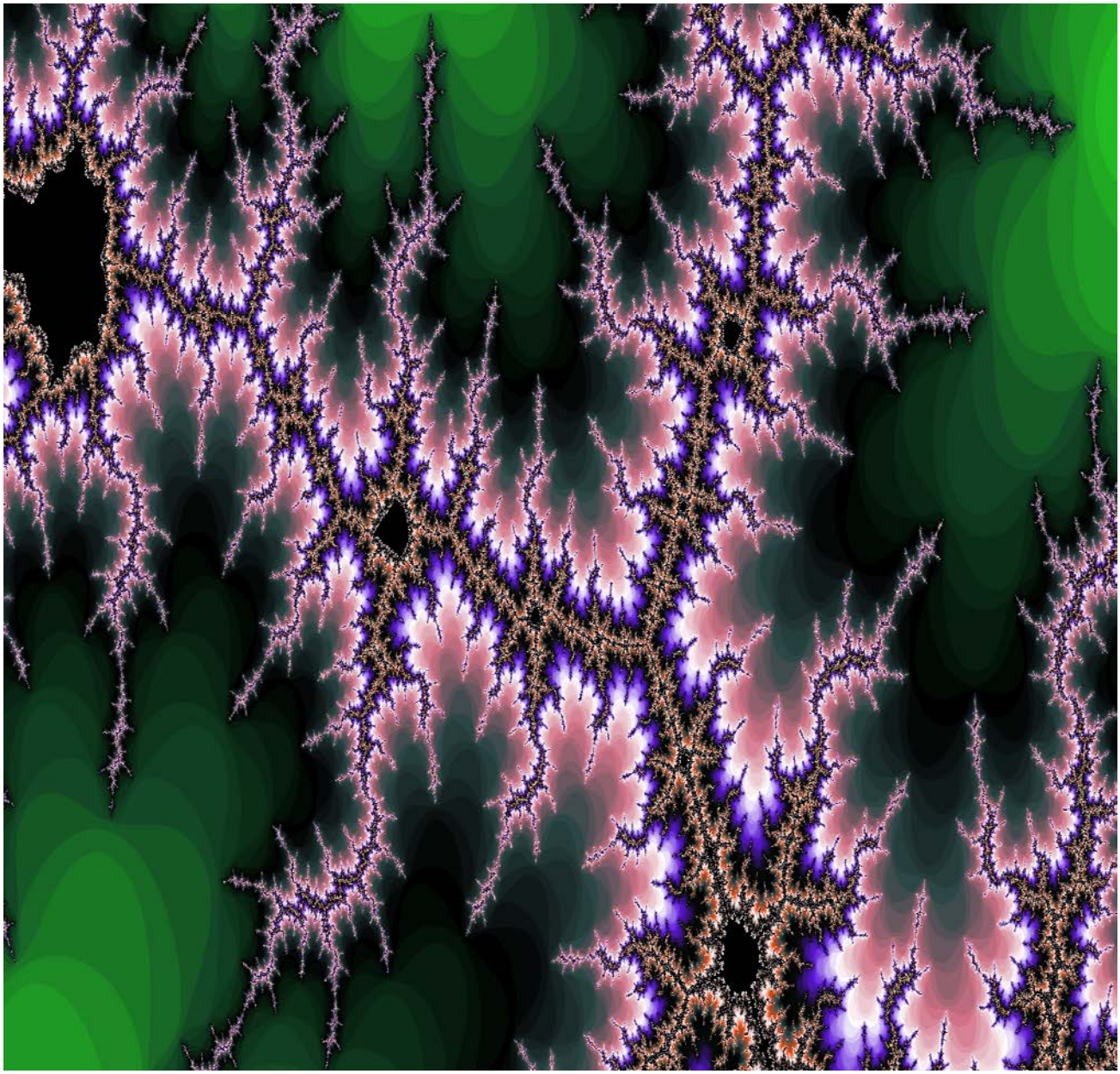
essentialresearch

Radiation Therapy Staffing and Workplace Survey 2018



asrt
American Society of Radiologic Technologists

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Executive Summary

The 2018 Radiation Therapy Staffing and Workplace Survey was emailed in early June 2018 to 1,541 managers of U.S. radiation therapy facilities. At the close of the survey in July 2018, a total of 138 completed questionnaires had been submitted, resulting in a response rate of 9.0%

The sample size of 138 yields a margin of error for overall percentages of a maximum ± 8.3% at the 95% confidence interval.

To keep this report brief, responses to open-ended questions were not included, but are available upon request.

Staffing of Facilities

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

- 7.7 for radiation therapy.
- 2.5 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 3.2% of FTE positions are unfilled.

In medical dosimetry, an estimated 2.4% 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 Pacific region (7.2%) and lowest in New England (0.0%). Overall, the percent of unfilled positions combing both disciplines was 2.9%.

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 rose by 0.4 from 7.3 to 7.7 between 2016, when the last Radiation Therapy Staffing Survey was conducted, and 2018. Overall, the number of FTE therapists budgeted per facility has increased by 1.7 from 6.0 in 2004 to 7.7 in 2018.

- The number of FTE medical dosimetrists budgeted at each facility rose by 0.3, from 2.2 in 2016 to 2.5 in 2018.
- The estimated vacancy rate for FTE positions in therapy rose by 0.3%, from 2.9% in 2016 to 3.2% in 2018. This marks the second time in a row estimated vacancy rates have risen.
- The estimated vacancy rate for FTE positions in medical dosimetry fell by 0.9%, from 3.5% in 2016 to 2.4% in 2018. This continues a downward trend in vacancy rates for medical dosimetry positions that began in 2012.

Facility Demographics

Urban facilities represented the largest share (53.3%) of respondents; 31.4% were suburban, and the remaining 15.3% were rural.

The average respondent to the survey works in a facility that offers 16.2 services in radiation therapy and related fields. The most commonly offered services are:

- CT/simulation (98.5% of facilities).
- Intensity-modulated radiation therapy (IMRT) (97.0% of facilities).
- Cone-beam CT (CBCT) (92.5% of facilities).

The least commonly offered services are:

- Hyperthermia (3.0% of facilities).
- Proton therapy (5.3% of facilities).
- Dynamic adaptive radiation therapy (15.8% of facilities).

When asked which, if any, services they plan to expand, 82.0% said they plan to add additional LINAC therapy units, 27.0% plan to add real-time surface tracking, and 24.3% plan to add adaptive planning.

