Executive Summary

Observations

- Cancer incidence and mortality are consistent among counties in the Finger Lakes Region. While age-adjusted cancer incidence **rates** appear to be peaking, total cancer **cases**, which influence how many patients receive radiation therapy, continue to rise due to the aging of the population.

- Regional radiation therapy capacity has been stable over the past 5 years.

- All providers have invested in new technology which has resulted in significant increases in capability and quality.

- Radiation therapy programs in the region have below-national average utilization of their megavoltage radiation therapy equipment on both a patients per unit and treatments per unit basis.

- Treatment rates per population are substantially below New York State and national rates.

- Based on the above cancer incidence and machine utilization rates, the region has no need for additional radiation therapy units at this time, unless need is demonstrated based on non-routine radiation procedures.

- Access to radiation therapy services varies by geographic area, based on exhibited use rates. Inner city Rochester areas have lower use than expected (based on demographics and health status), while use rates are higher than expected in Ontario and Wayne counties.

Recommendations

1) Unless supported by volumes of procedures using radiation in non-routine fashions, no additional radiation therapy capacity should be added in the region until patient or treatment volume per unit increases.

2) Given the finding of apparent under-utilization of radiation therapy in the Rochester area, oncology-related specialty committees associated with the IPAs and Medical Society should investigate if surgical, chemotherapy and radiation therapy are being utilized locally in optimum combinations, compared to national patterns and professional literature.

3) The radiation therapy care providers serving inner city Rochester residents should work with the African American and Hispanic Health Conference Committee to analyze the barriers to accessing cancer treatment services and develop interventions.

4) Organizations such as the American Cancer Society should increase education and outreach efforts in the inner city.

5) Rochester's radiation therapy providers should work together to develop a dedicated transportation system for radiation therapy patients.

6) Radiation therapy volume should be monitored on a more consistent basis.

Radiation Therapy Services
in the Finger Lakes Region, 2004

I. Introduction

Periodically, the Finger Lakes Health Systems Agency (FLHSA) assesses the need for specialty health care services in the Finger Lakes region. These reports are used to assure that there is adequate service capacity and access; the information is also used as the Agency reviews applications for new or expanded services submitted to the State's Certificate of Need program and/or, in the Rochester area, to the advisory review done by the Community Technology Assessment Advisory Board (CTAAB) for area insurers.

The last FLHSA assessment of radiation oncology/radiation therapy (RT) services was in 1999. With extraordinary assistance from the RT services in the region, FLHSA staff have been able to assemble this report. In Fall 2004, staff sent a survey to each RT service in the region plus the service at the Guthrie Clinic in Sayre, Pennsylvania, which serves a number of Southern Tier residents. The survey was developed with assistance from the RT specialty committee of the Rochester Independent Practice Association. Responses were received from all but one facility. Information on service availability and capabilities and utilization data was received from all respondents (although, as will be seen, not all facilities were able to provide all requested utilization detail).

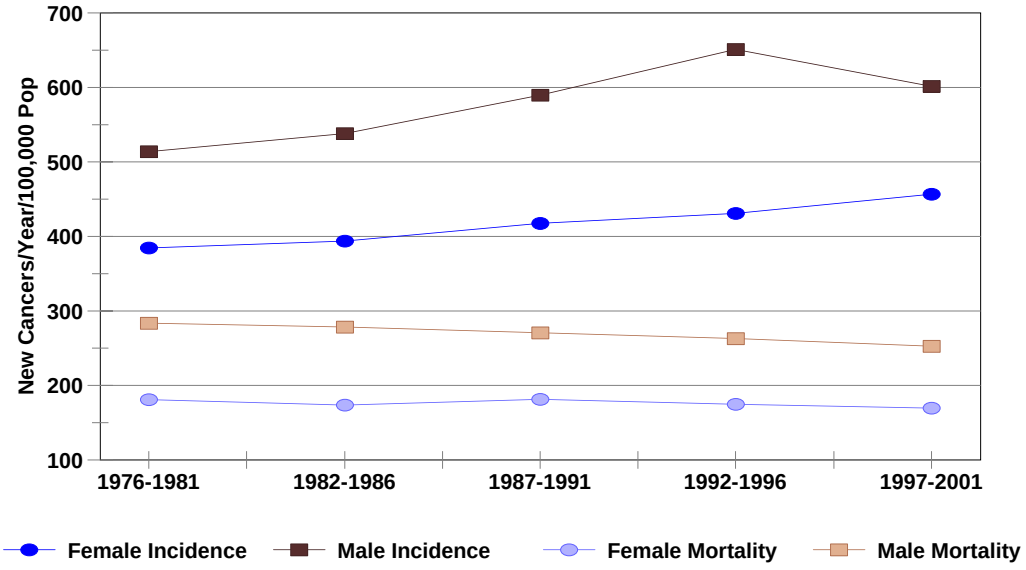
The analysis which follows sets forth the survey results. When applicable, planning guidelines and national benchmarks are compared to regional results.

II. Cancer Incidence and Mortality – Trends in FL Region

While radiation therapy is used for many clinical conditions, its prime use is treatment of cancer.

