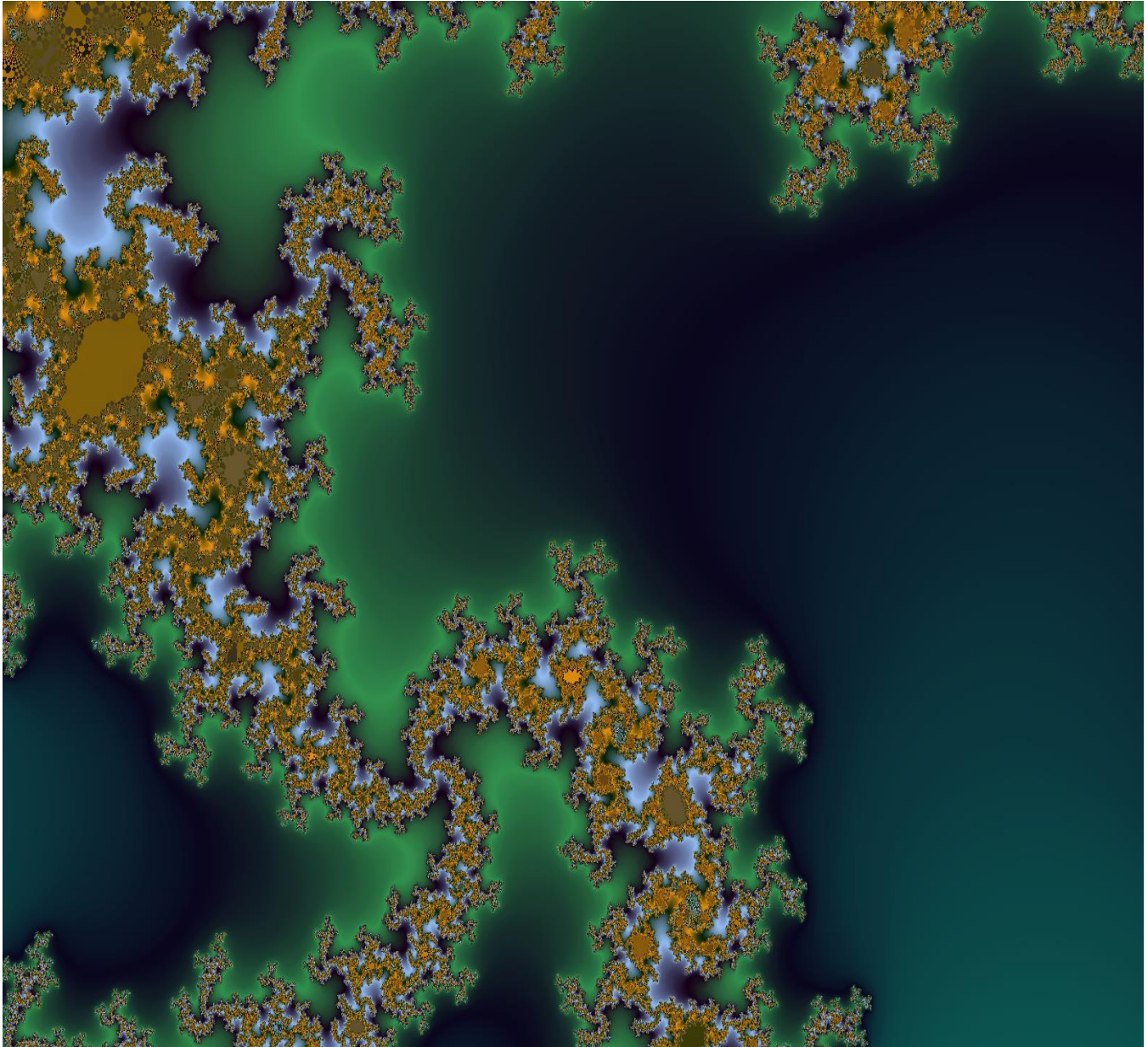


Radiation Therapy Staffing and Workplace Survey 2016



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Executive Summary

The Radiation Therapy Staffing and Workplace Survey 2016 was emailed in late July 2016 to 4,854 managers of U.S. radiation therapy facilities. At the close of the survey in September 2016, a total of 565 completed questionnaires had been submitted resulting in a response rate of 11.6%.

The sample size of 565 yields a margin of error for overall percentages of a maximum $\pm 4.1\%$ (at the 95% confidence interval).

To keep the report length minimal, 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:

- 7.3 for radiation therapy.
- 2.2 for medical dosimetry.

An estimation of the overall percentages of unfilled positions was calculated using the number of budgeted FTEs along with figures on vacant and recruiting positions.

- In radiation therapy, an estimated 2.9% of FTE positions are unfilled.
- In medical dosimetry, an estimated 3.5% of FTE positions are unfilled.
- Overall mean percentages of unfilled positions, calculated by combining the figures from both therapy and dosimetry, were highest in the South Atlantic region (5.2%) and lowest in the East North Central and East South Central regions (1.5% in both). Overall, the percent of unfilled positions combining both disciplines was 3.1%.

A majority of respondents (71.4%) described their facility as being appropriately staffed.

The survey also tracks longitudinal changes in staffing levels in radiation therapy and medical dosimetry.

- The number of FTE radiation therapists budgeted at each facility declined by 0.9 from 8.2 to 7.3 between 2014, when the last Radiation Therapy Staffing Survey was conducted, and 2016. Overall, the number of FTE therapists budgeted per facility has increased by 1.3 from 6.0 in 2004 to 7.3 in 2016.
- The number of FTE medical dosimetrists budgeted at each facility declined by 0.3, from 2.5 in 2014 to 2.2 in 2016.

- The estimated vacancy rate for FTE positions in therapy rose by 1.3%, from 1.6% in 2014 to 2.9% in 2016. This is the first time since 2011 that the vacancy rate for radiation therapists has risen.
- The estimated vacancy rate for FTE positions in medical dosimetry fell slightly by 0.1%, from 3.6% in 2014 to 3.5% in 2016. This continues a downward trend in vacancy rates for medical dosimetry positions that began in 2012.

Facility Demographics

Suburban facilities represented the largest share (43.4%) of respondents; 39.1% were urban, and the remaining 17.5% were rural.

