered services at the facilities where the survey respondents work are:

- Intensity-modulated radiation therapy (90.9% of facilities)
- Conformal radiation therapy delivery (88.3% of facilities)
- CT/Simulation (87.3% of facilities)
- Image-guided radiation therapy (83.3% of facilities)

The least commonly offered services at the facilities where the survey respondents work are:

- Intraoperative (9.0% of facilities)
- Dynamic adaptive radiation therapy (4.6% of facilities)
- Hyperthermia (3.4% of facilities)
- Proton therapy (1.2% of facilities)

The average respondent to the survey works at a facility with 2.28 linear accelerators. More than 96% work at a facility with treatment planning stations, with an average of 3.78 treatment planning stations per facility.

Personnel Demographics

More than 95% of the survey respondents are currently working in radiation therapy. Of this group, 92.6% hold a certificate in radiation therapy, 48.5% are certified in radiography and 15.1% are certified in medical dosimetry.

The average respondent works at a facility that typically schedules 2.34 therapists and 0.98 dosimetrists per linear accelerator.

Over 81% of respondents work at a facility with a physicist on-site daily. Among those facilities with on-site physics support, the average number of full-time equivalent physicists is 2.70. Among the facilities with no daily physics support, a physicist is on-site for an average of 11.04 hours per week. Slightly more than 15% of facilities with no daily physics support have a physicist on-site for one hour or less.

Inactive Demographics

Among the 4.4% of respondents not currently working in radiation therapy, 31.8% cited job unavailability as the reason they are inactive; 13.6% had changed careers, 9.1% had retired; and 45.5% answered "other". Inactive respondents had worked in radiation therapy for an average of 19 years.

When asked how many FTEs at their facility had retired in the last year, more than 91% of respondents had seen no retirements in therapy, and more than 96% had seen no retirements in dosimetry.

- In therapy, 6.8% of facilities saw one FTE retire, and only 1.5% saw two or more FTEs retire.
- In dosimetry, only 3.4% of facilities saw any retirements.

Tattooing Practices

The survey also asked respondents several questions about the tattooing practices at their facility. More than 53% of respondents said their facility has a formal document on tattooing procedures; 40.7% said they have no such document; and 6.1% were unsure whether they do or do not.

When asked what type of ink their facility uses for tattooing, 29.2% said they used sterile ink, while 70.8% said they used nonsterile ink.

Most respondents said their facility uses a nonsterile marker such as a sharpie to mark patients prior to tattooing, while 4.1% said they use a sterile marker and 4.9% said they use another implement.

More than 47% of respondents said their facility uses a hand-held needle to tattoo. Other commonly used implements are:

- Gauged needle (30.0%)
- Lancet (10.6%)
- Syringe (6.2%)
- Other (5.5%)

Calculation of Percent Vacancy Rates

The estimated proportion of unfilled positions for a given specialty for the population of U.S. hospital-based radiology facilities is defined as:

(mean number of vacant and recruiting FTEs per facility) / (mean number of budgeted FTEs per facility)*100

For example, in radiation therapy the mean vacant and recruiting FTE positions is equal to 0.158. When divided by the mean budgeted FTE of 7.41, this yields a proportion of unfilled FTE positions of .0213 (2.13%).

Only combinations which included both the number of budgeted FTEs and the number of vacant and recruiting FTEs were used in the calculation of vacancy rates.

Staffing of the Facilities

Provide the budgeted and vacant full-time employees (FTEs) for your facility. Please use decimals for fractional FTEs.

Radiation Therapist

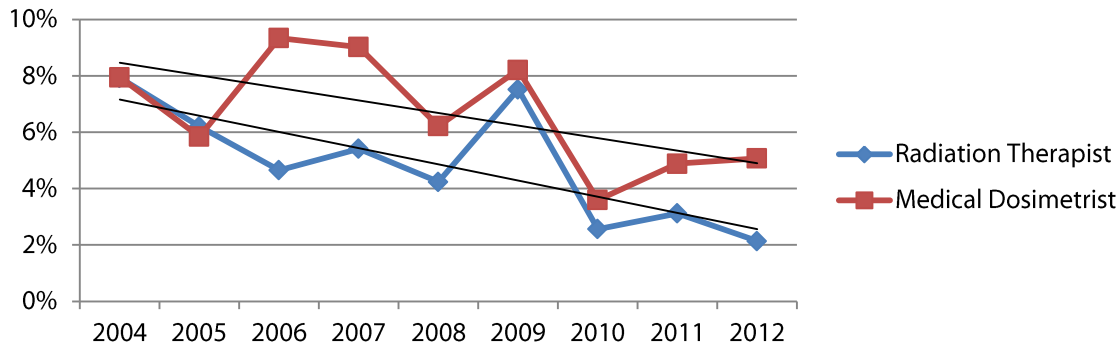
Year	N	Mean Budgeted FTEs per Facility	Mean Vacant and Recruiting FTEs per Facility	Estimated Percent Unfilled FTE Positions
2004	360	6.0	0.47	7.9%
2005	352	6.4	0.40	6.2%
2006	522	6.8	0.31	4.7%
2007	549	7.1	0.39	5.4%
2008	476	6.8	0.29	4.2%
2009	448	7.2	0.54	7.5%
2010	484	7.2	0.19	2.6%
2011	460	7.4	0.23	3.1%
2012	439	7.4	0.16	2.1%

Medical Dosimetrist

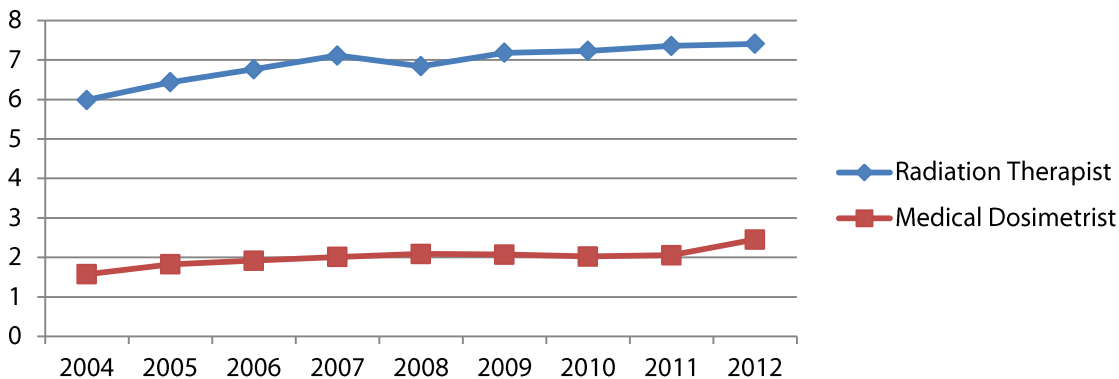
Year	N	Mean Budgeted FTEs per Facility	Mean Vacant and Recruiting FTEs per Facility	Estimated Percent Unfilled FTE Positions
2004	360	1.6	0.13	8.0%
2005	352	1.8	0.11	5.8%
2006	522	1.9	0.18	9.3%
2007	549	2.0	0.18	9.0%
2008	441	2.1	0.13	6.2%
2009	409	2.1	0.17	8.2%
2010	432	2.0	0.07	3.6%
2011	411	2.1* (SD = 1.9)	0.10	4.9%
2012	406	2.5* (SD = 3.9)	0.12	5.1%

*2012>2011, $t(815) = 2.08, p = 0.04$

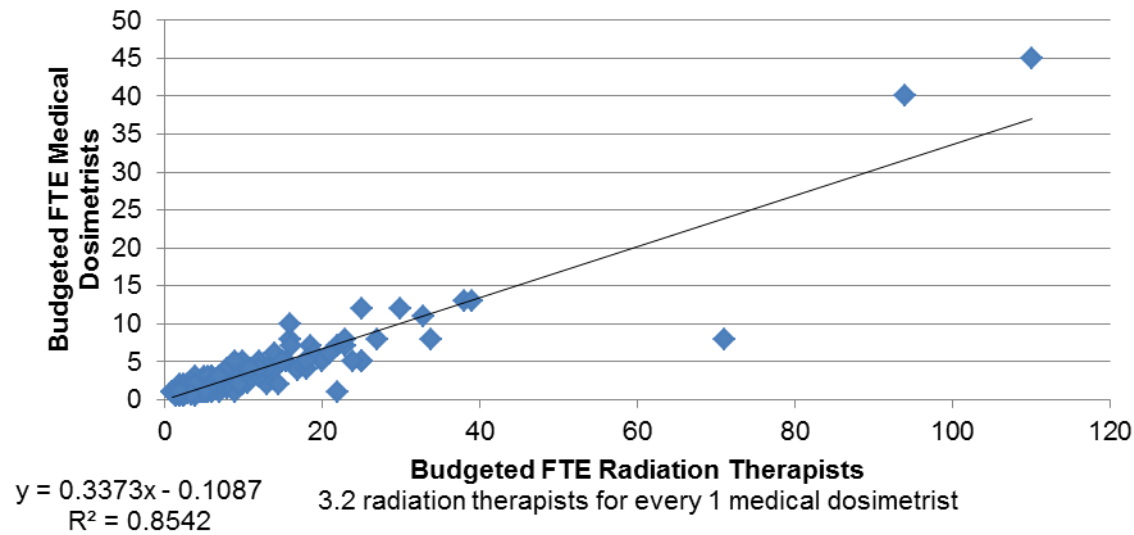
Estimated Percent Unfilled FTE Positions