According to the responses provided, the average facility treats 53.4 patients each day and uses 2.5 linear accelerators.

Personnel Demographics

The average respondent works at a facility that schedules 2.4 therapists and 1.1 dosimetrist per linear accelerator. On average, there is 1.0 hour 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 calculated 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 per facility is equal to 0.25. When divided by the mean budgeted FTE of 7.7, this yields a proportion of unfilled FTE positions of 0.032. Multiplying by 100 to give the percent value, and then rounding to the nearest tenth gives the percent vacancy rate for radiation therapy of 3.2%.

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.

Outliers

Numeric variables were analyzed for non-representative outliers with cross-tabulated scatter plots and box plots. By conventional definition, data that were 1.5 times greater than the third quartile were designated an outlier and excluded from the analysis.

Staffing of Facilities

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

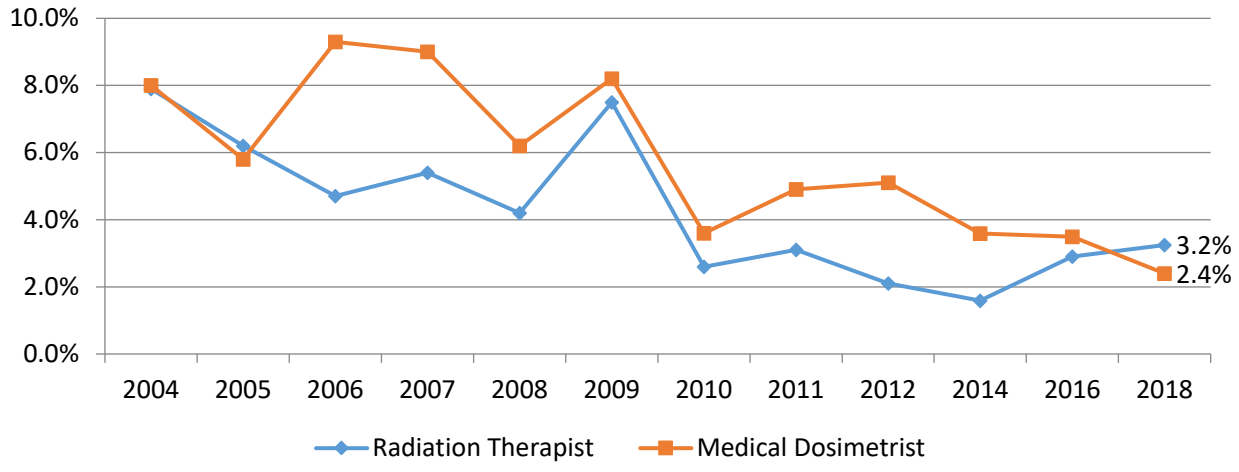
Radiation Therapist

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%
2018	**124**	**7.7**	**0.25**	**3.2%**

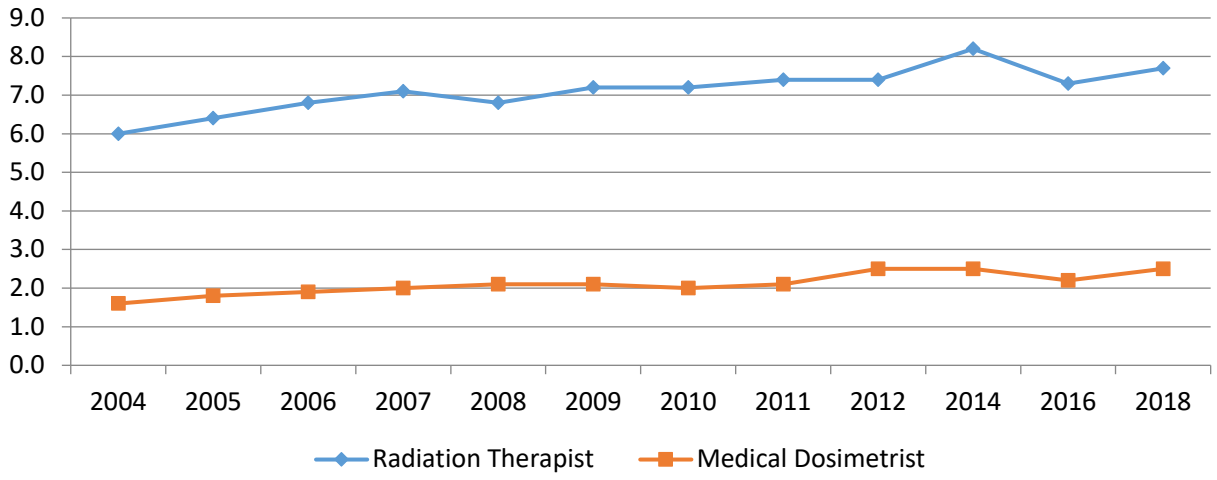
Medical Dosimetrist

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%
2018	**117**	**2.5**	**0.06**	**2.4%**