The average respondent to the survey works in a facility that offers 11.4 radiation therapy and related services. The most commonly offered services are:

- Conformal radiation therapy delivery (95.4% of facilities).
- Intensity-modulated radiation therapy (IMRT) (95.3% of facilities).
- Computed tomography (CT) simulation (93.5% of facilities).

The least commonly offered services are:

- Proton therapy (2.7% of facilities).
- Hyperthermia (3.4% of facilities).
- Dynamic adaptive radiation therapy (9.3% of facilities).

Moreover, according to the responses provided, the average facility treats 45.0 patients each day and uses 2.0 linear accelerators; 96.1% of respondents work in a facility that uses treatment planning stations, and among those, each has an average of 3.5 planning stations.

Personnel Demographics

Only 13 facilities responding to the survey listed staff working in proton therapy. On average, 12.3 staff work in proton therapy at those facilities.

The average respondent works at a facility that schedules 2.4 therapists and 1.0 dosimetrist per linear accelerator. On average, there is only 0.7 hours per day when only one therapist is scheduled per linear accelerator.

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:

$$\text{(mean number of vacant and recruiting FTEs per facility) / (mean number of budgeted FTEs per facility) * 100}$$

For example, in radiation therapy the mean vacant and recruiting FTE positions is equal to 0.21. When divided by the mean budgeted FTE of 7.3, this yields a proportion of unfilled FTE positions of 0.029. Multiplying by 100 to give the percent value, and then rounding to the nearest tenth gives the percent vacancy rate for therapy of 2.9%.

Note that only combinations that 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 equivalents (FTEs) for your facility. Please use decimals for fractional FTEs.

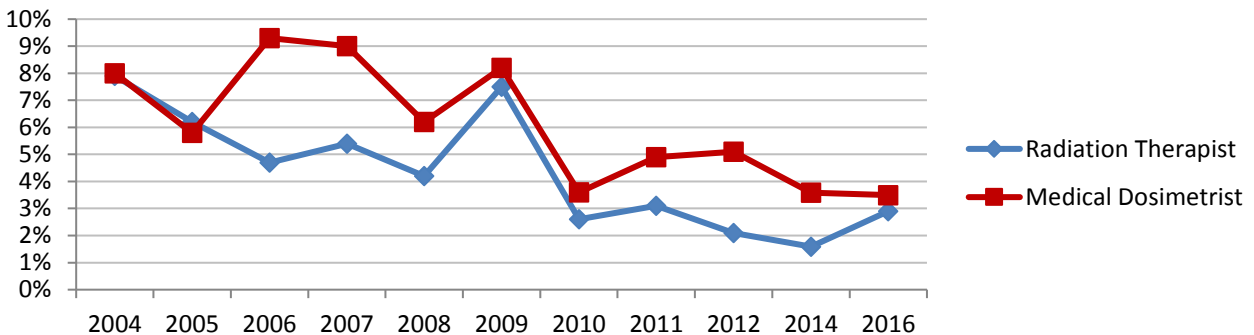
Radiation Therapist

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%
2014	575	8.2	0.13	1.6%
2016	552	7.3	0.21	2.9%

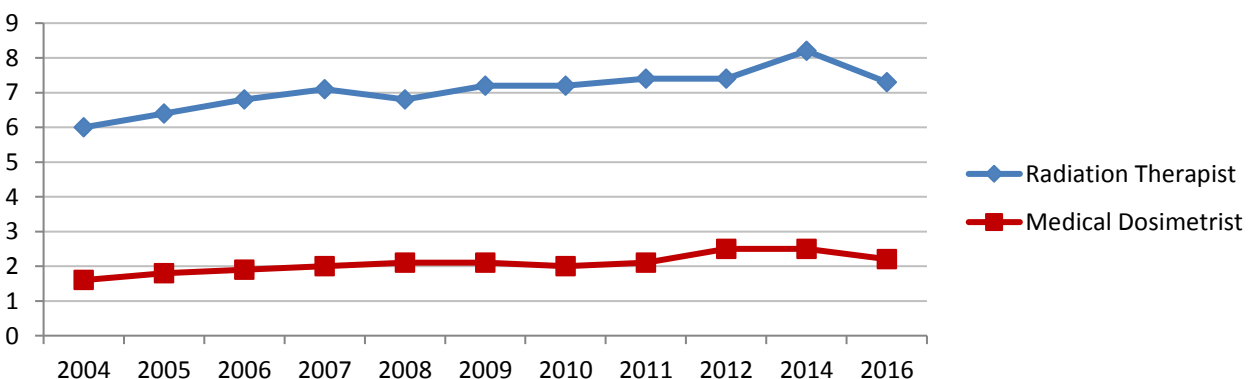
Medical Dosimetrist

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	0.10	4.9%
2012	406	2.5	0.12	5.1%
2014	544	2.5	0.09	3.6%
2016	517	2.2	0.08	3.5%