Mean Budgeted FTEs per Facility



Number of Budgeted FTE Radiation Therapists by Number of Budgeted FTE Medical Dosimetrists per Facility*



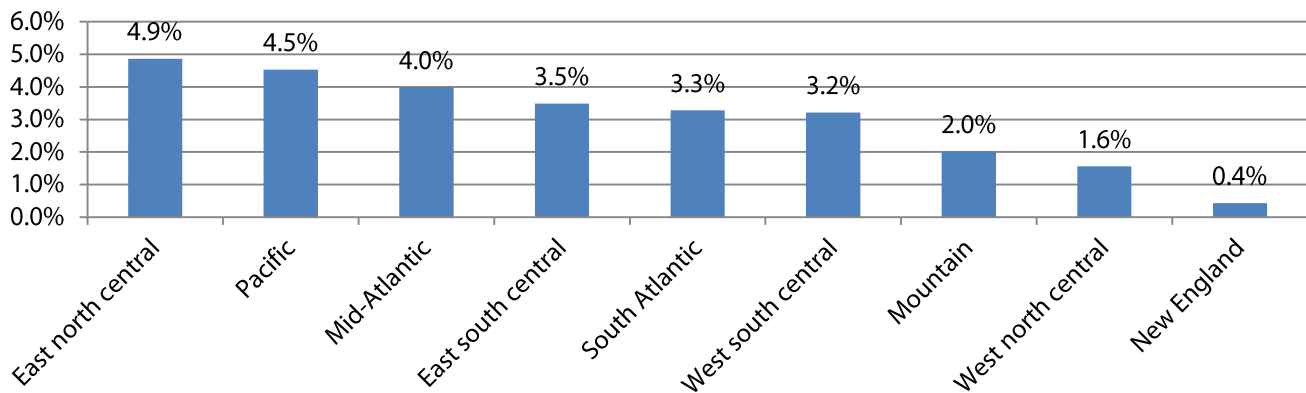
2012 Estimated Percent of Unfilled FTE Positions by Geographic Region^a

Discipline	Statistic	East north central	Pacific	Mid-Atlantic	East south central	South Atlantic	West south central	Mountain	West north central	New England
Radiation Therapist	N	70	53	51	19	71	42	33	44	20
	%	2.0%	1.2%	3.0%	2.7%	1.4%	1.6%	2.4%	1.5%	0.9%
Medical Dosimetrist	N	65	49	45	18	63	42	29	43	21
	%	8.0%	8.2%	5.1%	4.3%	5.4%	4.8%	1.6%	1.6%	0.0%

Overall Mean	4.9%	4.5%	4.0%	3.5%	3.3%	3.2%	2.0%	1.6%	0.4%
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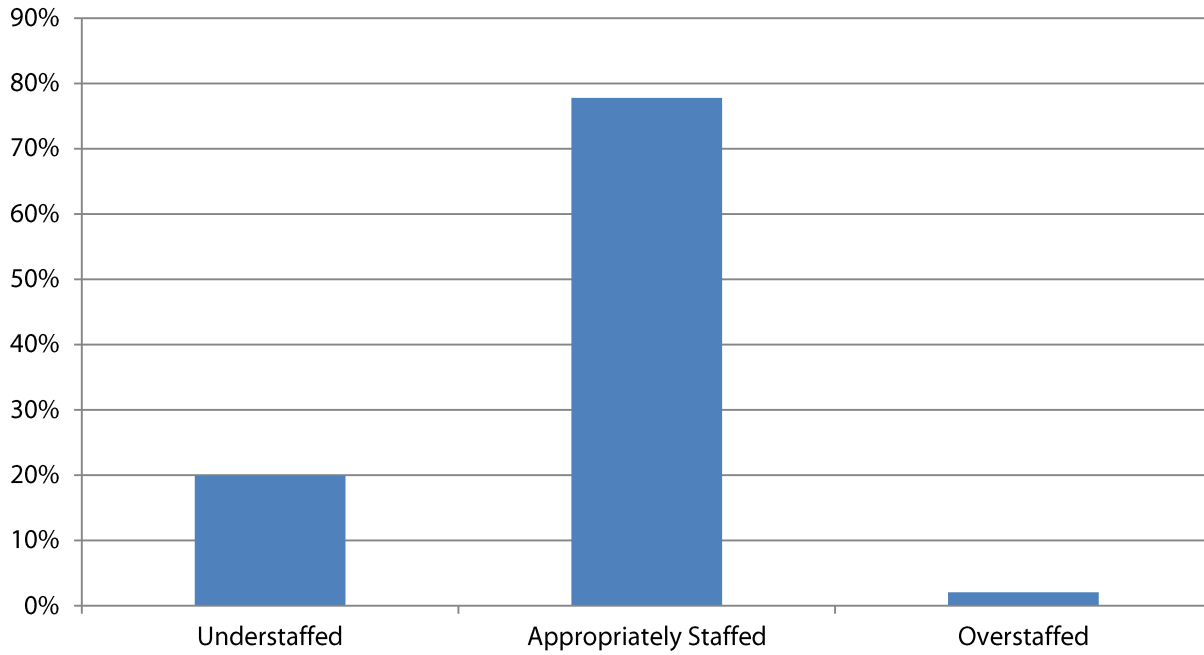
^a East north central: Wisconsin, Michigan, Illinois, Indiana and Ohio
 Pacific: Alaska, Washington, Oregon, California and Hawaii
 Mid-Atlantic: New York, Pennsylvania and New Jersey
 East south central: Kentucky, Tennessee, Mississippi and Alabama
 South Atlantic: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina and Georgia
 West south central: Oklahoma, Texas, Arkansas and Louisiana
 Mountain: Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona and New Mexico
 West north central: Missouri, North Dakota, South Dakota, Nebraska, Kansas, Minnesota and Iowa
 New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut

2012 Estimated Percent of Unfilled FTE Positions by Geographic Region



In terms of staffing levels, how would you describe your facility?

	N	Valid Percent
Understaffed	94	19.9%
Appropriately Staffed	368	77.8%
Overstaffed	10	2.1%
Total	472	99.8%



Facility Demographics

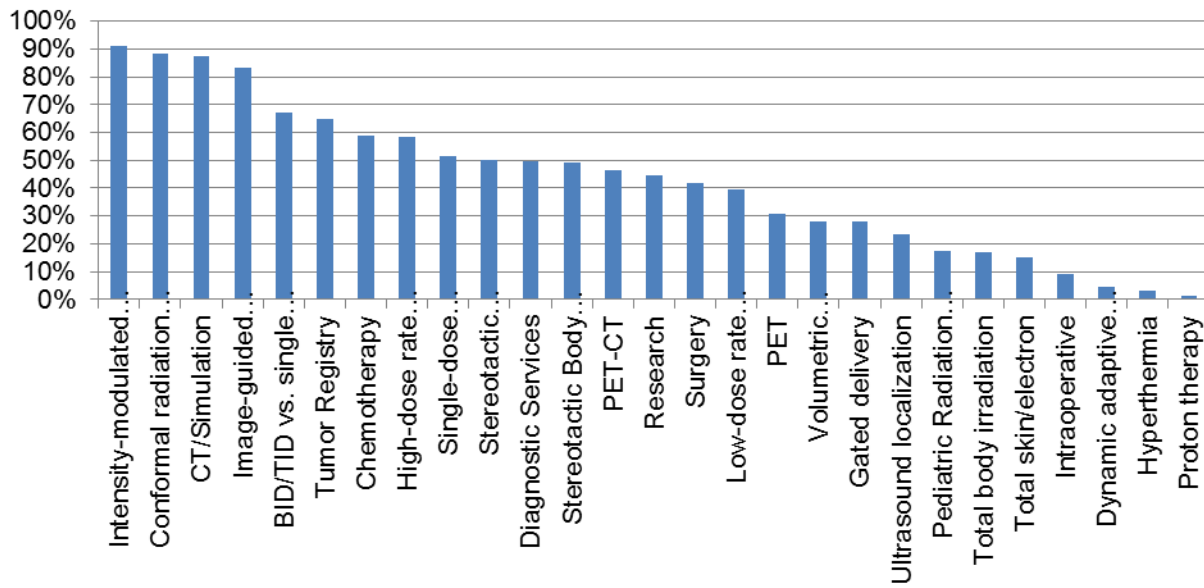
State

	N		N		N		N		N
AK	1	HI	2	ME	1	NJ	13	SD	1
AL	5	IA	8	MI	14	NM	3	TN	9
AR	4	ID	3	MN	12	NV	1	TX	26
AZ	15	IL	20	MO	13	NY	18	UT	3
CA	38	IN	13	MS	6	OH	19	VA	12
CO	7	KS	6	MT	2	OK	12	VT	1
CT	8	KY	3	NC	14	OR	6	WA	10
DE	2	LA	3	ND	1	PA	23	WI	8
FL	28	MA	10	NE	7	RI	2	WV	2
GA	6	MD/DC	6	NH	1	SC	6	WY	1

Which of the following services does your facility provide?