For many decades, cancer incidence and mortality rates increased. (As most cancers increase in frequency with age, it is important that rates be adjusted for the aging of the population; all rates in the following analysis are so adjusted.) In recent years, however, many cancers have exhibited a peaking, followed by evidence of reductions. Cancer incidence and mortality rates are generally consistent among counties in the Finger Lakes region; Monroe County data is shown in Figure 1.

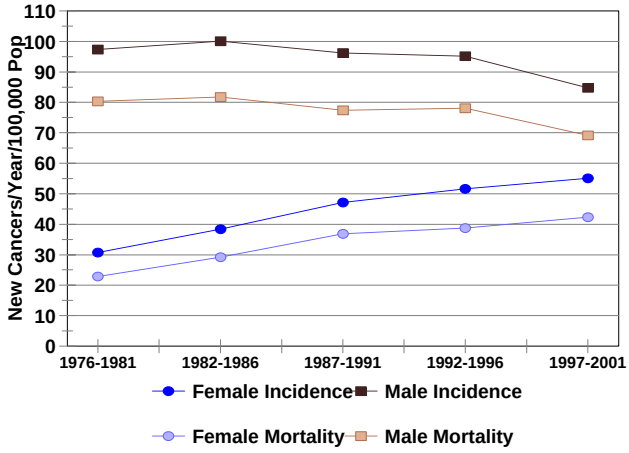
Figure 1 **Cancer Incidence & Mortality,All Sites**
Monroe County, 1976 - 2001



All rates age-sex adjusted to 2000 U.S. population

Figure 2 **Lung Cancer Incidence & Mortality**
Monroe County, 1976 - 2001

The reduction in overall cancer is more pronounced among males than females, as lung cancer incidence and mortality have peaked among men as rates of cigarette smoking decline, but have not yet peaked among women.

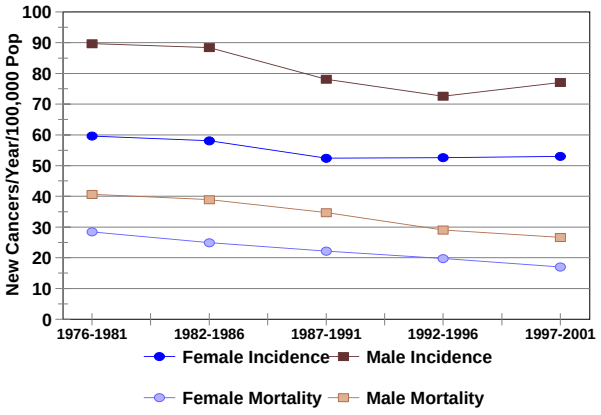


All rates age-sex adjusted to 2000 U.S. population

Many cancers have declined in incidence due to changes in lifestyle. Even in instances where cancer incidence is increasing, perhaps due both to lifestyle and environmental factors, for many cancers mortality is declining. Such declines are likely due to public education and improved screening which allow cancers to be detected and treated earlier, and due to improvements in cancer treatments, including improved radiation therapy. Cervical cancer, prostate cancer, colon cancer and breast cancer are all examples of improvements in detection and treatment leading to reduced mortality, sometimes even in the face of increased incidence. There is a concern among local oncologists, however, that there are trends toward reduced levels of cancer screening, which could lead to increases in cancer mortality over time. For instance, the increase in cervical cancer mortality evident in the most recent data could be a result of decreases in recent years in routine pap smears.

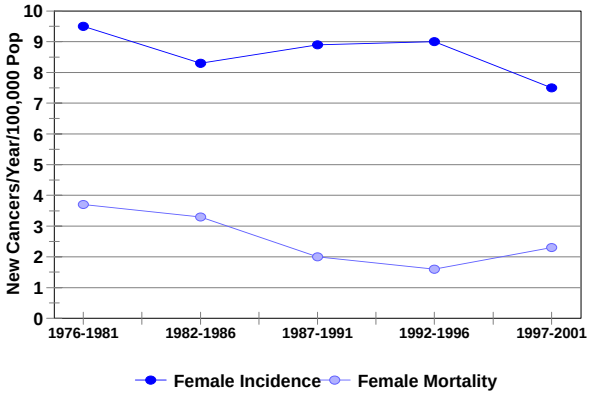
Figures 3

Colorectal Cancer Incidence&Mortality
Monroe County, 1976 - 2001



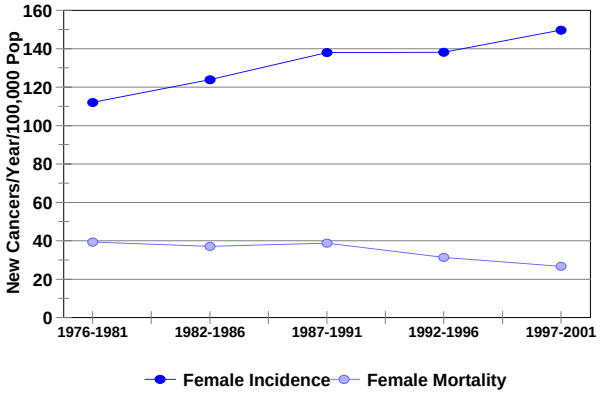
All rates age-sex adjusted to 2000 U.S. population