Estimated Percent Unfilled FTE Positions



Mean Budgeted FTEs per facility

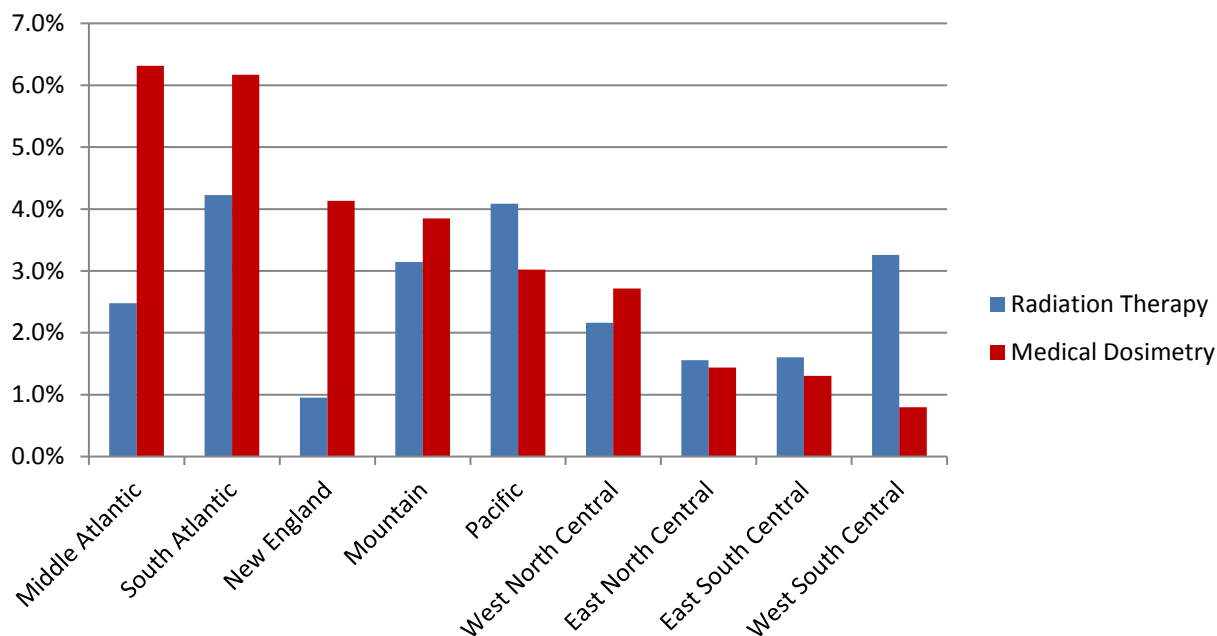


2016 Estimated Percent of Unfilled FTE Positions by Geographic Region^a

		Middle Atlantic	South Atlantic	New England	Mountain	Pacific	West North Central	East North Central	East South Central	West South Central
Radiation Therapy	N	35	88	43	86	87	40	67	32	70
	%	2.5%	4.2%	1.0%	3.1%	4.1%	2.2%	1.6%	1.6%	3.3%
Medical Dosimetry	N	33	87	38	78	77	39	64	31	67
	%	6.3%	6.2%	4.1%	3.8%	3.0%	2.7%	1.4%	1.3%	0.8%
Overall Mean		5.2%	4.3%	5.2%	2.4%	3.5%	3.6%	2.4%	1.5%	1.5%

^a Middle Atlantic: New York, Pennsylvania and New Jersey
 South Atlantic: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina and Georgia, Florida
 New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut
 Mountain: Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona and New Mexico
 Pacific: Alaska, Washington, Oregon, California and Hawaii
 West North Central: Missouri, North Dakota, South Dakota, Nebraska, Kansas, Minnesota and Iowa
 East North Central: Wisconsin, Michigan, Illinois, Indiana and Ohio
 East South Central: Kentucky, Tennessee, Mississippi and Alabama
 West South Central: Oklahoma, Texas, Arkansas and Louisiana

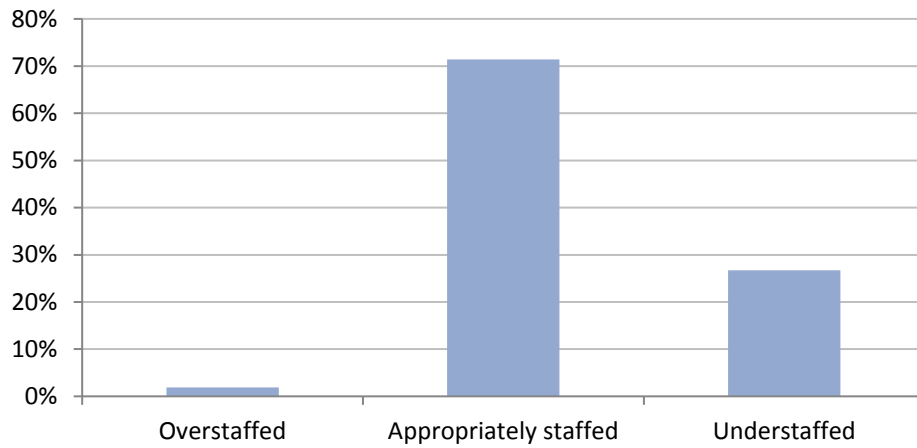
2016 Estimated Percent of FTE Positions by Geographic Region



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

	N	Valid Percent
Overstaffed	10	1.9%
Appropriately staffed	385	71.4%
Understaffed	144	26.7%
Total	539	100.0%

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



Facility Demographics

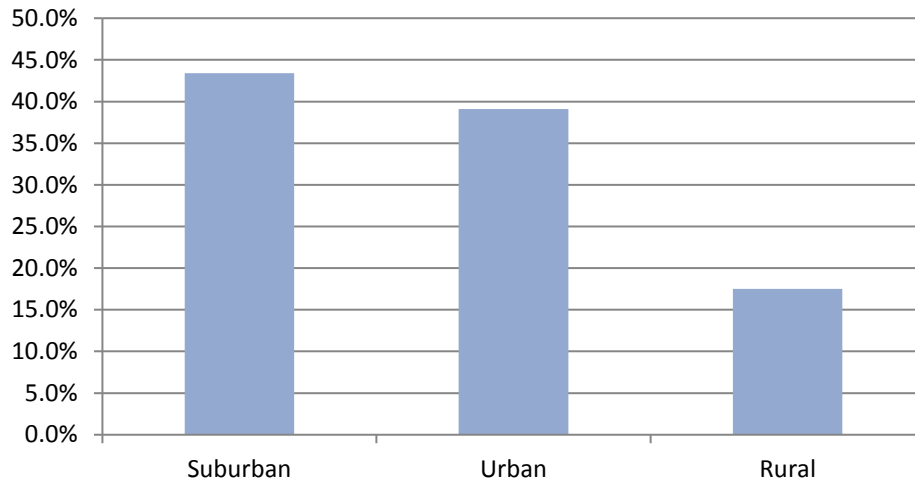
State

State	N	State	N	State	N	State	N	State	N
AK	1	HI	2	ME	1	NJ	20	SD	2
AL	7	IA	6	MI	18	NM	2	TN	8
AR	3	ID	5	MN	16	NV	4	TX	27
AZ	27	IL	16	MO	20	NY	34	UT	6
CA	54	IN	18	MS	8	OH	23	VA	16
CO	8	KS	5	MT	2	OK	10	VT	1
CT	6	KY	3	NC	19	OR	10	WA	17
DE	1	LA	6	ND	1	PA	32	WI	7
FL	25	MA	16	NE	8	RI	2	WV	3
GA	19	MD/DC	10	NH	1	SC	4	WY	1

Location of facility:

	N	Valid Percent
Suburban	245	43.4%
Urban	221	39.1%
Rural	99	17.5%
Total	565	100.0%

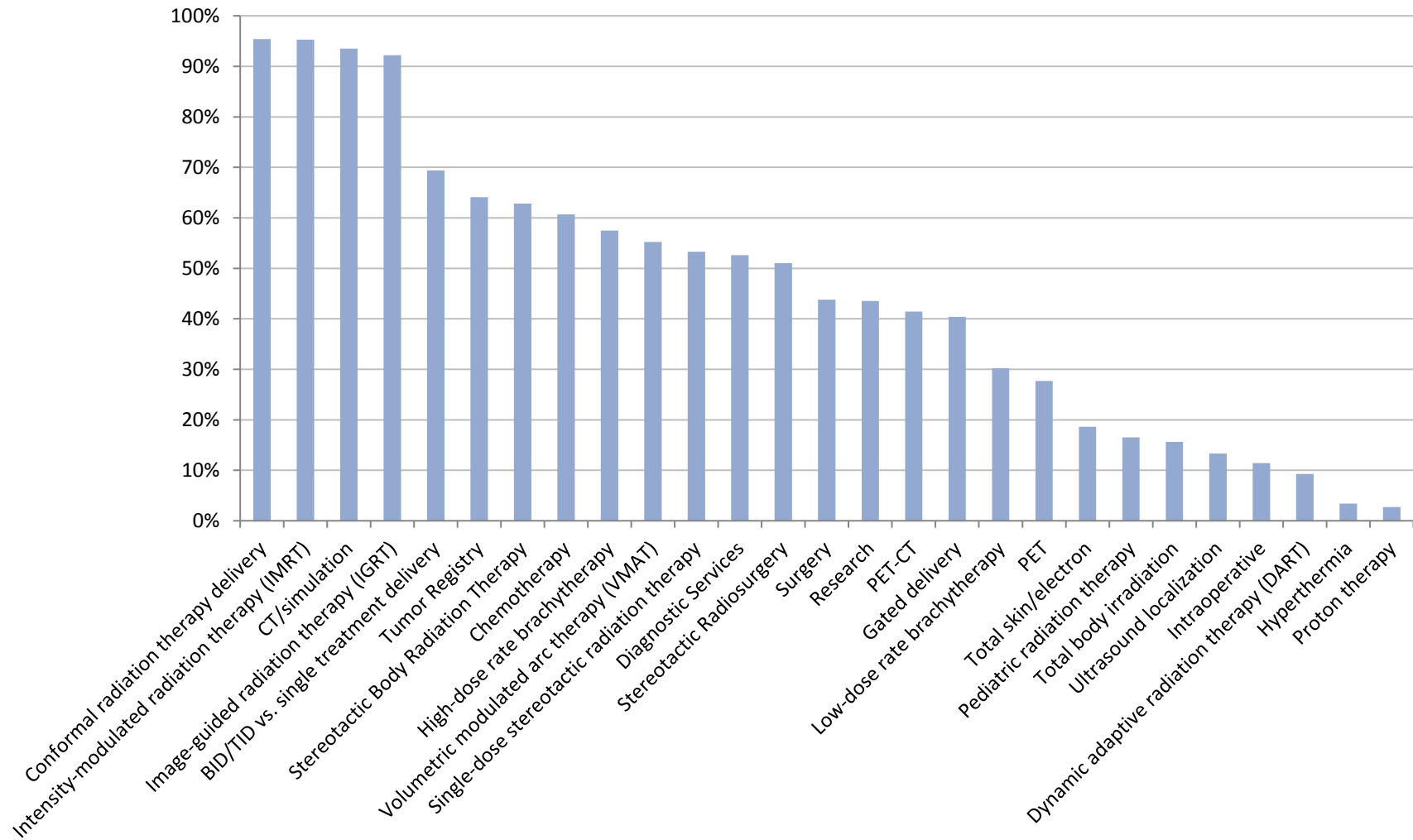
Location of facility:



Which of the following services does your facility provide?

	N	Percent of Cases
Conformal radiation therapy delivery	503	95.4%
Intensity-modulated radiation therapy (IMRT)	502	95.3%
CT/simulation	493	93.5%
Image-guided radiation therapy (IGRT)	486	92.2%
BID/TID vs. single treatment delivery	366	69.4%
Tumor Registry	338	64.1%
Stereotactic Body Radiation Therapy	331	62.8%
Chemotherapy	320	60.7%
High-dose rate brachytherapy	303	57.5%
Volumetric modulated arc therapy (VMAT)	291	55.2%
Single-dose stereotactic radiation therapy	281	53.3%
Diagnostic Services	277	52.6%
Stereotactic radiosurgery	269	51.0%
Surgery	231	43.8%
Research	229	43.5%
PET-CT	218	41.4%
Gated delivery	213	40.4%
Low-dose rate brachytherapy	159	30.2%
PET	146	27.7%
Total skin/electron	98	18.6%
Pediatric radiation therapy	87	16.5%
Total body irradiation	82	15.6%
Ultrasound localization	70	13.3%
Intraoperative	60	11.4%
Dynamic adaptive radiation therapy (DART)	49	9.3%
Hyperthermia	18	3.4%
Proton therapy	14	2.7%

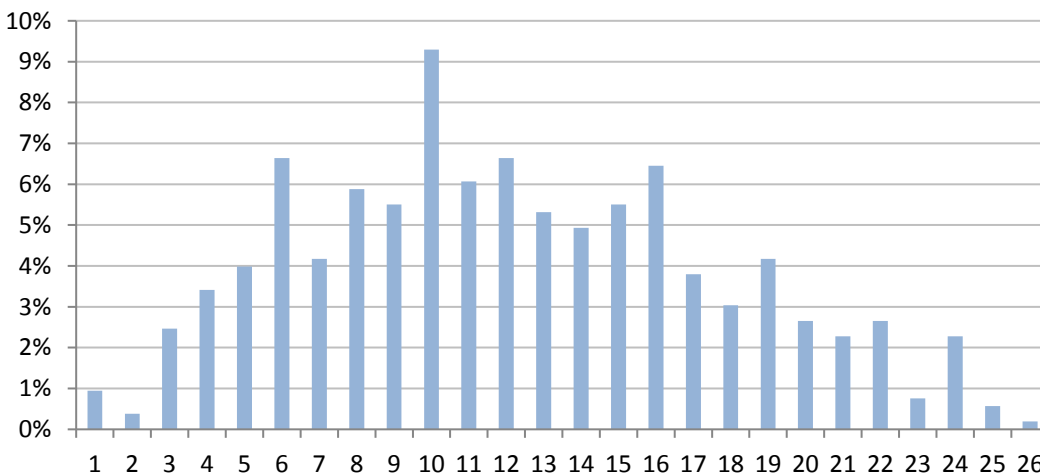
Which of the following services does your facility provide?