	N	Valid Percent
Intensity-modulated radiation therapy (IMRT)	457	90.9%
Conformal radiation therapy delivery	444	88.3%
CT/Simulation	439	87.3%
Image-guided radiation therapy (IGRT)	419	83.3%
BID/TID vs. single treatment delivery	338	67.2%
Tumor Registry	327	65.0%
Chemotherapy	297	59.1%
High-dose rate brachytherapy	293	58.3%
Single-dose stereotactic radiation therapy	259	51.5%
Stereotactic Radiosurgery	253	50.3%
Diagnostic Services	250	49.7%
Stereotactic Body Radiation Therapy	247	49.1%
PET-CT	233	46.3%
Research	225	44.7%
Surgery	211	42.0%
Low-dose rate brachytherapy	199	39.6%
PET	154	30.6%
Volumetric modulated arc therapy (VMAT)	142	28.2%
Gated delivery	141	28.0%
Ultrasound localization	117	23.3%
Pediatric Radiation Therapy	87	17.3%
Total body irradiation	85	16.9%
Total skin/electron	75	14.9%
Intraoperative	45	9.0%
Dynamic adaptive radiation therapy (DART)	23	4.6%
Hyperthermia	17	3.4%
Proton therapy	6	1.2%

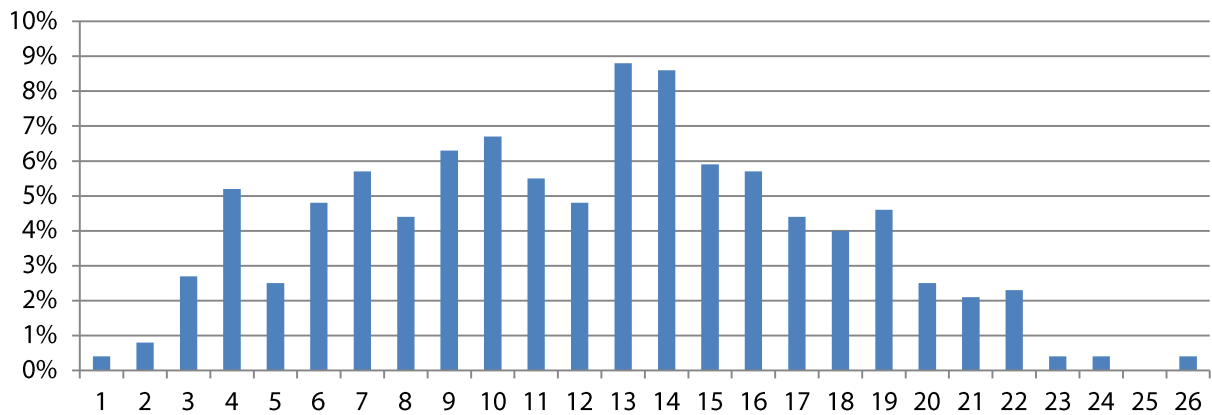
Frequency of Services Provided



Number of services provided by each facility

	Frequency	Valid Percent	Cumulative Percent
1	2	.4	.4
2	4	.8	1.3
3	13	2.7	4.0
4	25	5.2	9.2
5	12	2.5	11.7
6	23	4.8	16.6
7	27	5.7	22.2
8	21	4.4	26.6
9	30	6.3	32.9
10	32	6.7	39.6
11	26	5.5	45.1
12	23	4.8	49.9
13	42	8.8	58.7
14	41	8.6	67.3
15	28	5.9	73.2
16	27	5.7	78.8
17	21	4.4	83.2
18	19	4.0	87.2
19	22	4.6	91.8
20	12	2.5	94.3
21	10	2.1	96.4
22	11	2.3	98.7
23	2	.4	99.2
24	2	.4	99.6
25	0	.0	99.6
26	2	.4	100.0
Total	477	100.0	
Mean	12.1 (SD=5.2)		
Percentiles	5th=3.6, 25th=8.1, 50th=12.4, 75th=15.8, 95th=20.8		

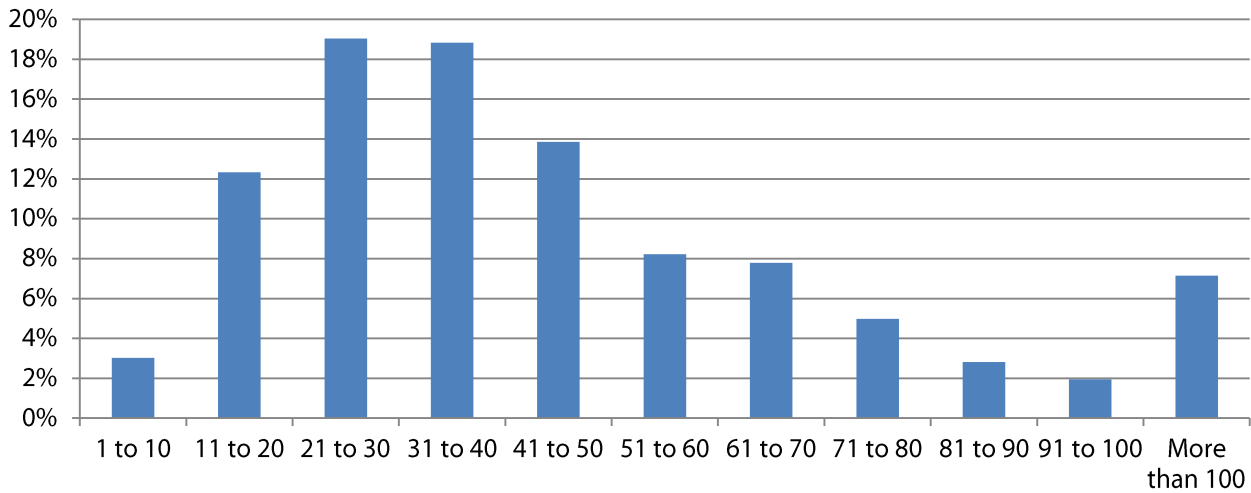
Number of Services Provided



Number of patients receiving treatment per day

	Frequency	Valid Percent	Cumulative Percent
1 to 10	14	3.0%	3.0%
11 to 20	57	12.3%	15.4%
21 to 30	88	19.1%	34.4%
31 to 40	87	18.8%	53.3%
41 to 50	64	13.9%	67.1%
51 to 60	38	8.2%	75.3%
61 to 70	36	7.8%	83.1%
71 to 80	23	5.0%	88.1%
81 to 90	13	2.8%	90.9%
91 to 100	9	2.0%	92.9%
More than 100	33	7.1%	100.0%
Total	462	100.0%	
Mean	51.6 (SD=50.6)		
Percentiles	5th=14.0, 25th=26.0, 50th=40.3, 75th=62.2, 95th=121.0		

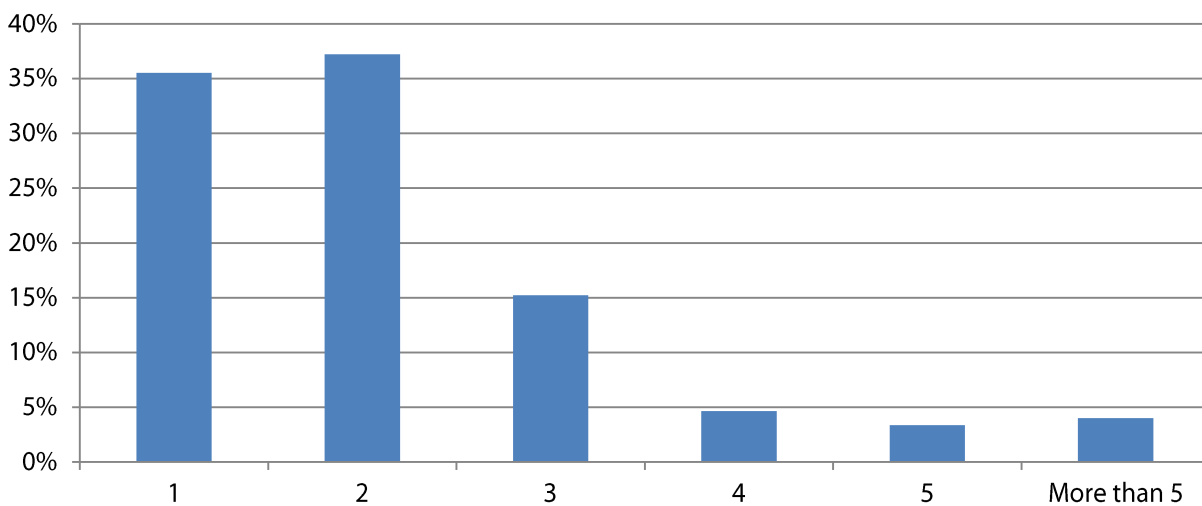
Number of patients receiving treatment per day