Estimated Percent Unfilled FTE Positions



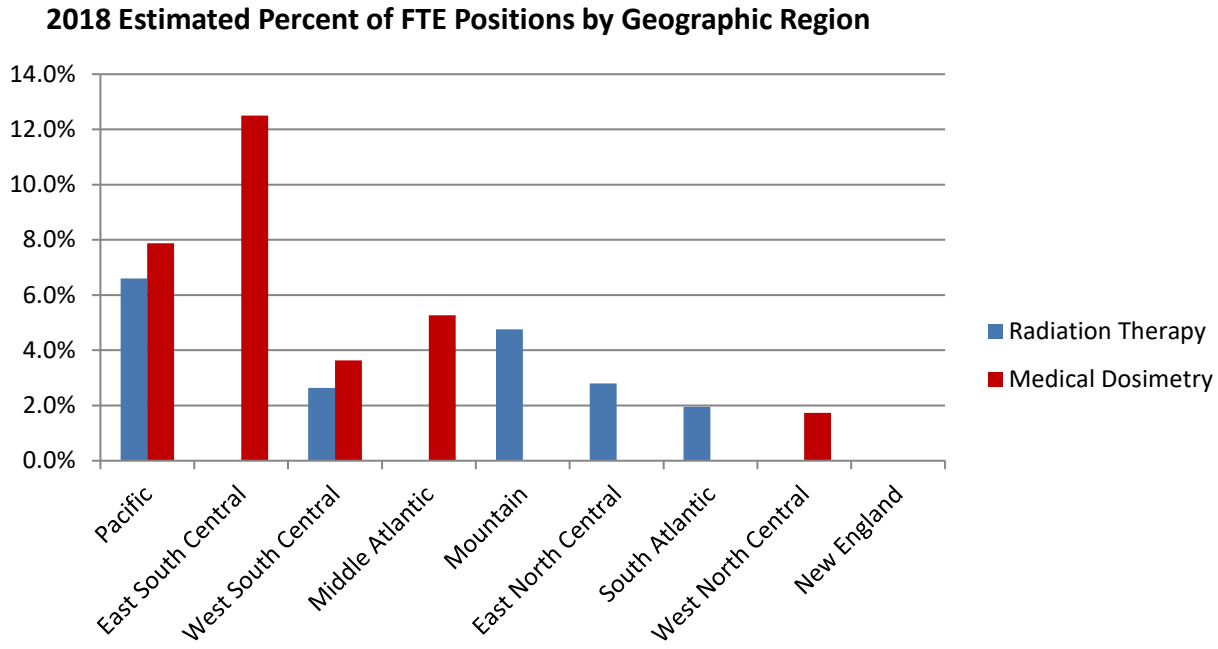
Mean Budgeted FTEs per facility



2018 Estimated Percent of Unfilled FTE Positions by Geographic Region[a]

		Pacific	East South Central	West South Central	Middle Atlantic	Mountain	East North Central	South Atlantic	West North Central	New England
Radiation Therapy	N	17	4	16	9	23	17	21	9	8
	%	6.6%	0.0%	2.6%	0.0%	4.8%	2.8%	1.9%	0.0%	0.0%
Medical Dosimetry	N	16	4	15	9	21	14	22	9	7
	%	7.9%	12.5%	3.6%	5.3%	0.0%	0.0%	0.0%	1.7%	0.0%
Overall Mean		**7.2%**	**6.3%**	**3.1%**	**2.6%**	**2.5%**	**1.5%**	**1.0%**	**0.9%**	**0.0%**

[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



Facility Demographics

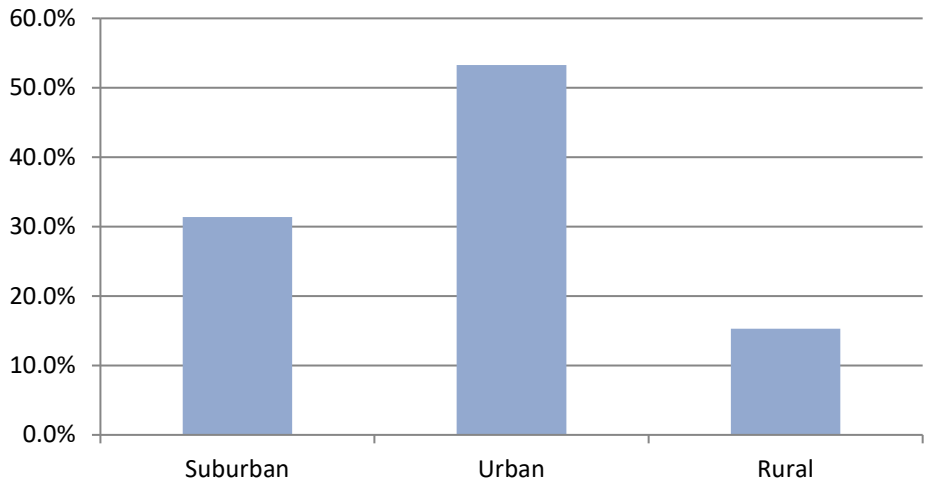
Responding Facilities by State

State	N	State	N	State	N	State	N	State	N
AK	0	HI	1	ME	0	NJ	3	SD	0
AL	3	IA	3	MI	1	NM	0	TN	3
AR	0	ID	1	MN	2	NV	1	TX	8
AZ	6	IL	5	MO	1	NY	14	UT	1
CA	7	IN	7	MS	4	OH	7	VA	6
CO	3	KS	1	MT	0	OK	2	VT	0
CT	1	KY	0	NC	4	OR	4	WA	2
DE	0	LA	2	ND	0	PA	9	WI	1
FL	8	MA	5	NE	1	RI	0	WV	0
GA	4	MD/DC	2	NH	0	SC	1	WY	1

Location of facility:

	N	Valid Percent
Suburban	43	31.4%
Urban	73	53.3%
Rural	21	15.3%
Total	**137**	**100.0%**

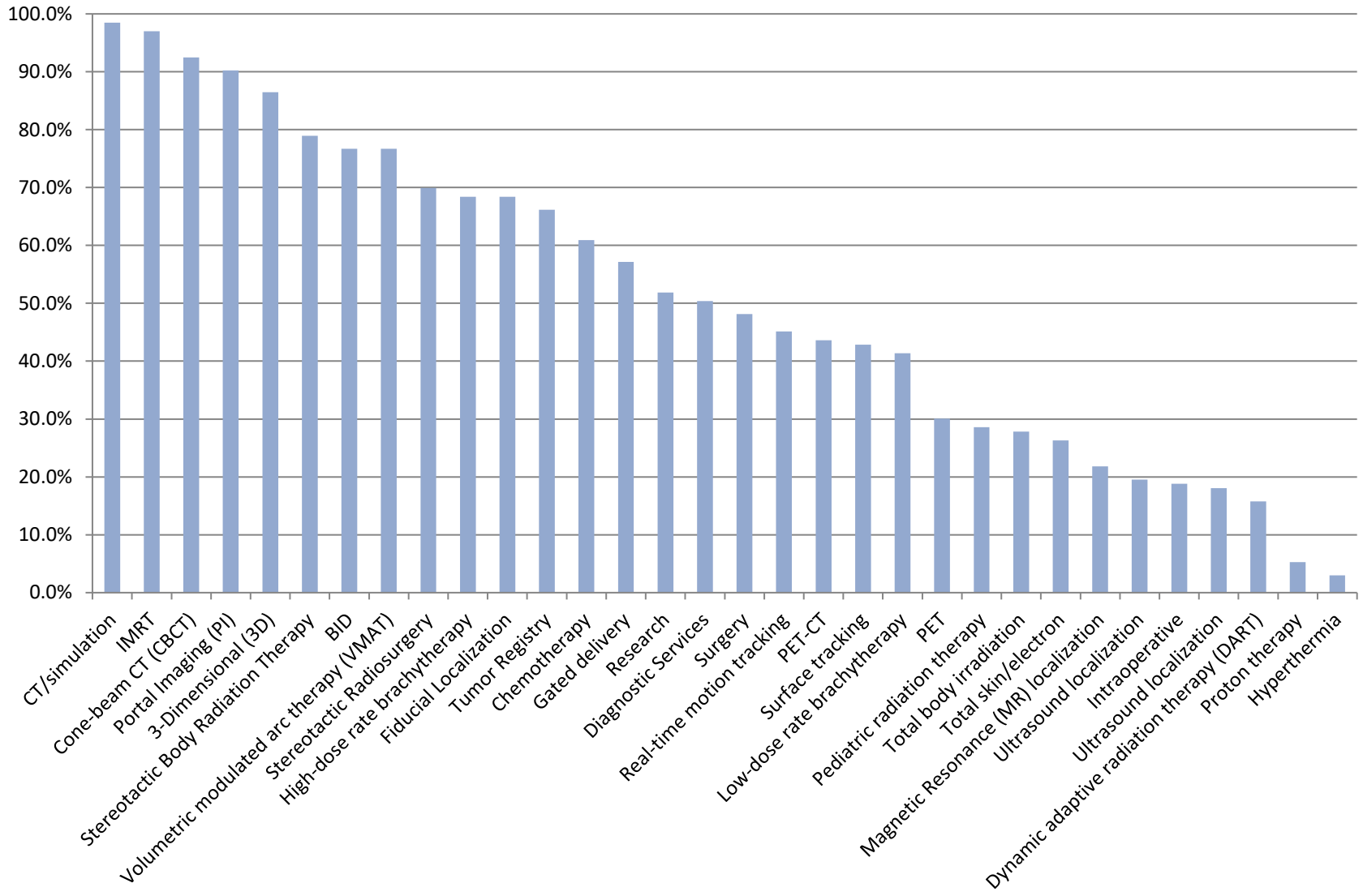
Location of facility:



Which of the following services does your facility provide?

	N	Percent of Cases
CT/simulation	131	98.5%
Intensity-modulated radiation therapy (IMRT)	129	97.0%
Cone-beam CT (CBCT)	123	92.5%
Portal Imaging (PI)	120	90.2%
3-Dimensional (3D)	115	86.5%
Stereotactic Body Radiation Therapy	105	78.9%
BID	102	76.7%
Volumetric modulated arc therapy (VMAT)	102	76.7%
Stereotactic Radiosurgery	93	69.9%
High-dose rate brachytherapy	91	68.4%
Fiducial Localization	91	68.4%
Tumor Registry	88	66.2%
Chemotherapy	81	60.9%
Gated delivery	76	57.1%
Research	69	51.9%
Diagnostic Services	67	50.4%
Surgery	64	48.1%
Real-time motion tracking	60	45.1%
PET-CT	58	43.6%
Surface tracking	57	42.9%
Low-dose rate brachytherapy	55	41.4%
PET	40	30.1%
Pediatric radiation therapy	38	28.6%
Total body irradiation	37	27.8%
Total skin/electron	35	26.3%
Magnetic Resonance (MR) localization	29	21.8%
Ultrasound localization	26	19.5%
Intraoperative	25	18.8%
Ultrasound localization	24	18.0%
Dynamic adaptive radiation therapy (DART)	21	15.8%
Proton therapy	7	5.3%
Hyperthermia	4	3.0%

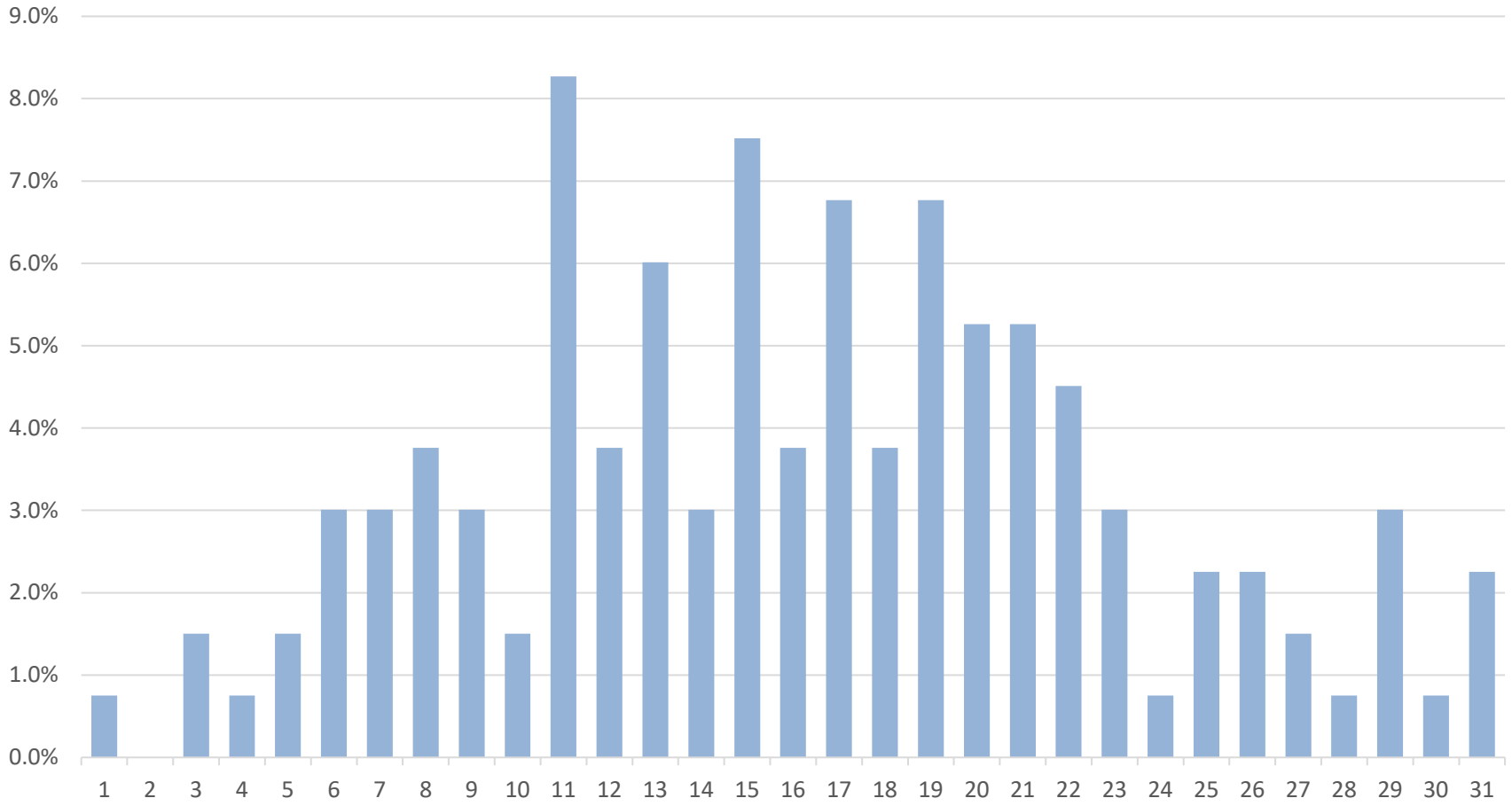
Which of the following services does your facility provide?