Number of services provided by each facility

	N	Valid Percent	Cumulative Percent
1	5	0.9%	0.9%
2	2	0.4%	1.3%
3	13	2.5%	3.8%
4	18	3.4%	7.2%
5	21	4.0%	11.2%
6	35	6.6%	17.8%
7	22	4.2%	22.0%
8	31	5.9%	27.9%
9	29	5.5%	33.4%
10	49	9.3%	42.7%
11	32	6.1%	48.8%
12	35	6.6%	55.4%
13	28	5.3%	60.7%
14	26	4.9%	65.7%
15	29	5.5%	71.2%
16	34	6.5%	77.6%
17	20	3.8%	81.4%
18	16	3.0%	84.4%
19	22	4.2%	88.6%
20	14	2.7%	91.3%
21	12	2.3%	93.5%
22	14	2.7%	96.2%
23	4	0.8%	97.0%
24	12	2.3%	99.2%
25	3	0.6%	99.8%
26	1	0.2%	100.0%
Total	527	100.0%	
Mean	12.2 (SD=5.5)		
Percentiles	5th=3.8, 25th=8.0, 50th=11.7, 75th=16.1, 95th=22.1		

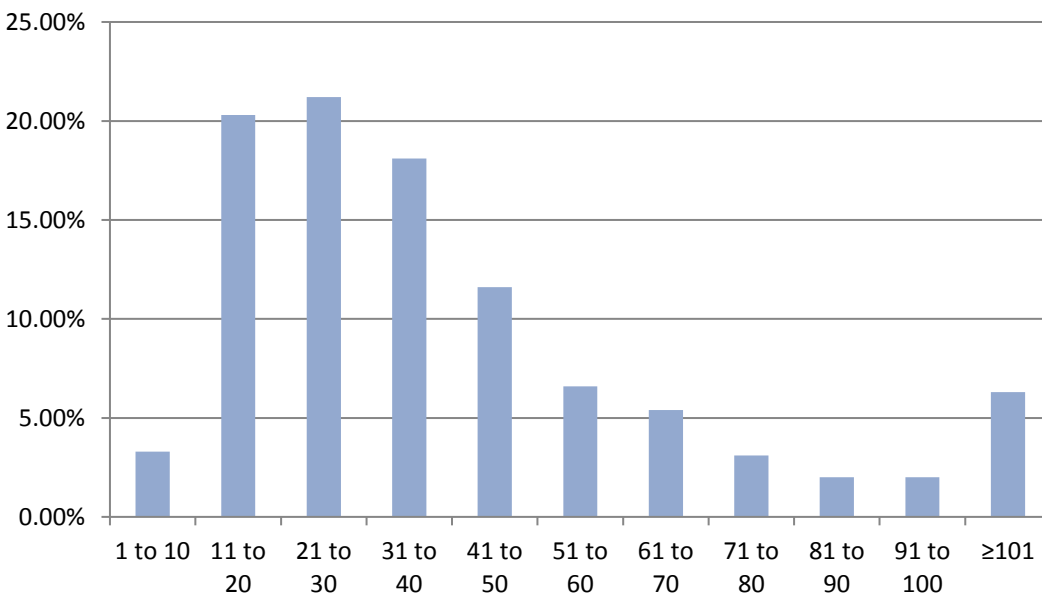
Number of service offered:



On average, how many patients are treated daily at your facility?

	N	Valid Percent	Cumulative Percent
1 to 10	18	3.3%	3.3%
11 to 20	110	20.3%	23.6%
21 to 30	115	21.2%	44.8%
31 to 40	98	18.1%	62.9%
41 to 50	63	11.6%	74.5%
51 to 60	36	6.6%	81.2%
61 to 70	29	5.4%	86.5%
71 to 80	17	3.1%	89.7%
81 to 90	11	2.0%	91.7%
91 to 100	11	2.0%	93.7%
≥101	34	6.3%	100.0%
Total	542	100.0%	
Mean	45.0 (SD=37.2)		
Percentiles	5th=12.0, 25th=22.9, 50th=34.7 75th=53.3, 95th=119.8		

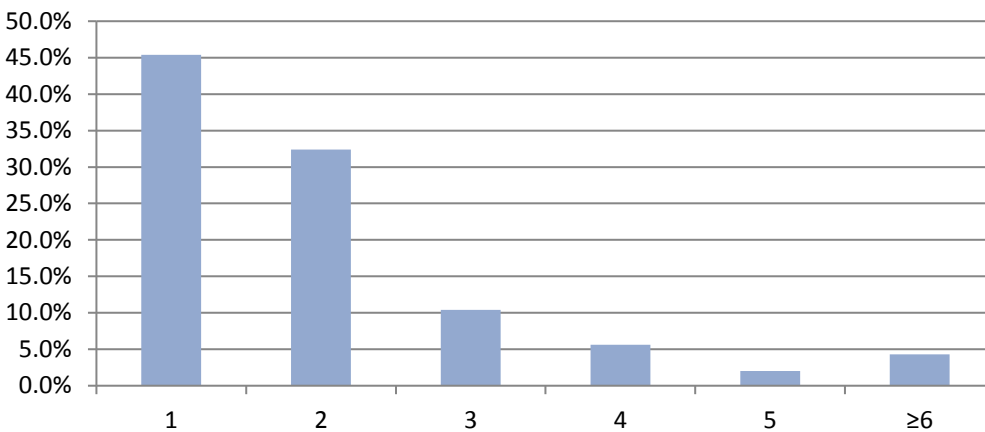
On average, how many patients are treated daily at your facility?



How many linear accelerators are used in your facility?