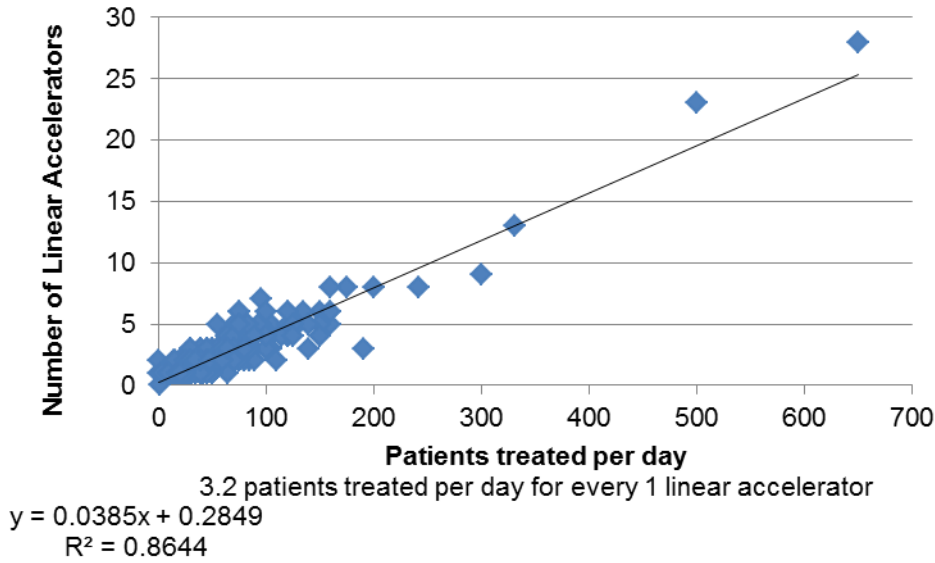
How many linear accelerators are used in your facility?

	Frequency	Valid Percent	Cumulative Percent
1	168	35.5%	35.5%
2	176	37.2%	72.7%
3	72	15.2%	88.0%
4	22	4.7%	92.6%
5	16	3.4%	96.0%
More than 5	19	4.0%	100.0%
Total	473	100.0%	
Mean	2.28 (SD=2.11)		
Percentiles	5th=.27 , 25th=1.19, 50th=1.88, 75th=2.63, 95th=5.26		

Number of linear accelerators



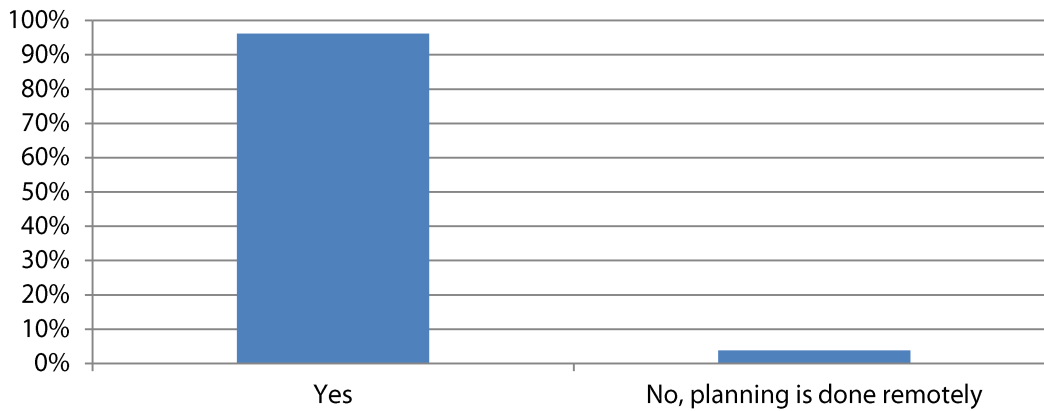
Patients treated per day by number of linear accelerators used at your facility



Are there treatment planning stations at your facility?

	Frequency	Valid Percent	Cumulative Percent
Yes	458	96.2%	96.2%
No, planning is done remotely	18	3.8%	100.0%
Total	476	100.0%	

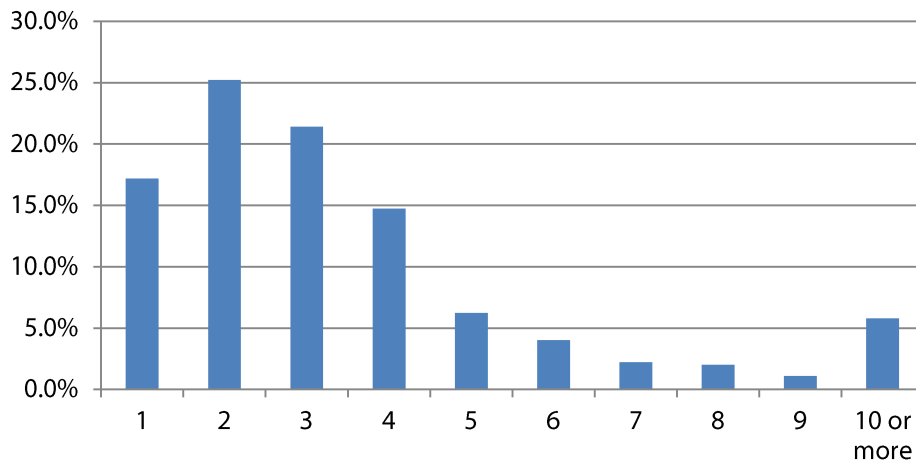
Treatment stations at facility



If you selected “yes” to the previous question, how many treatment planning stations do you have at your facility?

Number of Stations	Frequency	Valid Percent	Cumulative Percent
1	77	17.2%	17.2%
2	113	25.2%	42.4%
3	96	21.4%	63.8%
4	66	14.7%	78.6%
5	28	6.3%	84.8%
6	18	4.0%	88.8%
7	10	2.2%	91.1%
8	9	2.0%	93.1%
9	5	1.1%	94.2%
10 or more	26	5.8%	100.0%
Total	448	100.0%	
Mean	3.78 (SD=3.97)		
Percentiles	5th= -, 25th=1.77, 50th=2.87, 75th=4.36, 95th=9.84		

Number of Treatment Planning Stations

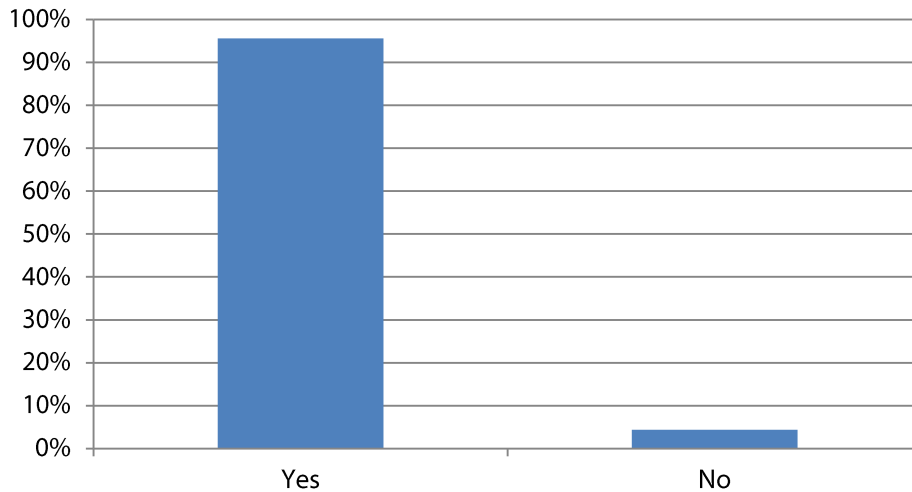


Personnel Demographics

Are you currently working in Radiation Therapy?