Number of services provided by each facility

	N	Valid Percent	Cumulative Percent
1	1	0.8%	0.8%
2	0	0.0%	0.8%
3	2	1.5%	2.3%
4	1	0.8%	3.0%
5	2	1.5%	4.5%
6	4	3.0%	7.5%
7	4	3.0%	10.5%
8	5	3.8%	14.3%
9	4	3.0%	17.3%
10	2	1.5%	18.8%
11	11	8.3%	27.1%
12	5	3.8%	30.8%
13	8	6.0%	36.8%
14	4	3.0%	39.8%
15	10	7.5%	47.4%
16	5	3.8%	51.1%
17	9	6.8%	57.9%
18	5	3.8%	61.7%
19	9	6.8%	68.4%
20	7	5.3%	73.7%
21	7	5.3%	78.9%
22	6	4.5%	83.5%
23	4	3.0%	86.5%
24	1	0.8%	87.2%
25	3	2.3%	89.5%
26	3	2.3%	91.7%
27	2	1.5%	93.2%
28	1	0.8%	94.0%
29	4	3.0%	97.0%
30	1	0.8%	97.7%
31	3	2.3%	100.0%
Total	**133**	**100.0%**	
Mean	**16.2** (*SD=6.8*)		
Percentiles	5th=5.7, 25th=11.0, 50th=16.0, 75th=21.0, 95th=29.0		

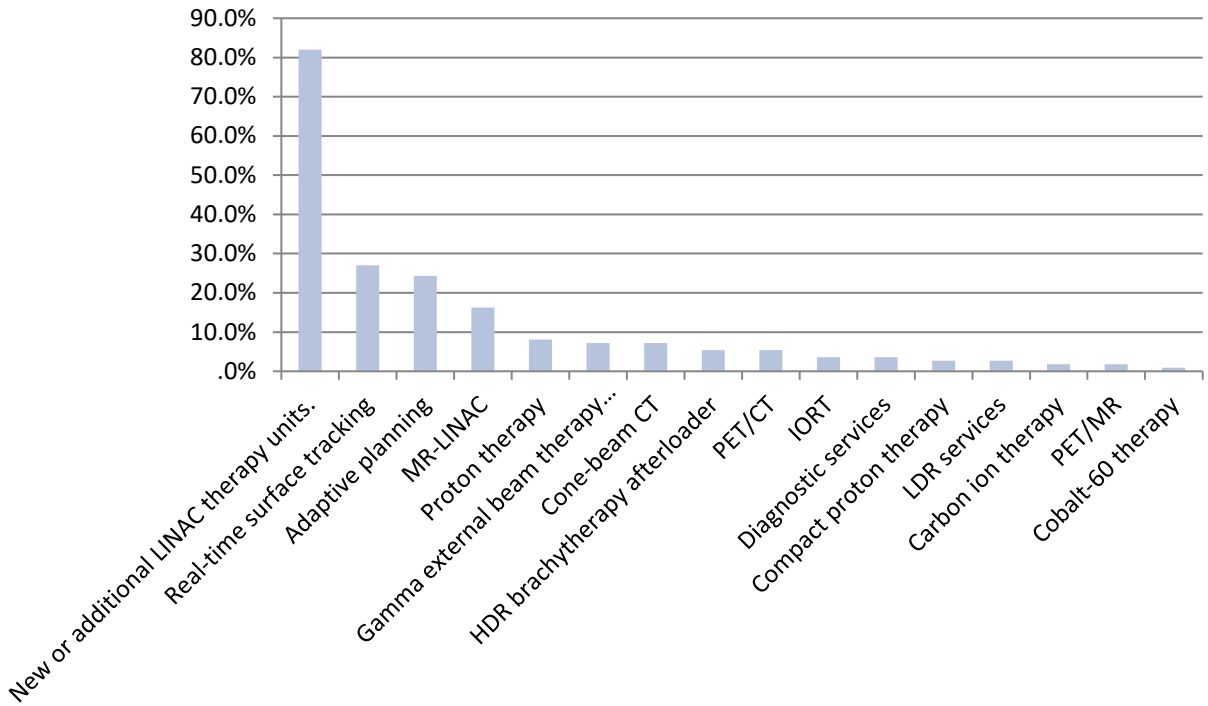
Number of serviced offered:



Over the next few years, is your facility planning to expand services to include any of the following?

	N	Percent of Cases
New or additional LINAC therapy units.	91	82.0%
Real-time surface tracking	30	27.0%
Adaptive planning	27	24.3%
MR-LINAC	18	16.2%
Proton therapy	9	8.1%
Gamma external beam therapy (Cyberknife, gammapod, Tomotherapy, etc.)	8	7.2%
Cone-beam CT	8	7.2%
HDR brachytherapy afterloader	6	5.4%
PET/CT	6	5.4%
IORT	4	3.6%
Diagnostic services	4	3.6%
Compact proton therapy	3	2.7%
LDR services	3	2.7%
Carbon ion therapy	2	1.8%
PET/MR	2	1.8%
Cobalt-60 therapy	1	.9%