Cervical Cancer Incidence & Mortality
Monroe County, 1976 - 2001



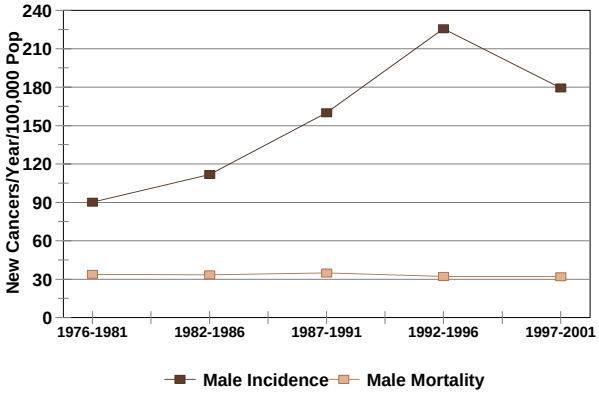
All rates age-sex adjusted to 2000 U.S. population

Breast Cancer Incidence & Mortality
Monroe County, 1976 - 2001



All rates age-sex adjusted to 2000 U.S. population

Prostate Cancer Incidence & Mortality
Monroe County, 1976 - 2001



All rates age-sex adjusted to 2000 U.S. population

III. Regional Services and Trends in Services

In the 5 years since the last FLHSA assessment of radiation therapy services, there have been significant changes in regional RT equipment. These changes have largely been oriented toward greater accuracy of delivery of radiation to the target tumor(s) and reduced radiation to surrounding tissues. Thus, improved shaping of the external radiation beam through collimation (blocking parts of the beam at its source), through modulation of the intensity of the radiation, and through increased numbers of angles, have all been employed to increase accuracy. Perhaps of equal importance, the increased use of computers to calculate the optimal pattern of treatment, including 3-dimensional characterization of the tumor, when coupled with the increased precision of the radiation beam, has increased accuracy. Increased accuracy permits greater total radiation dose delivered to the tumor, while minimizing morbidity.

While previous assessments do not provide comparable data, it appears there is also an increase in use of radiation delivery from inside the body, known as brachytherapy. Again, some of this increase may be due to improved capabilities of computer-based planning of the brachytherapy treatment.

Generally, there haven't been increases in capacity (more radiation therapy units), but increases in capabilities. The tables which follow will document some of these changes.

Treatment Units

There are presently 16 megavoltage external beam radiation therapy units in the Finger Lakes region; this is a reduction from the 17 units in operation or approved at the time of the 1999 FLHSA radiation therapy assessment. All present units are linear accelerators (linacs); there are no longer any cobalt-based units in the region. See appended Tables.

Changes in capacity in the past 5 years include:

- The Sands Cancer Center in Canandaigua began operations with an upgraded unit relocated from Highland Hospital (2000);
- The Cancer Treatment Services unit in Corning merged with the program at Guthrie Corning and reduced capacity by 1 unit (2000); and
- The 2 former units at Genesee Hospital were replaced with 1 unit at the Pluta Cancer Center, now located in Henrietta in the southern part of Monroe County (2002).

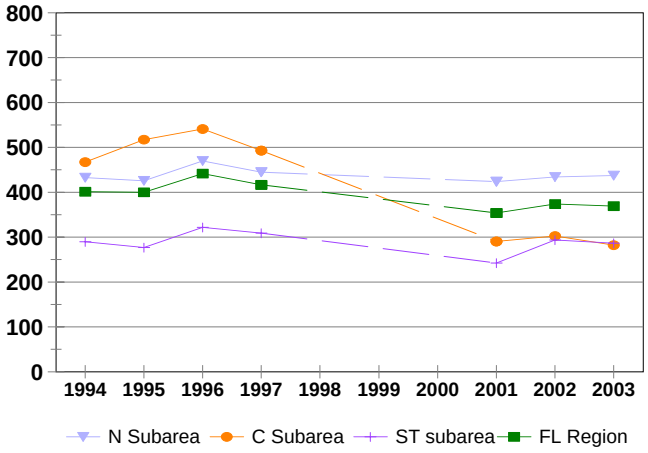
Thus, the region continues to have the same number of sites of care as in 1999, but with fewer units.

IV. Trends in Utilization[1]

Patients Per **Program**

Figure 4

Number of Patients Per RT Program
Finger Lakes Region, 1994-2003



The number of new cancer patients per radiation therapy program has been fairly steady in Monroe County and the Southern Tier, but, due to the introduction of the new program in Canandaigua, dropped substantially in the Central Subarea counties. The national average patient load per program is 420[2]. With the exception of providers in the Northern Subarea, regional patients-per-program are substantially below that benchmark, as seen in Figure 4.

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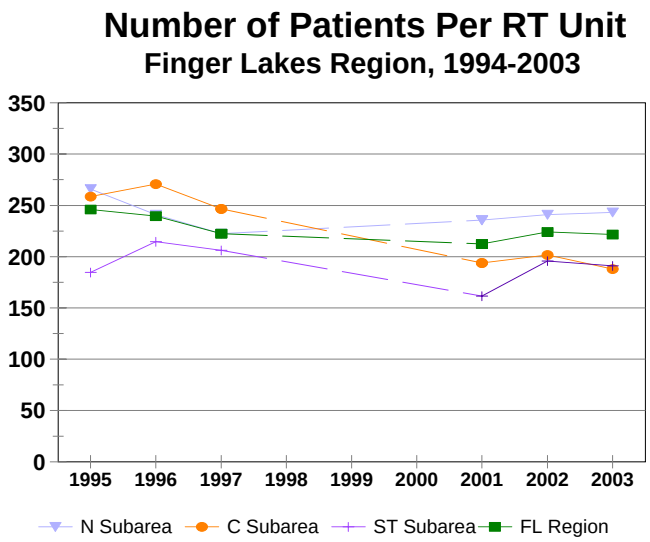
[1]For analysis, the Finger Lakes region is divided into Northern subarea (Monroe Co.), Central Subarea (Livingston, Ontario, Wayne, Seneca, and Yates Cos.), and Southern Tier Subarea (Chemung, Schuyler, and Steuben Cos.).