	N	Valid Percent	Cumulative Percent
1	245	45.4%	45.4%
2	175	32.4%	77.8%
3	56	10.4%	88.1%
4	30	5.6%	93.7%
5	11	2.0%	95.7%
≥6	23	4.3%	100.0%
Total	540	100.0%	
Mean	2.0 (SD=1.4)		
Percentiles	5th=-, 25th=1.1, 50th=1.6 75th=2.6, 95th=5.1		

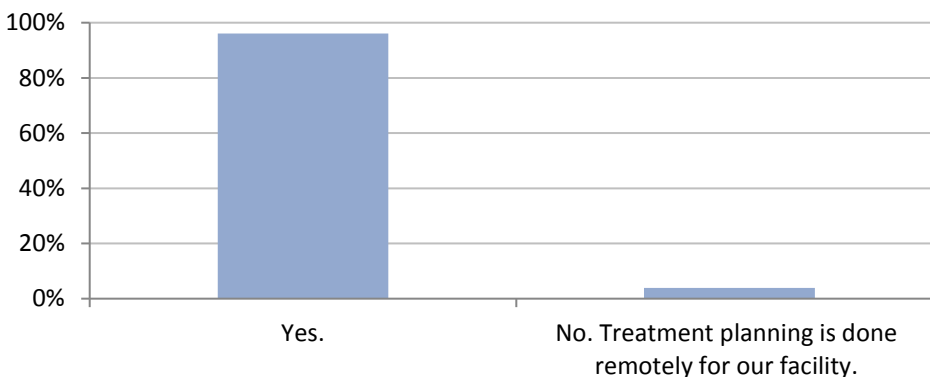
How many linear accelerators are used in your facility?



Are there treatment planning stations at your facility?

	N	Valid Percent
Yes.	517	96.1%
No. Treatment planning is done remotely for our facility.	21	3.9%
Total	538	100.0%

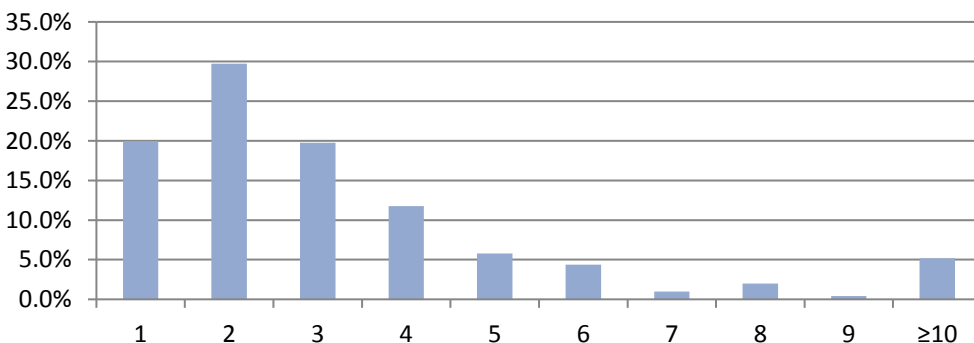
Are there treatment planning stations at your facility?



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

	N	Valid Percent	Cumulative Percent
1	100	20.0%	20.0%
2	149	29.7%	49.7%
3	99	19.8%	69.5%
4	59	11.8%	81.2%
5	29	5.8%	87.0%
6	22	4.4%	91.4%
7	5	1.0%	92.4%
8	10	2.0%	94.4%
9	2	0.4%	94.8%
≥10	26	5.2%	100.0%
Total	501	100.0%	
Mean	3.5 (SD=3.4)		
Percentiles	5th=-, 25th=1.7, 50th=2.6, 75th=4.0, 95th=9.4		

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

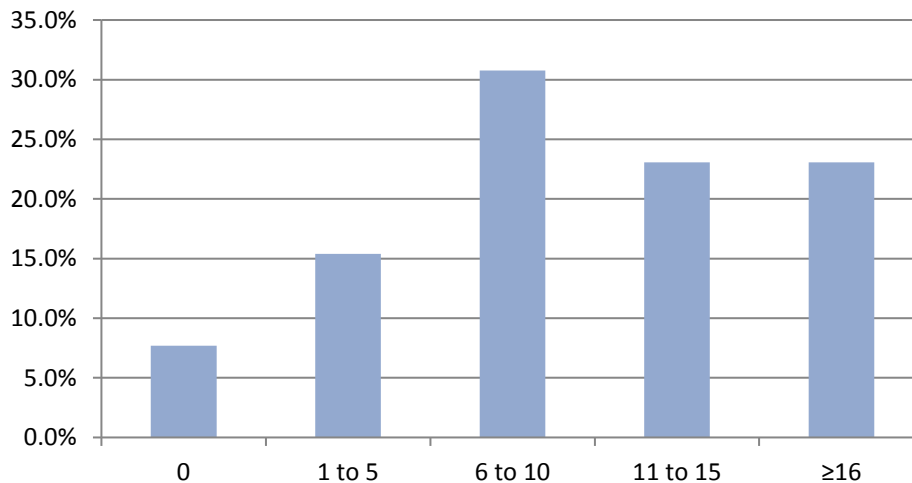


Personnel Demographics

How many of your staff work in proton therapy?

	N	Percent	Valid Percent	Cumulative Percent
0	1	0.2%	7.7%	7.7%
1 to 5	2	0.4%	15.4%	23.1%
6 to 10	4	0.8%	30.8%	53.8%
11 to 15	3	0.6%	23.1%	76.9%
≥16	3	0.6%	23.1%	100.0%
Total facilities that provide proton therapy	13	2.3%	100.0%	
Total facilities that do not provide proton therapy	552	97.7%		
Mean	12.3 (SD=8.8)			
Percentiles	5th=0.4, 25th=5.7, 50th=11.0, 75th=16.5, 95th=29.5			

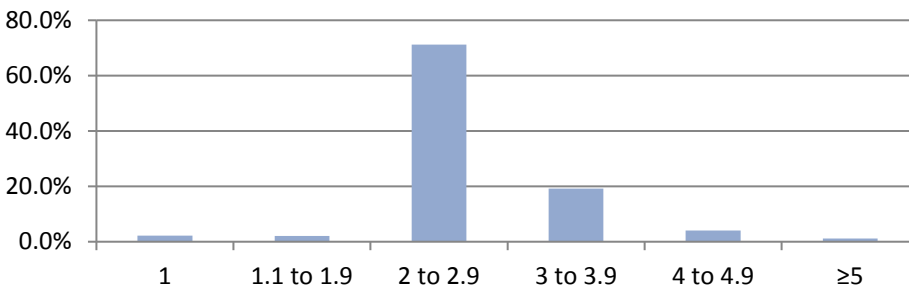
How many of your staff work in proton therapy? (of the facilities that provide Proton Therapy)