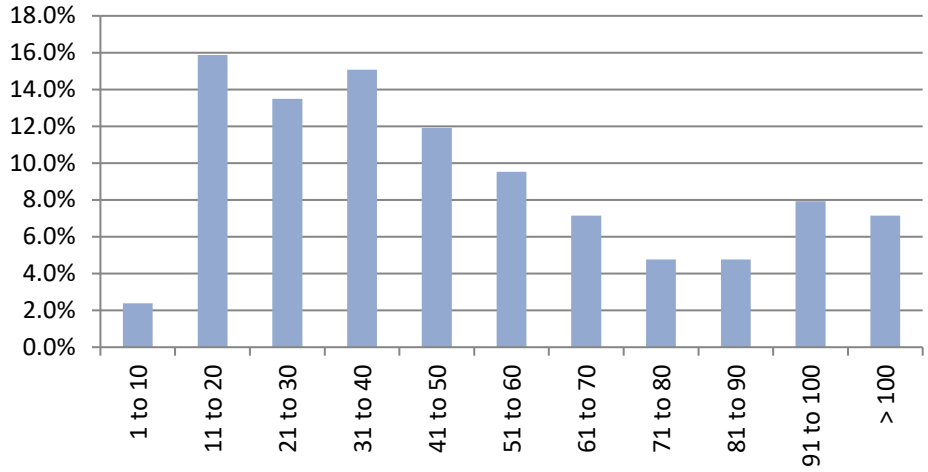
Over the next few years, is your facility planning to expand services to include any of the following?



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

	N	Valid Percent	Cumulative Percent
1 to 10	3	2.4%	2.4%
11 to 20	20	15.9%	18.3%
21 to 30	17	13.5%	31.7%
31 to 40	19	15.1%	46.8%
41 to 50	15	11.9%	58.7%
51 to 60	12	9.5%	68.3%
61 to 70	9	7.1%	75.4%
71 to 80	6	4.8%	80.2%
81 to 90	6	4.8%	84.9%
91 to 100	10	7.9%	92.9%
> 100	9	7.1%	100.0%
Total	**126**	**100.0%**	
Mean	**53.4** (*SD=34.2*)		
Percentiles	5th=15.0, 25th=25.0, 50th=48.0 75th=71.0, 95th=120.0		

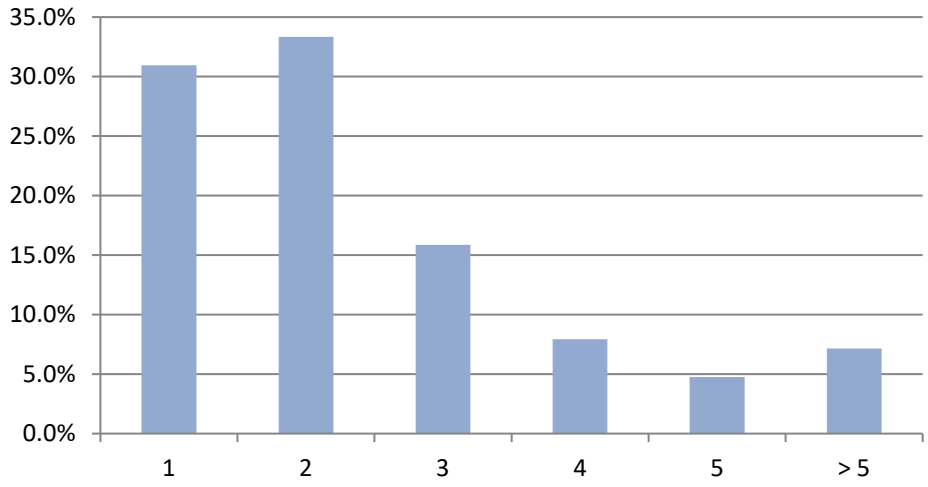
On average, how many patients are treated daily at your facility?



How many linear accelerators are used in your facility?

	N	Valid Percent	Cumulative Percent
1	39	31.0%	31.0%
2	42	33.3%	64.3%
3	20	15.9%	80.2%
4	10	7.9%	88.1%
5	6	4.8%	92.9%
> 5	9	7.1%	100.0%
Total	**126**	**100.0%**	
Mean	**2.5** (SD=1.6)		
Percentiles	5th=1.0, 25th=1.0, 50th=2.0 75th=3.0, 95th=6.0		

How many linear accelerators are used in your facility?

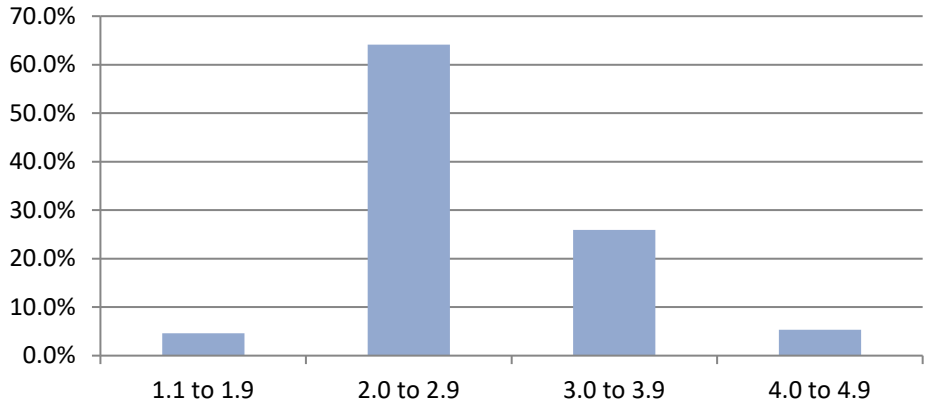


Personnel Demographics

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

	N	Valid Percent	Cumulative Percent
1.1 to 1.9	6	4.6%	4.6%
2.0 to 2.9	84	64.1%	68.7%
3.0 to 3.9	34	26.0%	94.7%
4.0 to 4.9	7	5.3%	100.0%
Total	**131**	**100.0%**	
Mean	**2.4** (*SD=0.62*)		
Percentiles	5th=1.8, 25th=2.0, 50th=2.0 75th=3.0, 95th=4.0		

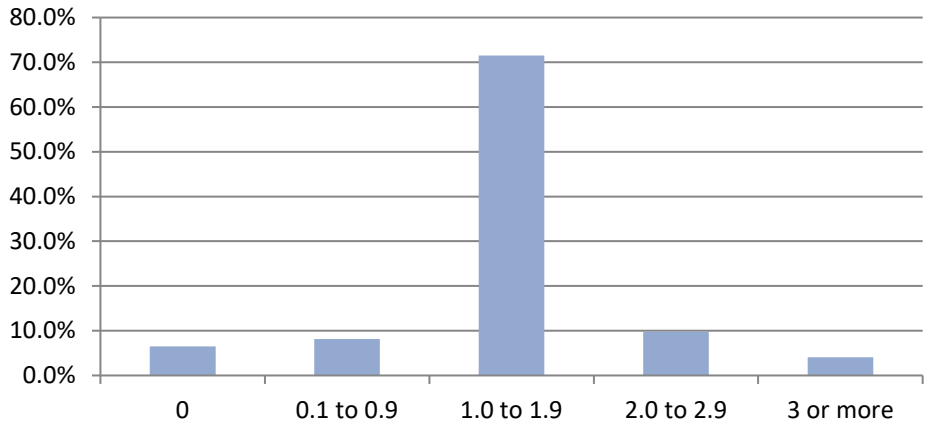
On average, how many therapists per linear accelerator are routinely scheduled at your facility?