[2]This and all subsequent references to national data are from the *2003 Radiation Oncology Benchmark Report* published by IMV Medical Information Division, Inc., Des Plaines, Ill., 2004.

Patients Per MEV **Unit**

Figure 5



Furthermore, the radiation therapy programs in the region have below-national average utilization of their megavoltage radiation therapy units, on the basis of patients per unit. The national average is 413 patients per unit. A *Blue Book* guideline[3] was 250 patients per unit. Local programs may have fewer patients/unit because, contrary to national data, most have multiple units/program.

Treatments

Figure 6

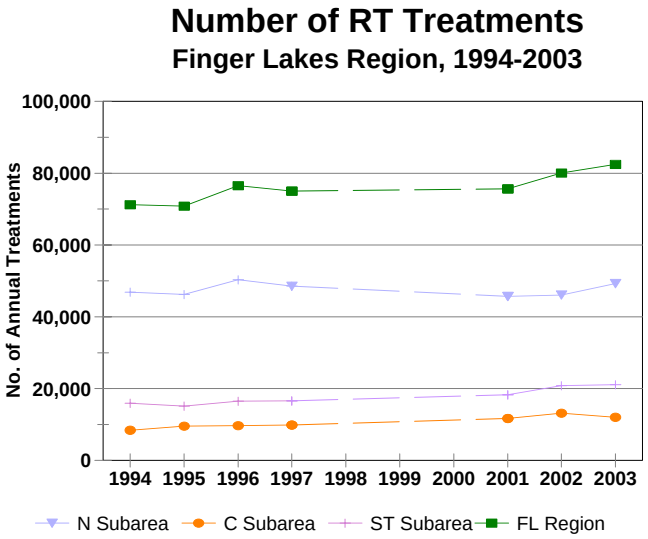


Figure 6 demonstrates a steady increase in the number of "treatments" (radiation therapy sessions) in the Finger Lakes region in the past decade. This reflects an increase in number of patients due to the aging of the population. It also reflects an increase in the proportion of patients treated with intent to cure; because of the increase in accuracy of radiation delivery, radiation oncologists are becoming more aggressive about their approach to treat- ment of advanced cancers. Such patients receive more treatments per course of therapy than do patients treated only to relieve symptoms (palliative care).

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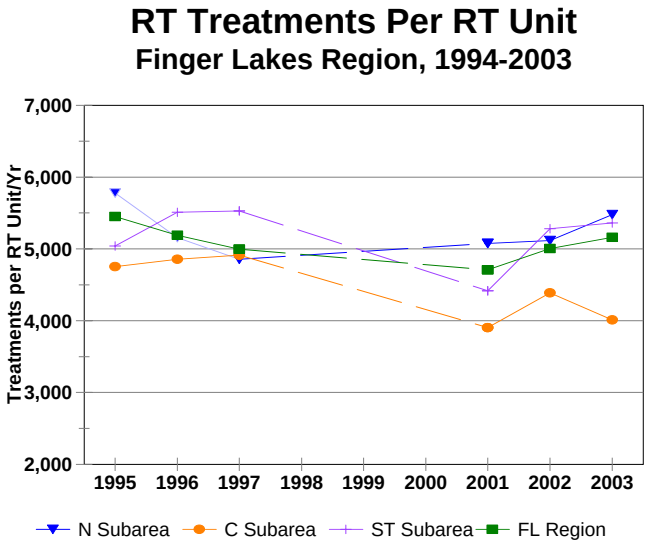
[3]Inter-Society Council for Radiation Oncology, *Radiation Oncology in Integrated Cancer Management*, December 1991. The document, developed by representatives of nine professional societies, set out "reasonable standards for radiation therapy, inclusive of those for personnel, equipment, facilities and operations, and guidelines for the optimal use of radiation therapy in the integrated management of patients with cancer." Although the Blue Book had previously been updated every few years, it has not been updated beyond this edition.