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

	N	Valid Percent	Cumulative Percent
1	12	2.2%	2.2%
1.1 to 1.9	11	2.1%	4.3%
2 to 2.9	382	71.3%	75.6%
3 to 3.9	103	19.2%	94.8%
4 to 4.9	22	4.1%	98.9%
≥5	6	1.1%	100.0%
Total	536	100.0%	
Mean	2.4 (SD=1.3)		
Percentiles	5th=1.5, 25th=1.8, 50th=2.1, 75th=2.6, 95th=3.8		

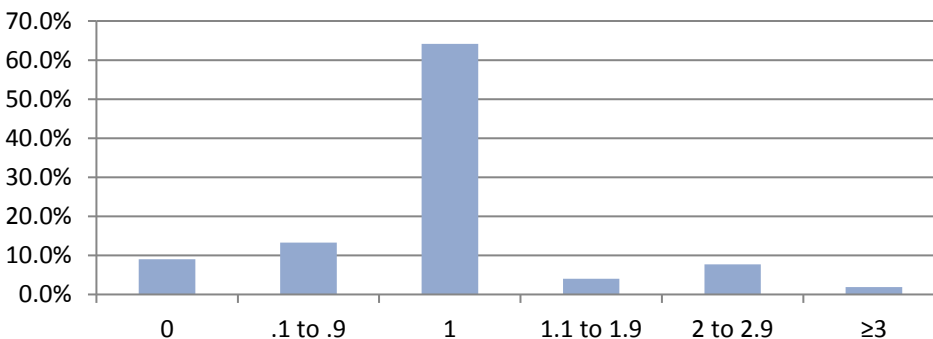
On average, how many therapists per linear accelerator are routinely scheduled at your facility?



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

	Frequency	Valid Percent	Cumulative Percent
0	47	9.0%	9.0%
0.1 to 0.9	69	13.2%	22.3%
1	334	64.1%	86.4%
1.1 to 1.9	21	4.0%	90.4%
2 to 2.9	40	7.7%	98.1%
≥3	10	1.9%	100.0%
Total	521	100.0%	
Mean	1.0 (SD=.69)		
Percentiles	5th=0.0, 25th=1.0, 50th=1.0, 75th=1.1, 95th=2.1		

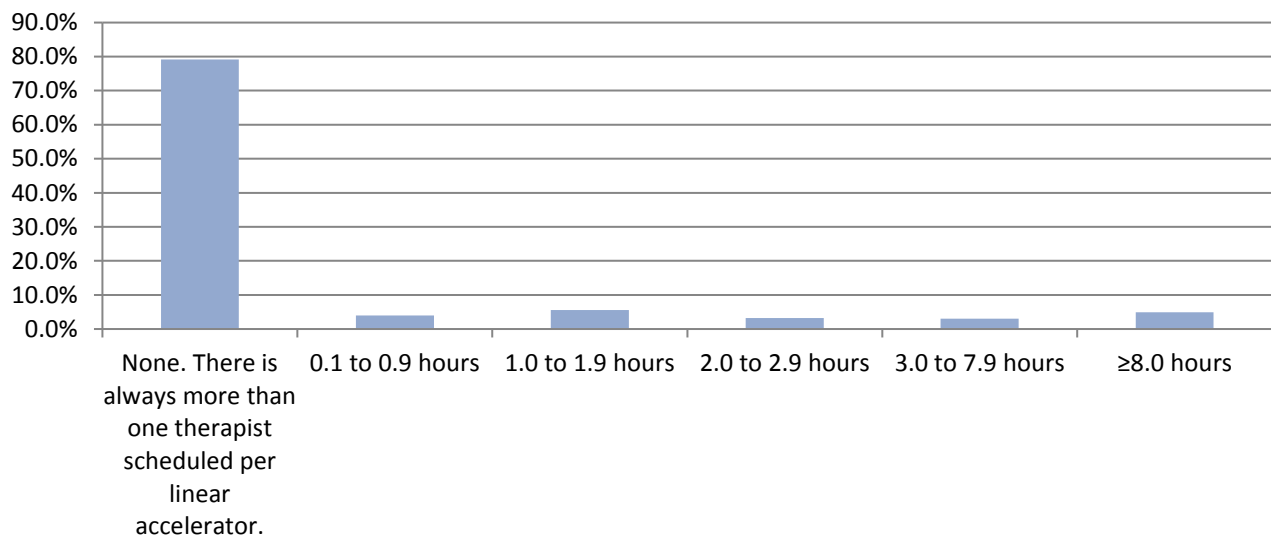
On average, how many dosimetrists per linear accelerator are routinely scheduled at your facility?



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

	N	Valid Percent	Cumulative Percent
None. There is always more than one therapist scheduled per linear accelerator.	415	79.2%	79.2%
0.1 to 0.9 hours	21	4.0%	83.2%
1.0 to 1.9 hours	29	5.5%	88.7%
2.0 to 2.9 hours	17	3.2%	92.0%
3.0 to 7.9 hours	16	3.1%	95.0%
≥8.0 hours	26	5.0%	100.0%
Total	524	100.0%	200.0%
Mean	0.7 (SD=1.9)		
Percentiles	5th=-, 25th=-, 50th=0.07 75th=0.22, 95th=7.1		