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

	N	Valid Percent	Cumulative Percent
0	8	6.5%	6.5%
0.1 to 0.9	10	8.1%	14.6%
1.0 to 1.9	88	71.5%	86.2%
2.0 to 2.9	12	9.8%	95.9%
3 or more	5	4.1%	100.0%
Total	**123**	**100.0%**	
Mean	**1.1** (SD=0.63)		
Percentiles	5th=0.0, 25th=1.0, 50th=1.0 75th=1.0, 95th=2.2		

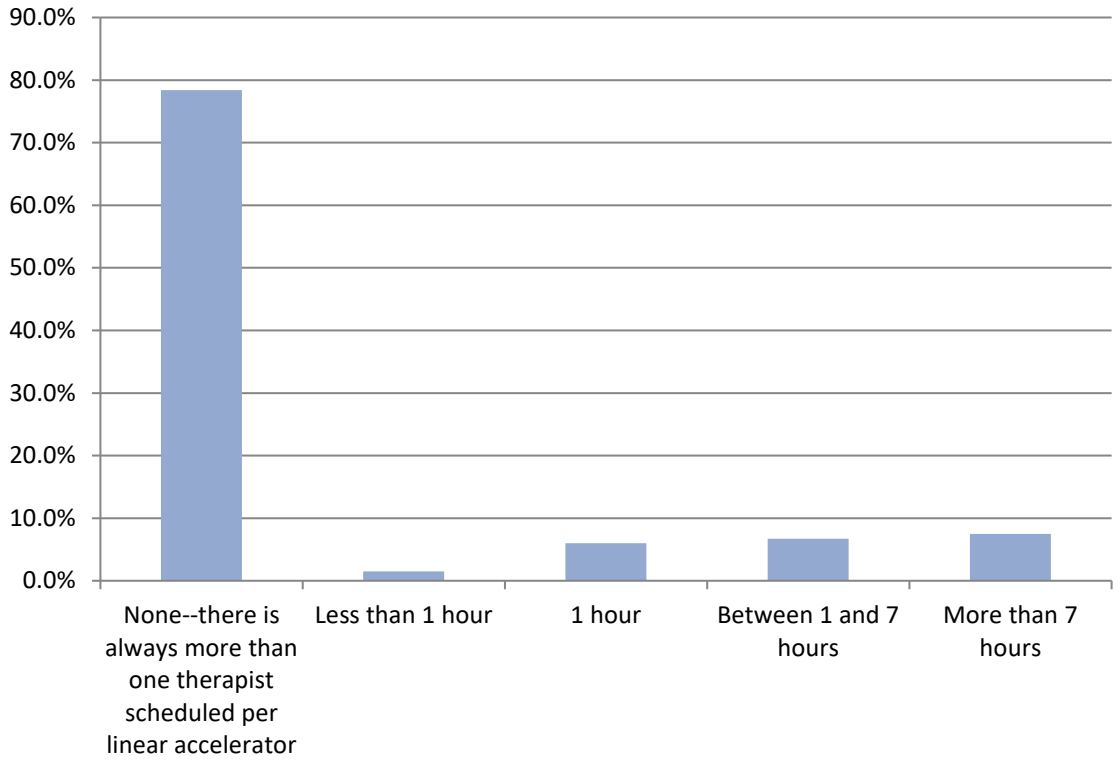
On average, how many dosimetrists per linear accelerator are routinely scheduled at your facility?



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	105	78.4%	78.4%
Less than 1 hour	2	1.5%	79.9%
1 hour	8	6.0%	85.8%
Between 1 and 7 hours	9	6.7%	92.5%
More than 7 hours	10	7.5%	100.0%
Total	**134**	**100.0%**	
Mean	**1.0** (*SD=2.6*)		
Percentiles	5th=0.0, 25th=0.0, 50th=0.0 75th=0.0, 95th=8.0		

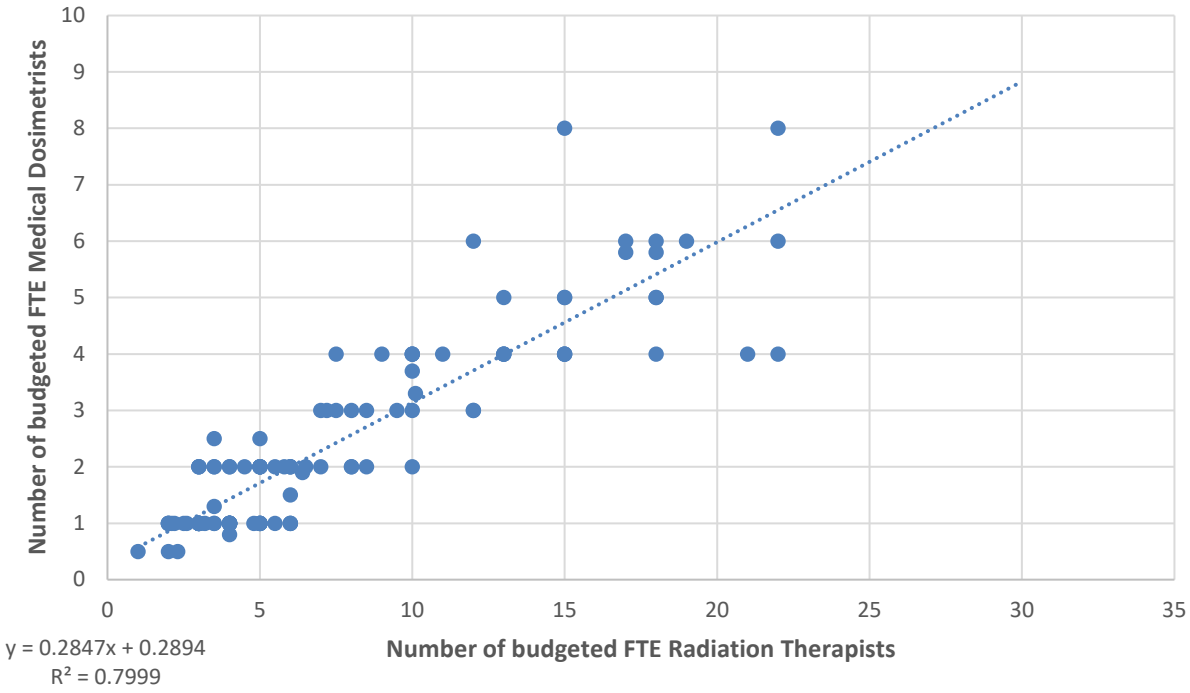
How many, if any, hours per day does your facility routinely schedule only one therapist per linear accelerator?