Treatments per Unit

Figure 7



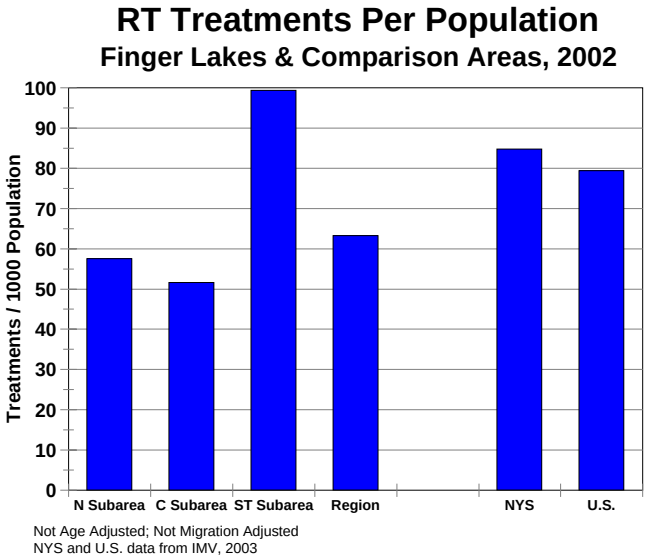
In the past decade, the number of megavoltage treatment units has increased from 13 to 16, although local capacity has been steady since 2001 at 16 units. Since 2001, total treatments have increased, with a concomitant rise in treatments per unit (Figure 7). Utilization per megavoltage machine has been near 5,000 treatments/unit/year, except in the Central Subarea where a new program was opened at FF Thompson in 2001. Utilization at a level of approximately 5,000 treatments is well below most benchmarks:

- 6,500 treatments/unit per newly revised state regulations,
- 6,500 treatments/unit per the Blue Book, (4 units if only CON-approved capacity is counted)
- 7,400 treatments/unit national average per IMV.

This suggests there is more capacity in the Finger Lakes region than needed to meet the treatment demands of the regional population.

Treatments Per Population

Figure 8



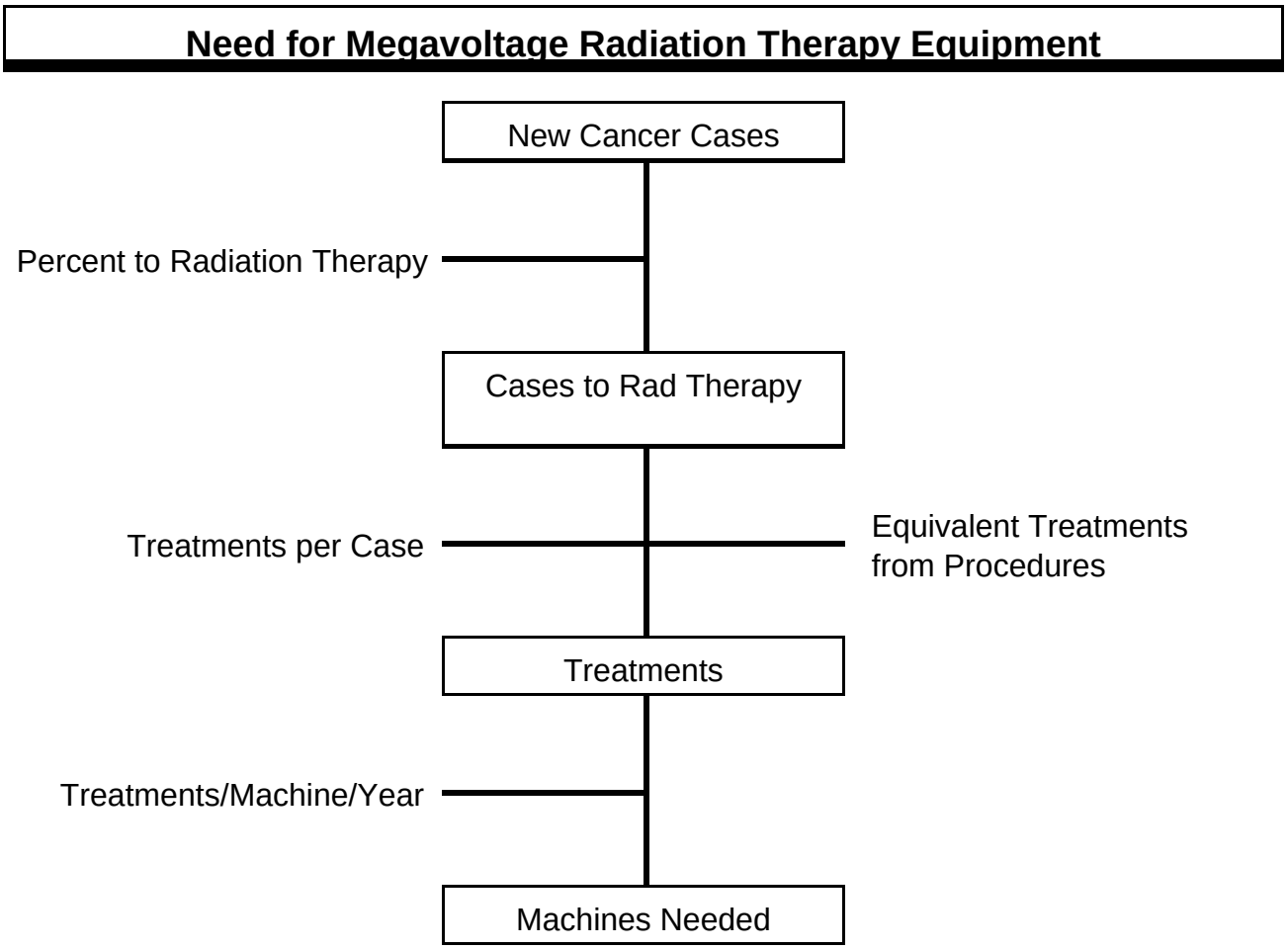
In contrast to the above conclusion, however, data on treatments per 1,000 population (Figure 8) suggest the region under-utilizes radiation therapy as a modality. While not adjusted for patient migration (which might affect the subarea values), most of the region experiences fewer radiation therapy treatments per population than either the New York State or U.S. averages. If the U.S. average treatments per population were applied to the regional population, utilization per unit would be near 6,200, very near the state planning benchmark.