	Frequency	Valid Percent
Yes	481	95.6%
No	22	4.4%
Total	503	100.0%

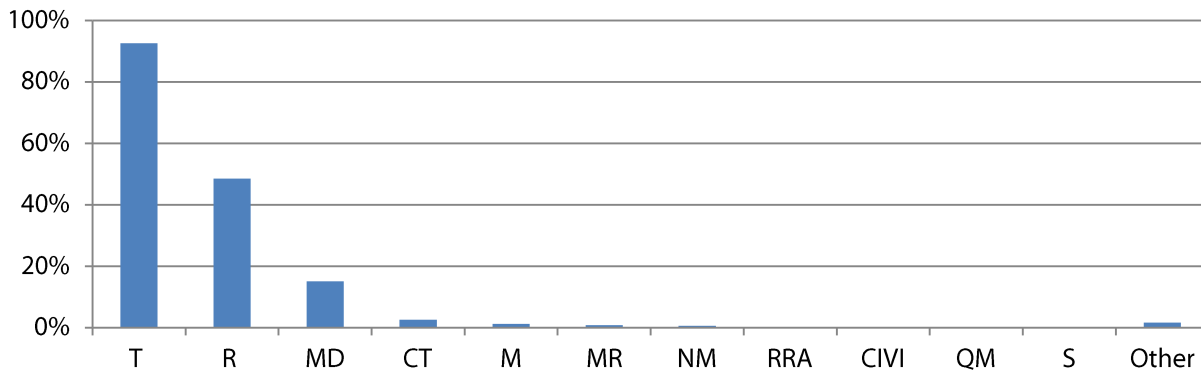
Currently working in Radiation Therapy (yes/no)



Check all the disciplines in which you are certified:

	Frequency	Valid Percent
Radiation Therapy	466	92.6%
Radiography	244	48.5%
Medical Dosimetry	76	15.1%
Computed Tomography	13	2.6%
Mammography	6	1.2%
Magnetic Resonance Imaging	4	0.8%
Nuclear Medicine	3	0.6%
Registered Radiologist Assistant	1	0.2%
Cardiovascular/Interventional	0	0%
Quality Management	0	0%
Sonography	0	0%
Other	8	1.6%
Total # of Licenses	821	

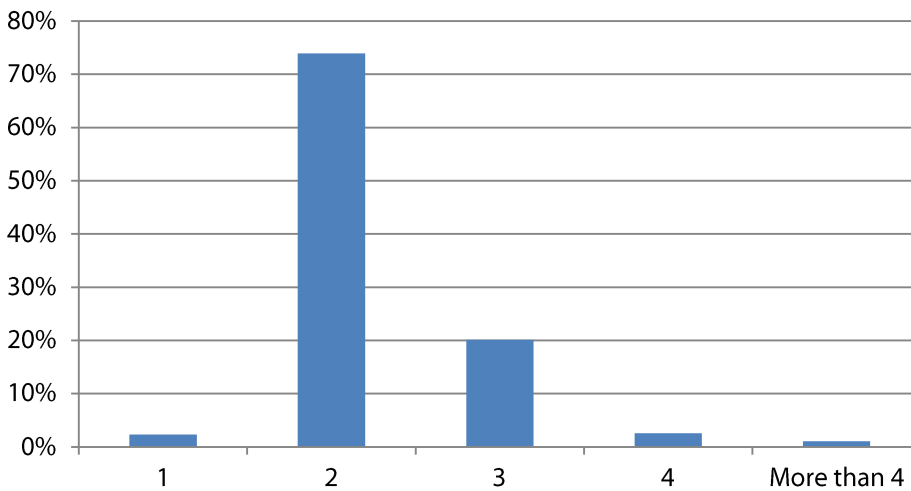
Disciplines in which respondents are certified



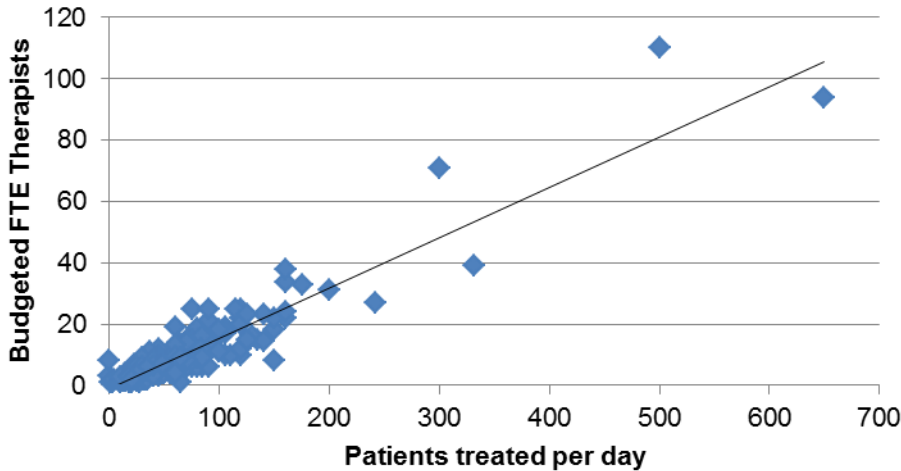
On average, how many therapists per linear accelerator are routinely scheduled at your facility?
(Rounded to the nearest whole number.)

	Frequency	Valid Percent	Cumulative Percent
1	11	2.3%	2.3%
2	349	73.9%	76.3%
3	95	20.1%	96.4%
4	12	2.5%	98.9%
More than 4	5	1.1%	100.0%
Total	472	100.0%	
Mean	2.34 (SD=1.91)		
Percentiles	5th=1.9, 25th=1.96, 50th=2.13, 75th=2.45, 95th=3.39		

Therapists per linear accelerator



Patients treated per day by budgeted FTE radiation therapists per facility



7.9 patients treated per day for every 1 FTE radiation therapist

$$y = 0.164x - 1.0723$$

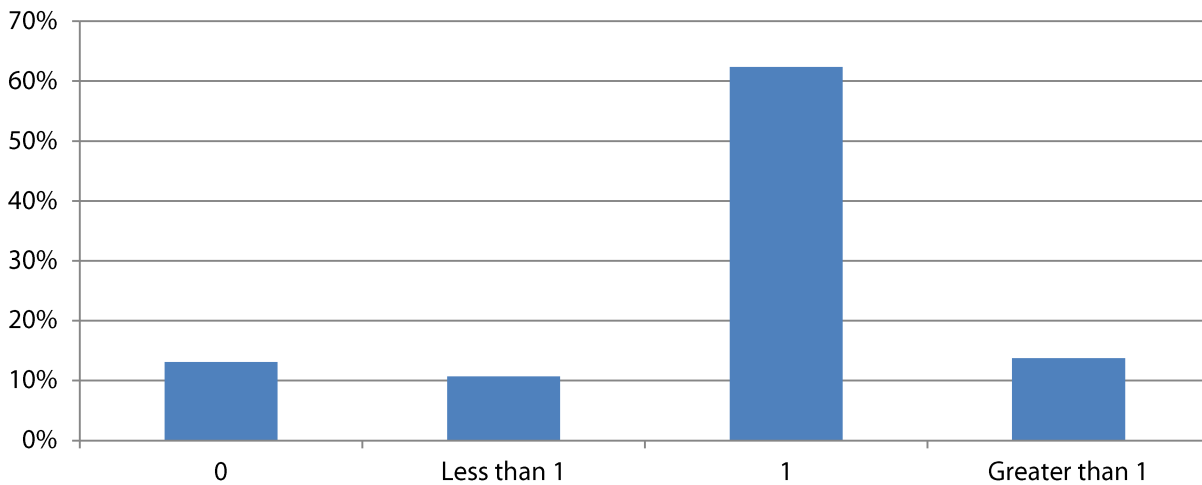
$$R^2 = 0.8584$$

On average, how many dosimetrists are routinely scheduled per linear accelerator at your facility?

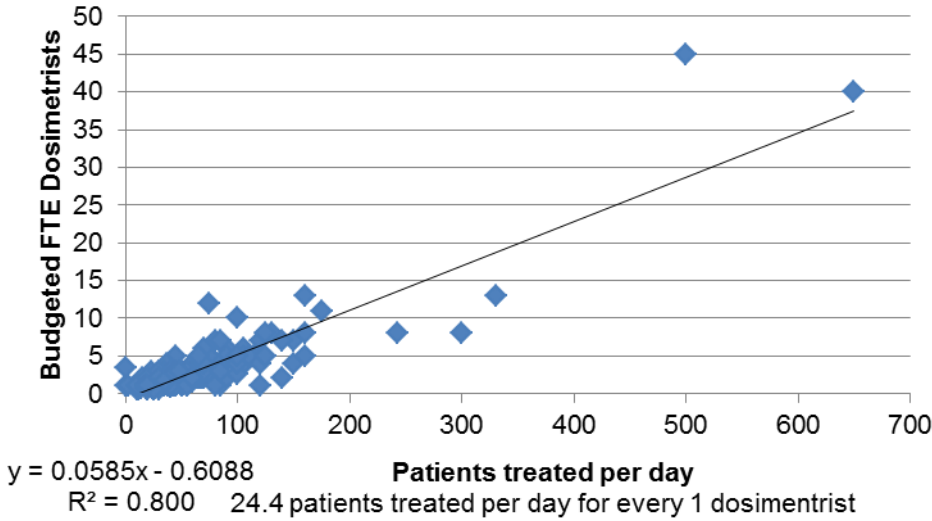
(Rounded to the nearest whole number.)