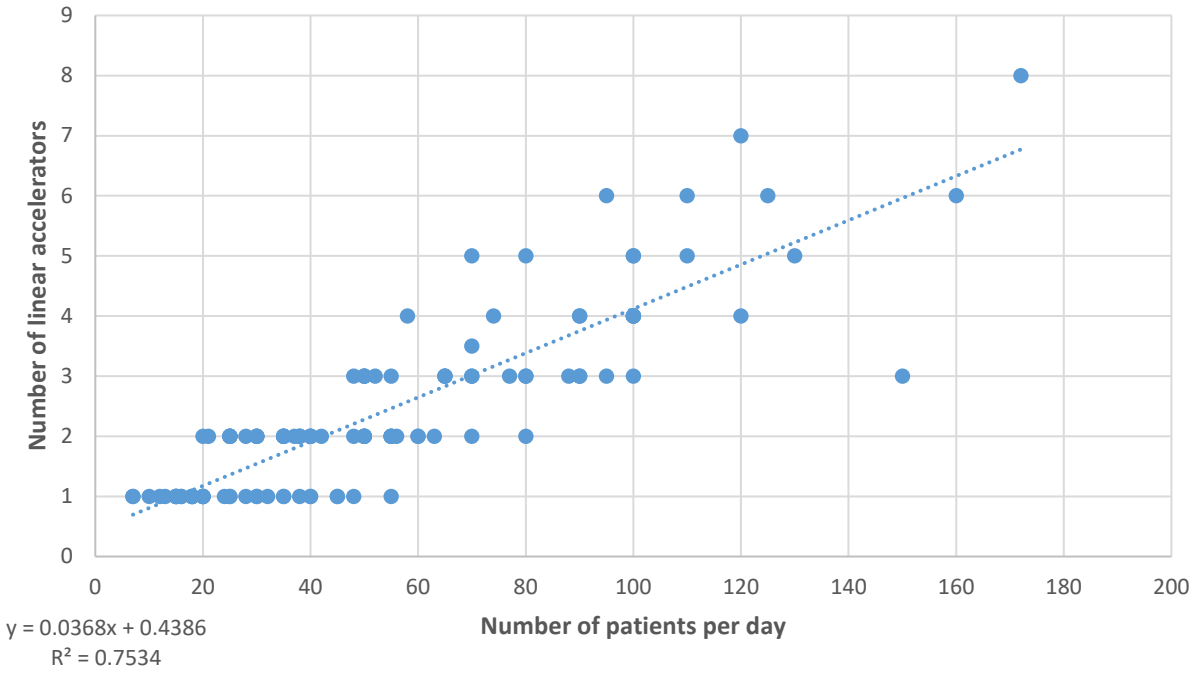
Appendix A. Scatterplots

Below are scatterplots that demonstrate the observed relationship 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 Medical Dosimetrists per Facility by Number of Budgeted FTE Radiation Therapists per Facility

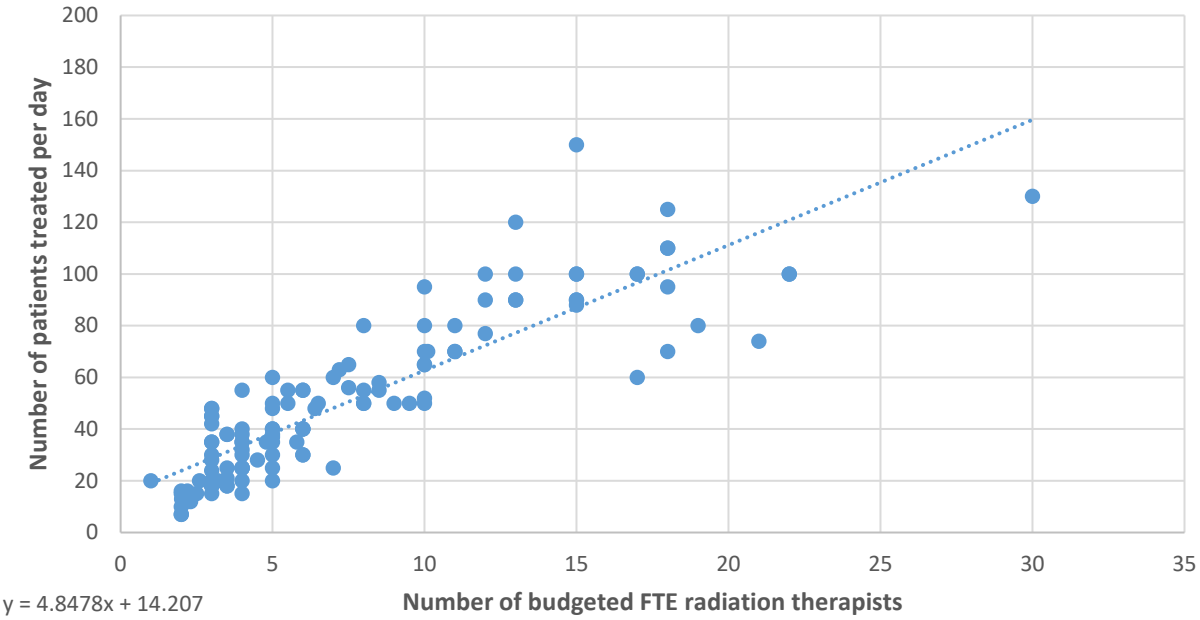


Number of linear accelerators used at facility by number of patients treated per day



y = 0.0368x + 0.4386
R^2 = 0.7534

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



y = 4.8478x + 14.207
R^2 = 0.7611

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