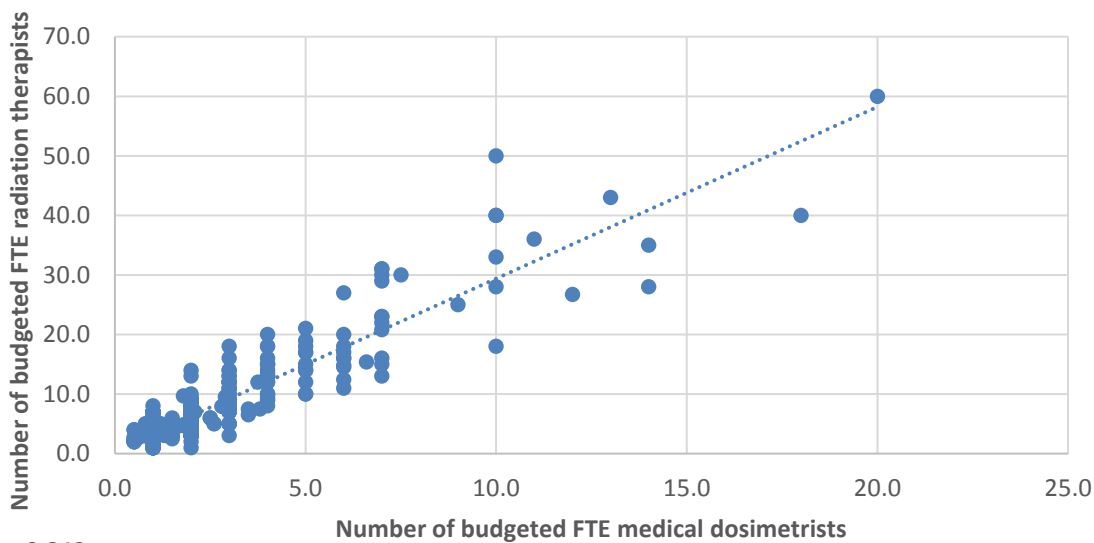
How many, if any, hours per day does your facility routinely schedule only one therapist per linear accelerator?



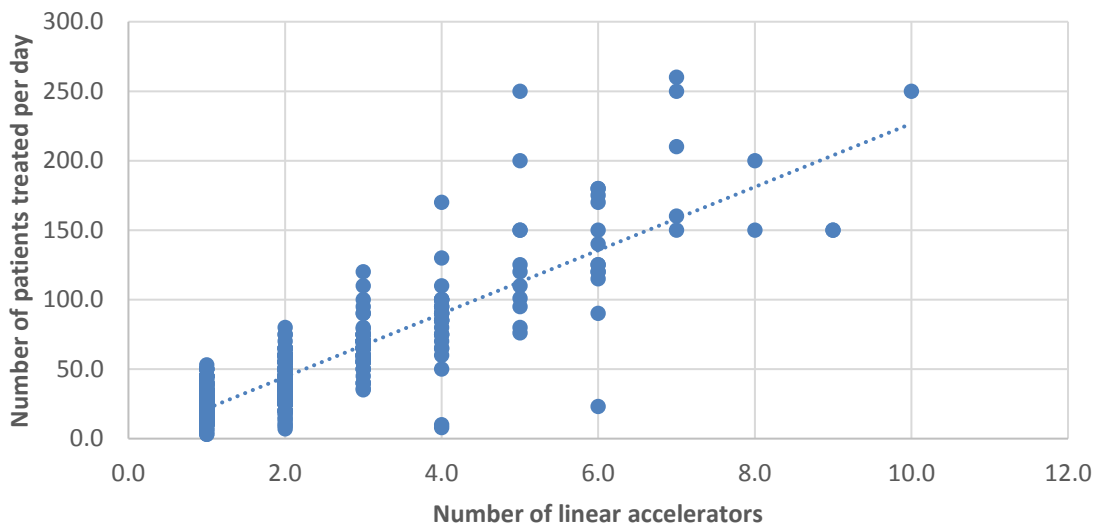
Appendix A. Scatterplots

Below are scatterplots that demonstrate the observed relation between selected variables from the survey. Please note that these scatterplots do not necessarily demonstrate any causal relation. They merely show how the given factors measured in the survey vary from each other. In each instance below, one variable is treated as independent (charted on the x-axis) and another is treated as dependent (charted on the y-axis). The points on the chart represent each of the observed data points from the survey. The diagonal line running across the chart represents the best-fit straight line through the observed data points. This is derived from the regression equation in the lower left-hand corner of the chart. The r^2 measures the proportion of variance among the data points accounted for by the regression equation. The closer the r^2 is to 1, the better the line fits the data; the closer the r^2 is to 0, the more poorly the line fits the data. Also listed is the ratio of the variable on the x-axis to the variable on the y-axis.

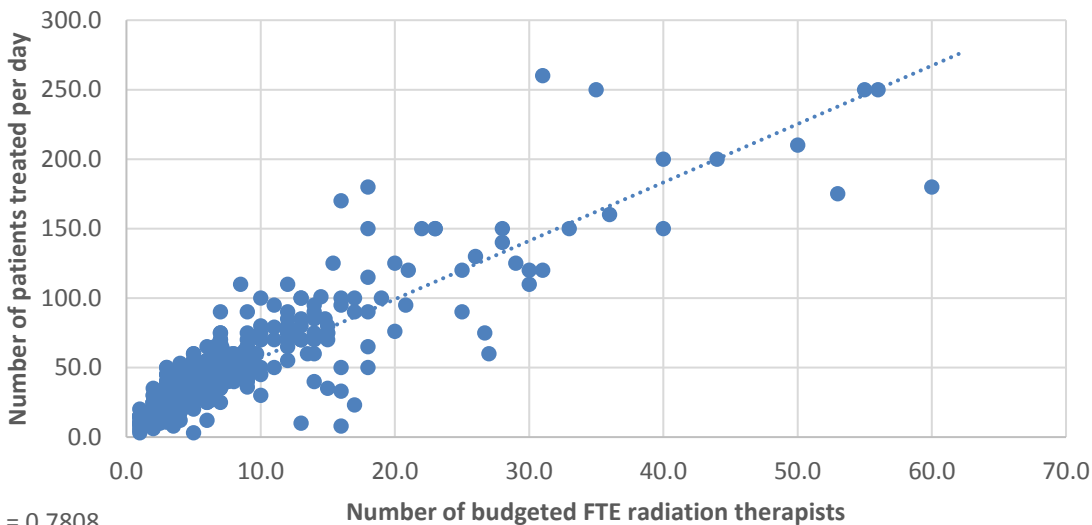
**Number of budgeted FTE radiation therapists per facility by
Number of budgeted FTE medical dosimetrists per facility**



**Number of patients treated per day by number of linear
accelerators per facility**



Number of patients treated per day by Number of budgeted FTE radiation therapists per facility



Number of patients treated per day by number of budgeted FTE medical dosimetrists per facility