Average Number of Dosimetrists per Accelerator	Frequency	Valid Percent	Cumulative Percent
0	60	13.1%	13.1%
Less than 1	49	10.7%	23.9%
1	285	62.4%	86.2%
More than 1	63	13.8%	100.0%
Total	457	100.0%	
Mean	0.98 (SD=.71)		
Percentiles	5th=-, 25th=.90, 50th=.98, 75th=1.2, 95th=2.0		

Dosimetrists per linear accelerator



Patients treated per day by budgeted FTE medical dosimetrists per facility

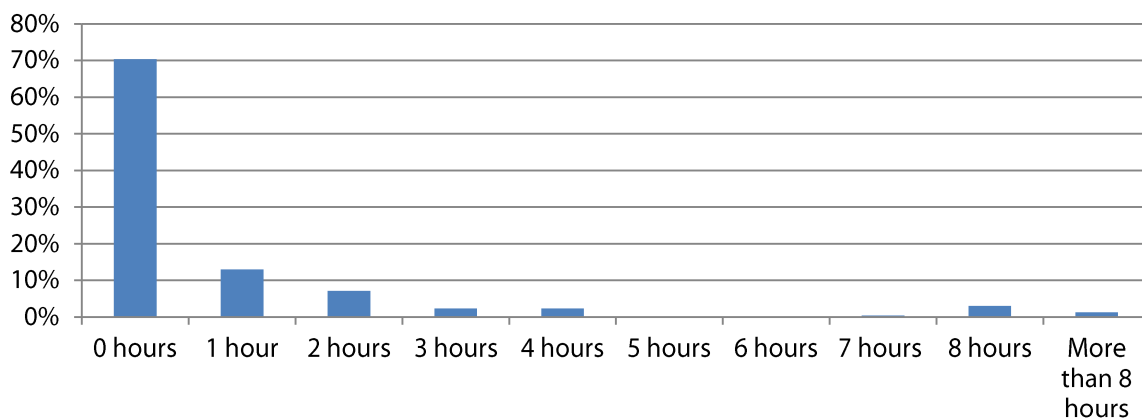


How many, if any, hours per day does your facility routinely schedule only one therapist per linear accelerator?

(Rounded to the nearest hour.)

	Frequency	Valid Percent	Cumulative Percent
0 hours	325	70.3%	70.3%
1 hour	60	13.0%	83.3%
2 hours	33	7.1%	90.5%
3 hours	11	2.4%	92.9%
4 hours	11	2.4%	95.2%
5 hours	0	0.0%	95.2%
6 hours	0	0.0%	95.2%
7 hours	2	0.4%	95.7%
8 hours	16	3.5%	99.1%
More than 8 hours	4	0.9%	100.0%
Total	462	100.0%	
Mean	48 minutes (<i>SD</i> =1 hours 53 minutes)		
Percentiles	5th=-, 25th=-, 50th=12 minutes, 75th=56 minutes, 95th=6 hours 16 minutes		

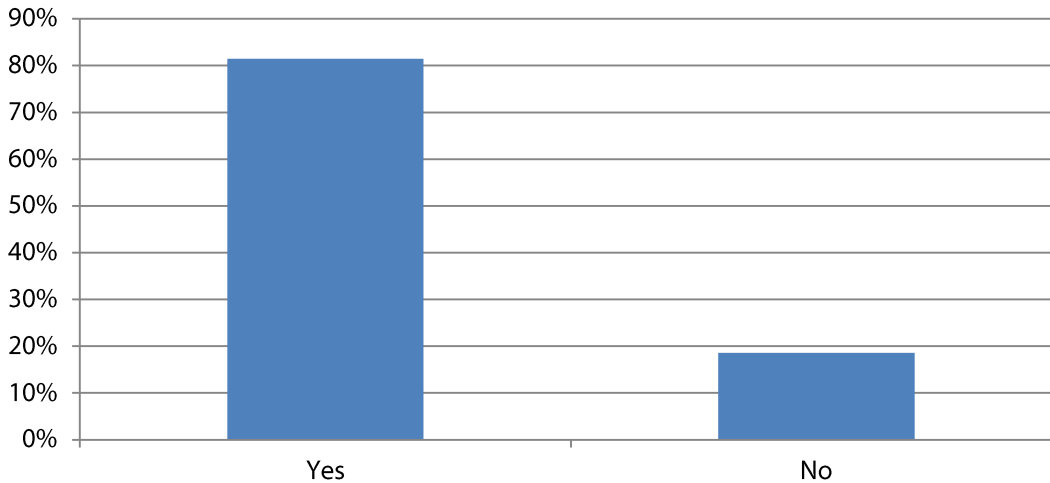
Hours per day does your facility routinely schedules only one therapist per linear accelerator



Do you have a physicist at your facility daily?

	Frequency	Valid Percent
Yes	386	81.4%
No	88	18.6%
Total	474	100.0%

Physicist at facility

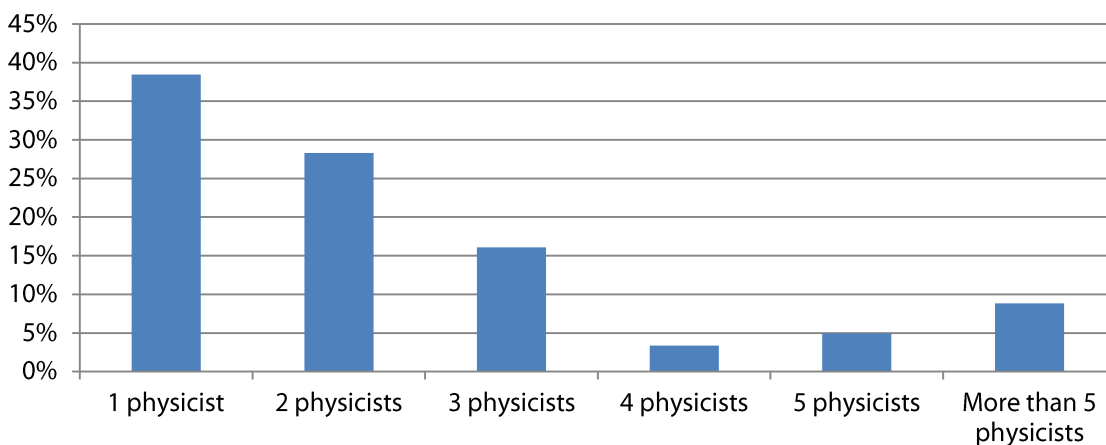


If you selected "yes" on the previous question, how many full-time equivalent physicists do you have?

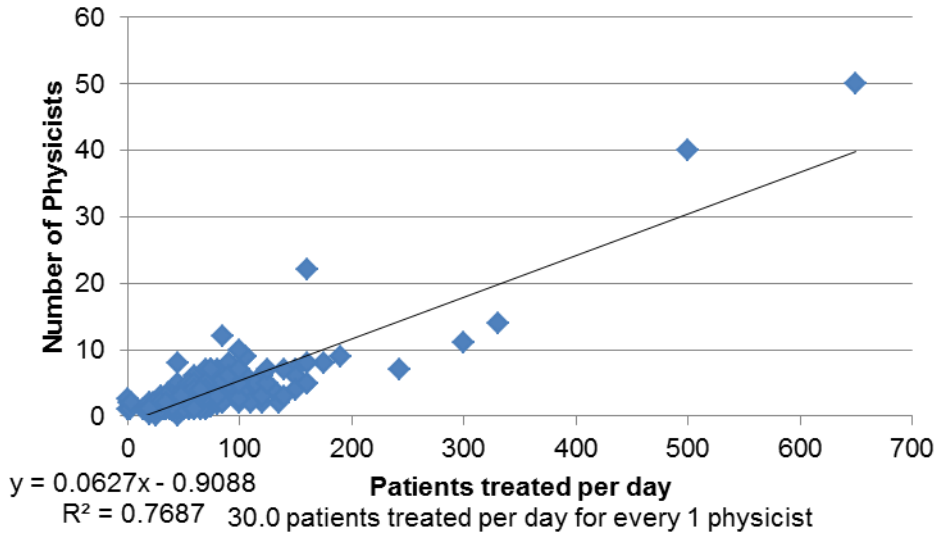
(Rounded to the nearest whole number.)