V. Need for Treatment Capacity

Both previous planning in this region, and newly revised NYS planning standards, build the need for radiation therapy capacity from the number of cancer cases in an area. The planning method is diagramed in Figure 9.

In both local usage and in the new state regulations, the proportion of cancer cases which are anticipated to need radiation therapy is 60%. In the state regulations, the number treated is further divided, half treated for cure and half for palliation. Those treated for cure are anticipated to receive 35 treatments; those for cure receive 15 treatments. The average is 25 treatments per cancer case treated with radiation. In local usage, a range from 22.5 to 25 treatments per course of radiation is suggested. Some additional treatment equivalents are recognized locally for non-cancer patients treated with radiation (such as some orthopedic patients) or for patients who receive complex radiation treatments (such as total body irradiation).

Figure 9


Need for Megavoltage Radiation Therapy Equipment
New Cancer Cases
Percent to Radiation Therapy
Cases to Rad Therapy
Treatments per Case
Equivalent Treatments from Procedures
Treatments
Treatments/Machine/Year
Machines Needed

Finally, to calculate the number of machines needed to provide the treatments needed, one requires a standard of treatments/machine/year. If one schedules patients for 7½ hours per day, 250 days per year, and 15 minutes per treatment slot, an annual capacity of 7,500 treatments per year is feasible. NYS regulations calculate need based on 6,500 treatments/machine. Local providers suggest use of 6,500 and 7,000 treatments/machine in assessing need (Figure 10). However, anticipating increased use of IMRT and precision patient positioning systems which increase time per treatment, local providers believe a lower figure could be justified for IMRT-capable units.[4]

As seen in Figure 10, using the methodology in NYS regulations, there is a marginal need for one additional unit in the region; using more stringent local factors, there would be no need. There are three caveats to this conclusion:

1) This is based on cancer cases as of 2001; due to the aging of the population, cases may continue to increase, even as age-adjusted rates decline.

2) Data were not provided by the facilities on radiation therapy procedures, which would add to need.

3) While local planning counts all units, the state planning only includes units approved through the CON process, excluding privately-owned facilities; 4 units would be needed in the region if only CON-approved capacity is counted.

Additionally, the need calculation is based on residence. To the extent there is voluntary patient migration (that is, migration not necessitated by relative lack of capacity in an area), the need in the "recipient" area may increase while decreasing in the "home" area.

There is an amount of uncertainty involved in calculation of need for radiation therapy equipment, especially given the rapid pace of technologic change in this field. It is reasonable that determinations of need be based not only on calculated need but also on current utilization of existing equipment. As seen above, present equipment is not utilized to the level suggested as feasible by available benchmarks, but periodic monitoring of actual utilization is appropriate.

[4]Increased use of IMRT precision positioning systems, which increase the accuracy of radiation dose delivery, may lead to increases in the number and intensity of treatments per course of therapy and to the length of time per treatment, For instance, if 25% of patients are treated with IMRT and each IMRT session requires 30 minutes instead of 15 minutes, 1,875 extra treatment slots (7,500 x 25%) are consumed and capacity is reduced to 5,625 patients/year for that machine.

Figure 10

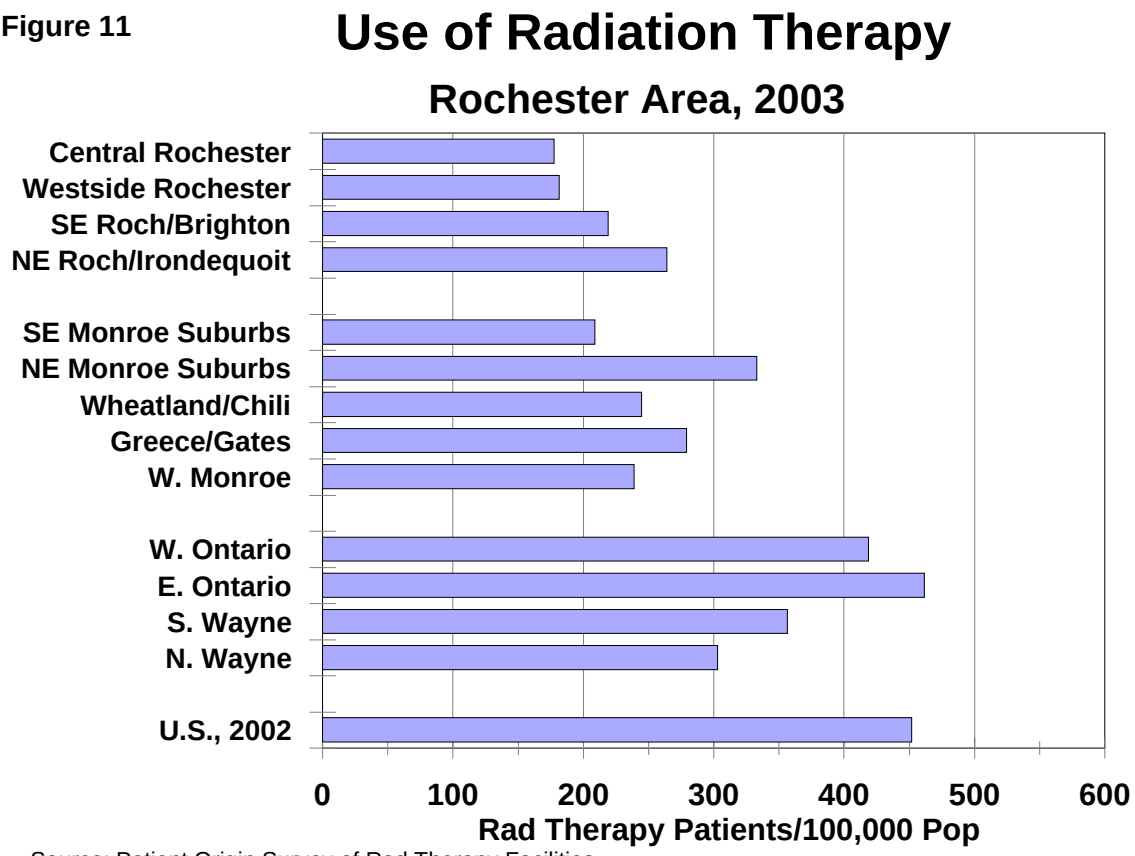
Need for Megavoltage Radiation Therapy Equipment