	Frequency	Valid Percent	Cumulative Percent
1 physicist	148	38.4%	38.4%
2 physicists	109	28.3%	66.8%
3 physicists	62	16.1%	82.9%
4 physicists	13	3.4%	86.2%
5 physicists	19	4.9%	91.2%
More than 5 physicists	34	8.8%	100.0%
Total	385	100.0%	
Mean	2.70 (SD=3.79)		
Percentiles	5th=.82, 25th=1.06, 50th=1.93, 75th=2.98, 95th=7.11		

Percent of facilities with given number of physicists



Patients treated per day by number of physicists

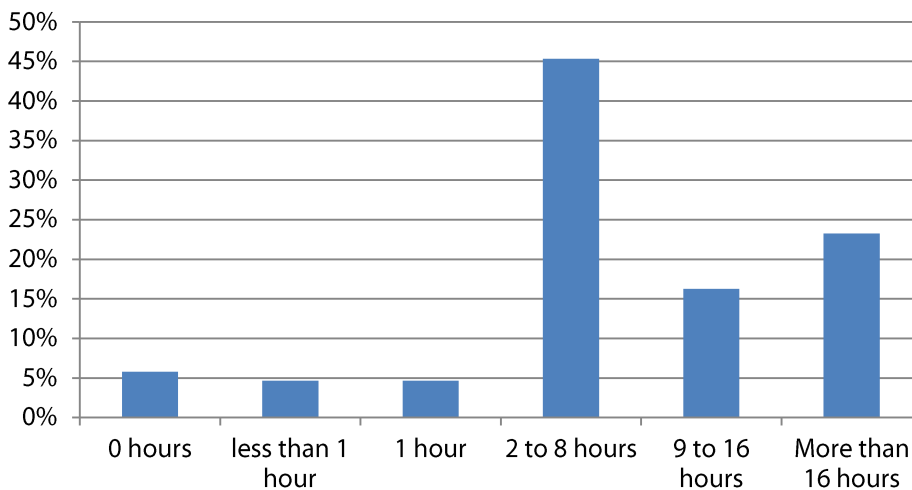


If you selected “no” to the above question, how many hours per week do you have on-site physics support?

(Rounded to the nearest hour.)

	Frequency	Valid Percent	Cumulative Percent
0 hours	5	5.8%	5.8%
less than 1 hour	4	4.7%	10.5%
1 hour	4	4.7%	15.1%
2 to 8 hours	39	45.4%	60.5%
9 to 16 hours	14	16.3%	76.7%
17 hours or more	20	23.3%	100.0%
Total	86	100.0%	
Missing	417		
Total	503		
Mean	11.04 (SD=9.62)		
Percentiles	5th=.06, 25th=4.40, 50th=7.94, 75th=17.25, 95th=31.40		

Hours per week with on-site physics support

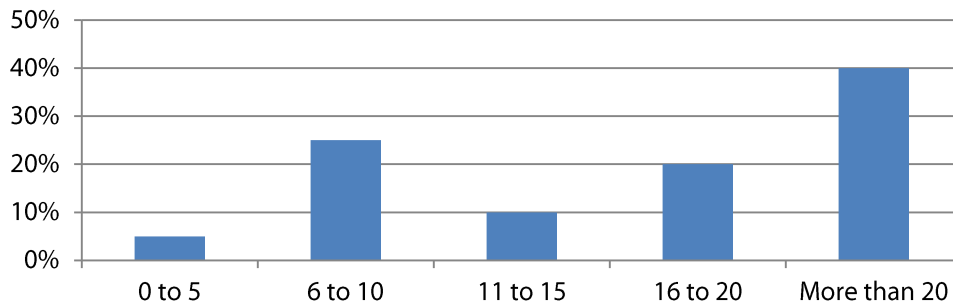


Inactive Demographics

If you are not currently working in radiation therapy, how many years did you work in radiation therapy?

	Frequency	Valid Percent	Cumulative Percent
0 to 5	1	5.0%	5.0%
6 to 10	5	25.0%	30.0%
11 to 15	2	10.0%	40.0%
16 to 20	4	20.0%	60.0%
More than 20	8	40.0%	100.0%
Total	20	100.0%	
Mean	19.1 (SD=10.2)		
Percentiles	5th=3.5, 25th=10.0, 50th=19.5, 75th=28.5, 95th=34.0		

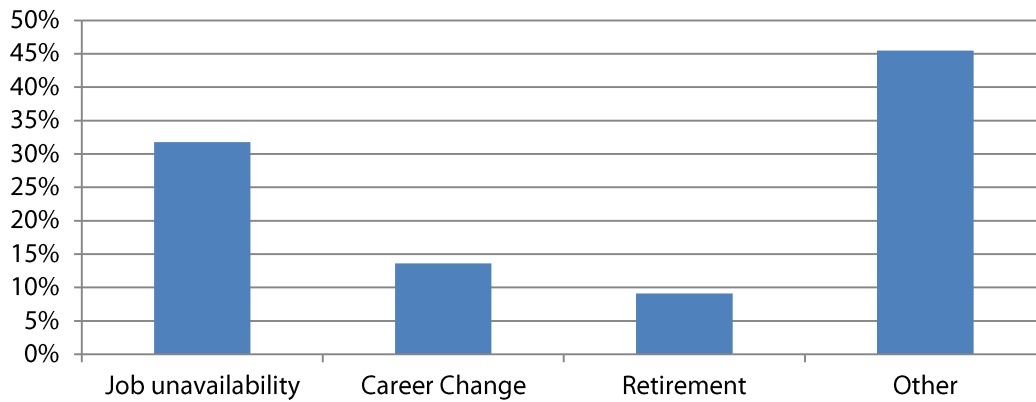
Years worked in therapy among respondents who are no longer active



If you are not currently working in radiation therapy, choose the primary reason you are unemployed or employed outside of radiation therapy?

	Frequency	Valid Percent
Job unavailability	7	31.8%
Career Change	3	13.6%
Retirement	2	9.1%
Other	10	45.5%
Total	22	100.0%

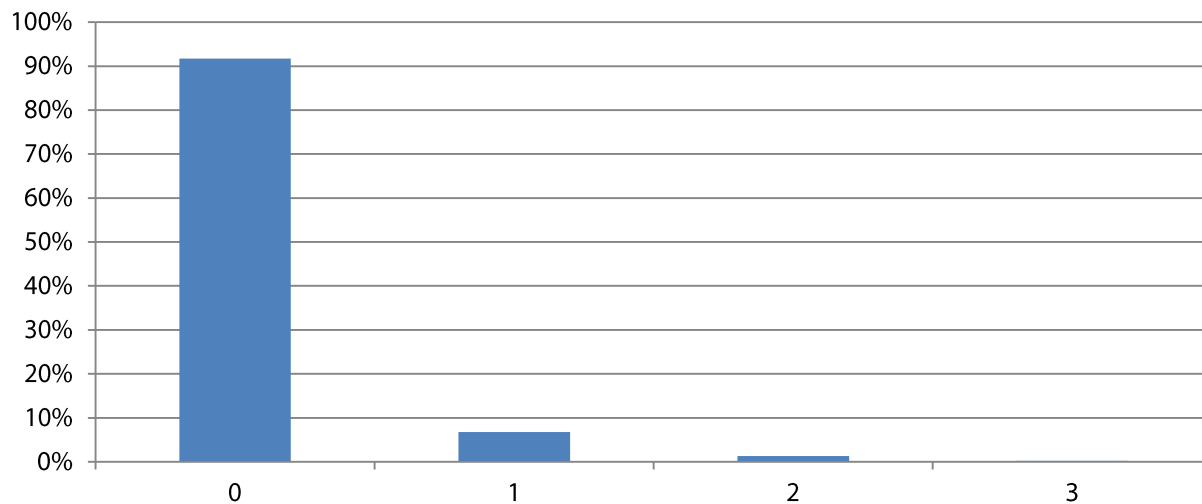
Reason unemployed/employed outside of radiation therapy



Within the last year, how many full-time employees have retired? (Radiation Therapy)

	Frequency	Valid Percent	Cumulative Percent
0	421	91.7%	91.7%
1	31	6.8%	98.5%
2	6	1.3%	99.8%
3	1	0.2%	100.0%
Total	459	100.0%	
Mean	.10 (SD=.36)		

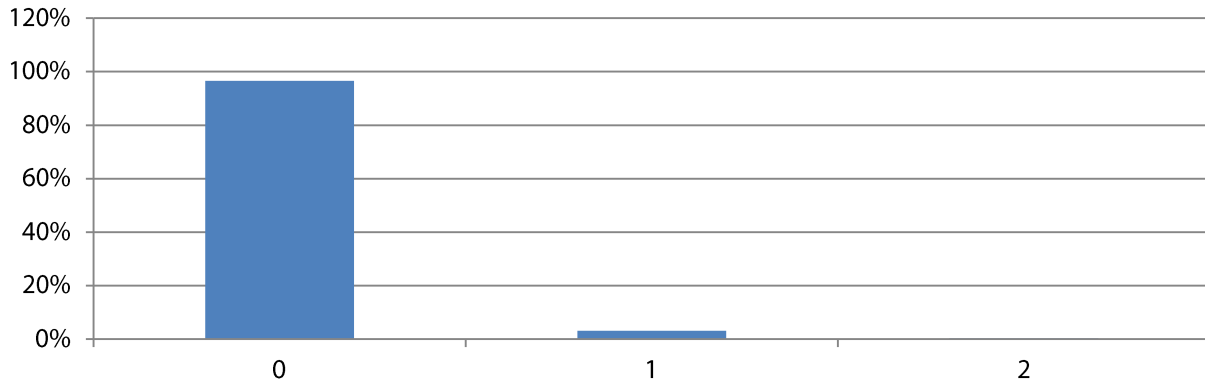
Percentage of Facilities with 0, 1, 2 or 3 retirements in Radiation Therapy