Year 2001 Factor	Value	Finger Lakes Subarea	Northern Subarea	Southern Subarea
New Cancer Cases		1,333	4,127	1,189
% to Rad Therapy	60%			
Cases to Rad Therapy		800	2,476	714
Lower Range Case				
Treatments per Case	22.5			
Equivalent Treatments from Procedures				
Total Treatments		17,993	55,712	16,057
Treatments per MEV Unit	7,000			
Needed Units		2.57	7.96	2.29
Needed Units (rounded)		3	8	2
Current Units		3	9	4
Unmet Need (Units)		0	0	0
Upper Range Case **(equivalent to NYS methodology)**				
Treatments per Case	25			
Equivalent Treatments from Procedures				
Total Treatments		19,992	61,902	17,841
Treatments per MEV Unit	6,500			
Needed Units		3.08	9.52	2.74
Needed Units (rounded)		3	10	3
Current Units		3	9	4
Current Units **(CON approved)**		1	8	3
Unmet Need (Units)		0	1	0
Unmet Need **(NYS methodology)**		2	2	0

VI. Access to Radiation Therapy Services

Most respondents to the radiation therapy services survey were able to provide information on patients by ZIP Code of residence. Combined, these data allow calculation of radiation therapy usage per population.[5] Figure 11 shows that inner city Rochester residents have a lower use rate, while Wayne residents have a higher use rate.

Figure 11

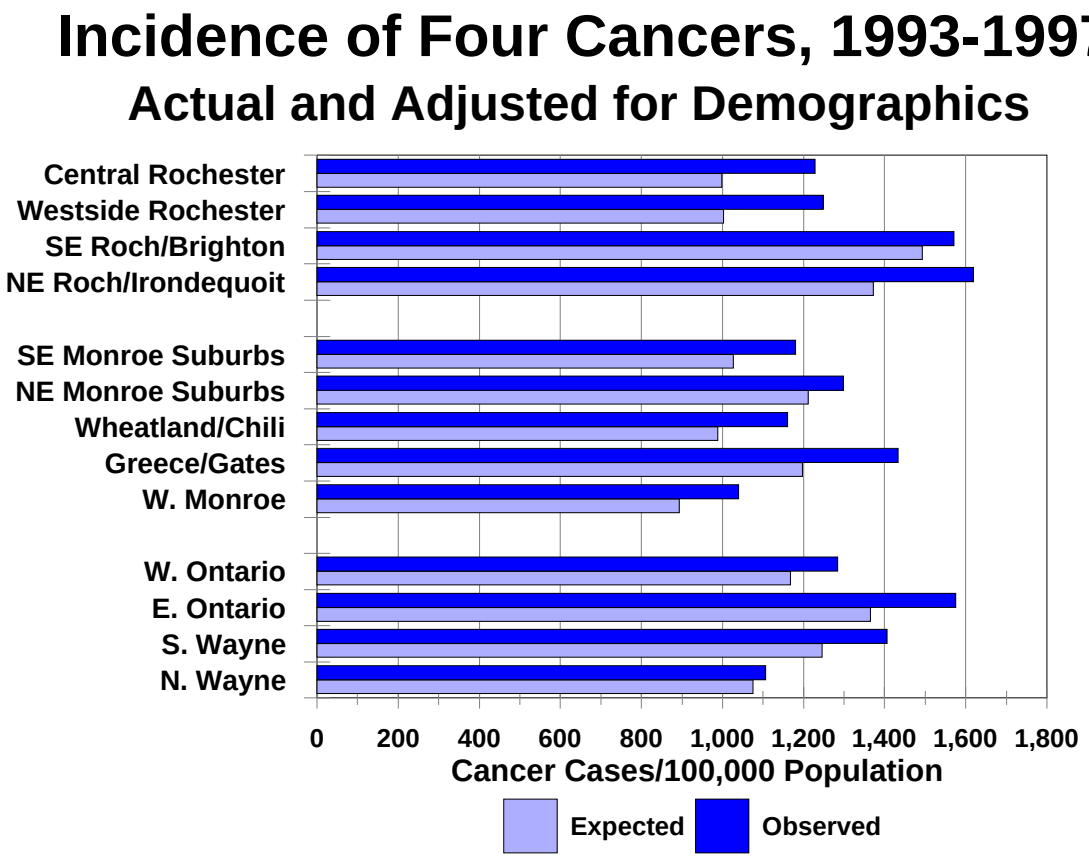


Source: Patient Origin Survey of Rad Therapy Facilities
Calculations by FLHSA; US Data by IMV