Within the last year, how many full-time employees have retired? (Medical Dosimetry)

	Frequency	Valid Percent	Cumulative Percent
0	427	96.6%	96.6%
1	14	3.2%	99.8%
2	1	0.2%	100.0%
Total	442	100.0%	
Mean	.04 (SD=.20)		

Percentage of facilities with 0, 1 or 2 retirements in Medical Dosimetry

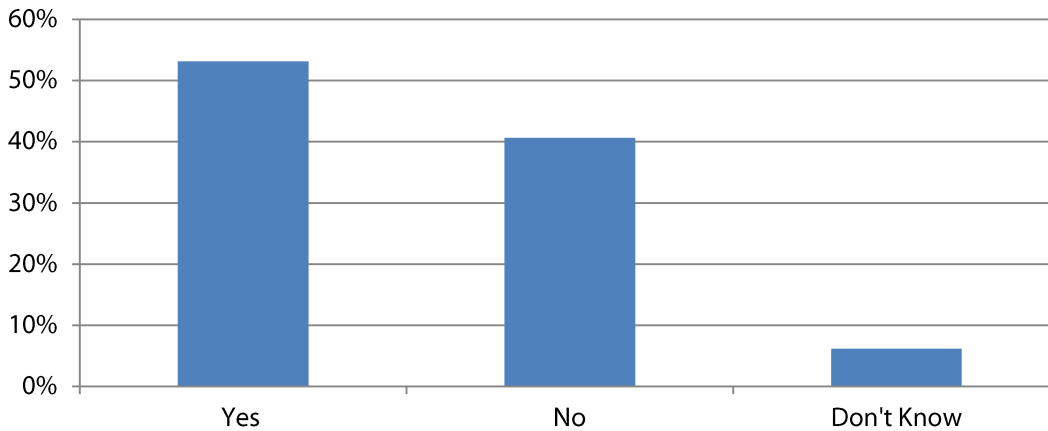


Tattooing Practices

Does your department have a formalized official document on tattooing procedures/protocol?

	Frequency	Valid Percent
Yes	251	53.2%
No	192	40.7%
Don't Know	29	6.1%
Total	472	100.0%

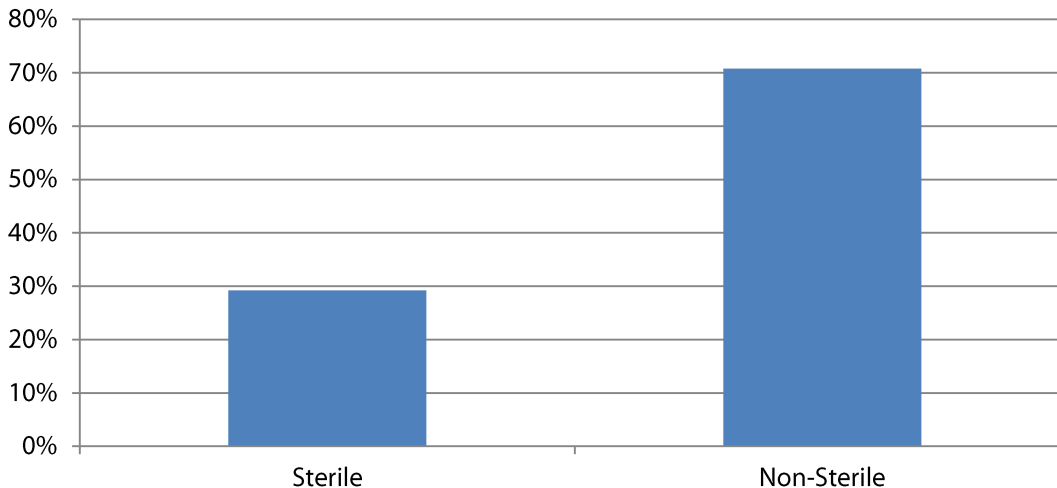
Formalized tattooing procedure



What type of tattoo ink is used in your department?

	Frequency	Valid Percent
Sterile	132	29.2%
Non-Sterile	320	70.8%
Total	452	100.0%

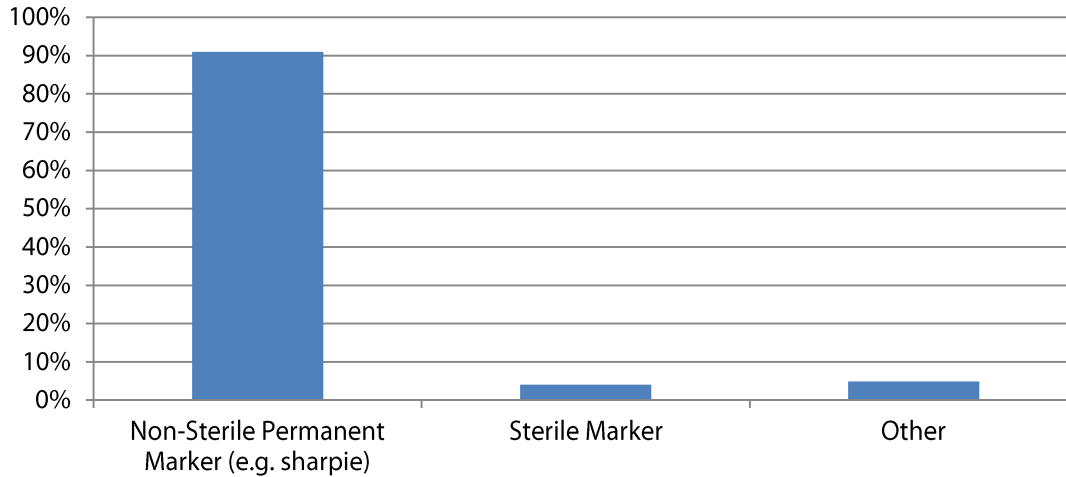
Type of ink used for tattooing



What type of device is used to mark patients prior to tattooing?

	Frequency	Valid Percent
Non-Sterile Permanent Marker (e.g. sharpie)	426	91.0%
Sterile Marker	19	4.1%
Other	23	4.9%
Total	468	100.0%

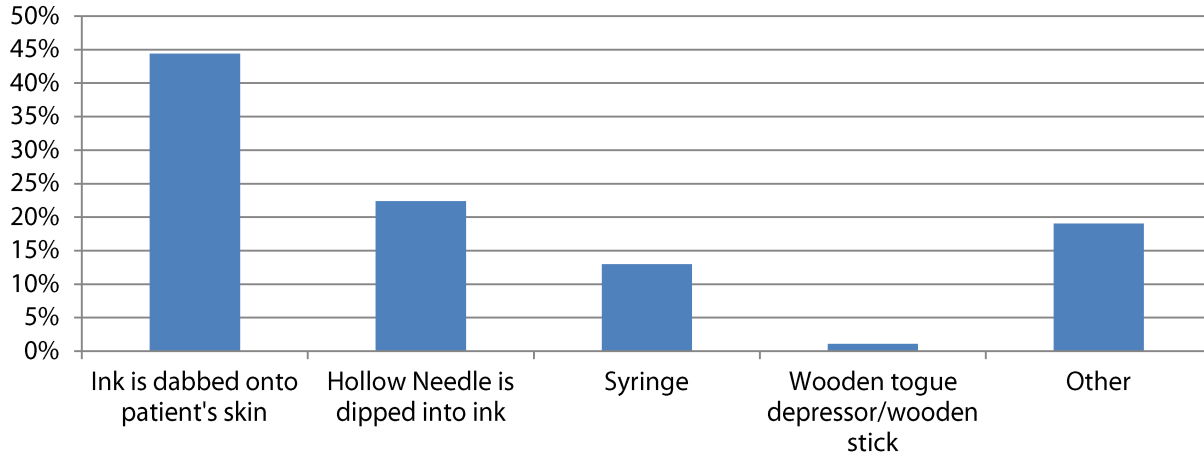
Type of device used to mark patients prior to tattooing



How is ink transferred from the container to the patient prior to tattooing?

	Frequency	Valid Percent
Ink is dabbed onto patient's skin	198	44.4%
Hollow Needle is dipped into ink	100	22.4%
Syringe	58	13.0%
Wooden tongue depressor/wooden stick	5	1.1%
Other	85	19.1%
Total	446	100.0%

Method for transferring ink from the container to the patient prior to tattooing



What type of device is used to tattoo in your department?

	Frequency	Valid Percent
Hand-held needle	217	47.8%
Gauged Needle	136	30.0%
Lancet	48	10.6%
Syringe	28	6.2%
Other	25	5.5%
Total	454	100.0%

Type of device used to tattoo