[5]Rates were not calculated for areas with substantial potential out-migration. For instance, some Seneca residents may travel to Syracuse facilities for care, while some Yates residents may seek care in Ithaca, and some Southern Tier residents may receive care in Pennsylvania. As data are not available from facilities in those areas, calculated use rates would necessarily understate the actual utilization rate.

The radiation oncology physicians reviewing this data suggested that it be adjusted for the relative age of the population; perhaps the central city population used less radiation because it was younger than average. While the New York State Health Department does not publish data on all cancers for small areas, it does publish such data for four major cancers: Breast, lung, colo-rectal, and prostate cancer (these cancers are often treated with radiation). For each of these cancers, it provides observed and expected numbers of cases for each ZIP Code. The "expected cases" figure is calculated by applying the age-, sex- and race-specific state-wide cancer rate to the population of the ZIP Code. Thus, the expected cases number takes into account the age and other demographic factors of each ZIP Code. In Figure 12, one sees that there are differences in rates of cancer for the four cancers combined for the groups of ZIP Codes FLHSA uses for small geographic area analysis.

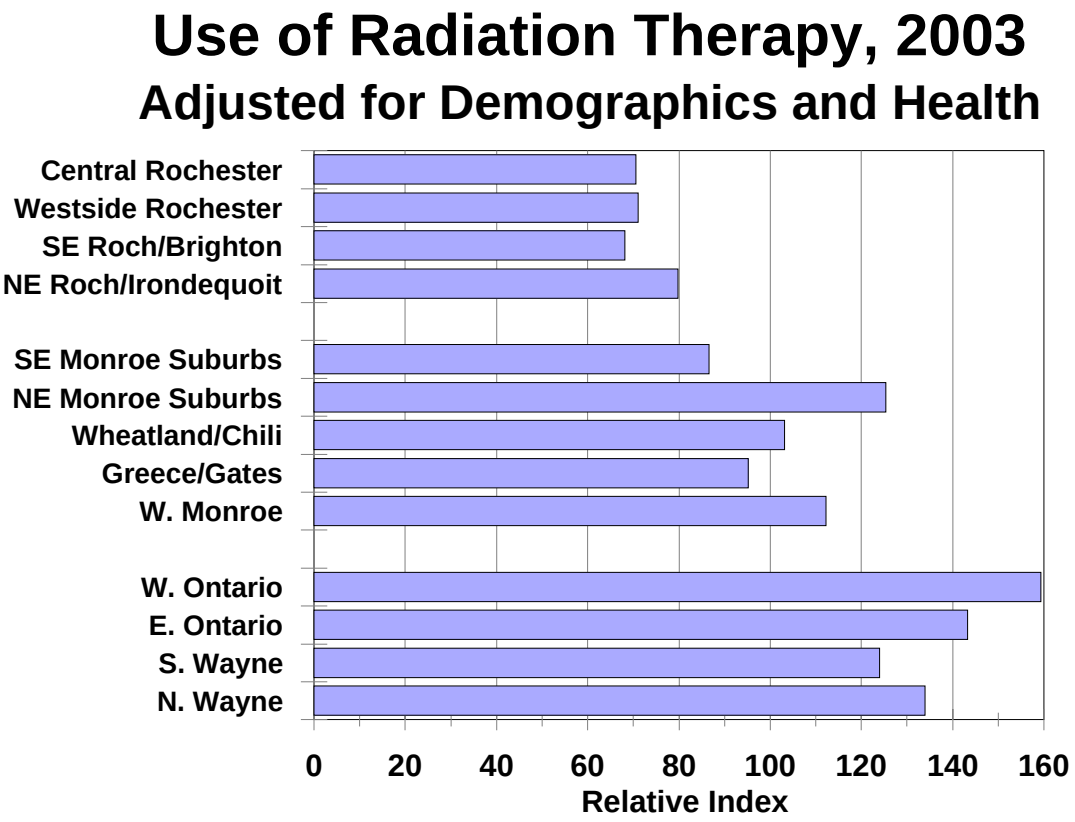
Figure 12



"Expected" is state rate by age, sex, and race, applied to local population (demographics).

Adjusted for both demographics (age/sex/race) and for "health status" (the difference between observed number of cases and expected number of cases), and standardized to the average of the analyzed areas Figure 13 provides a measure of the relative use of radiation for treatment of cancer. An index value of 100 suggests an area which is receiving the appropriate amount of radiation, given its demographics and health status and regional patterns of use of radiation. Areas with an index below 100 receive less radiation therapy than needed, based on demographics and health, while those with an index above 100 are receiving relatively more radiation than needed.

Figure 13



Note: An Index of less than 100 suggests the area is receiving less radiation therapy than needed based on its demographics and cancer experience.

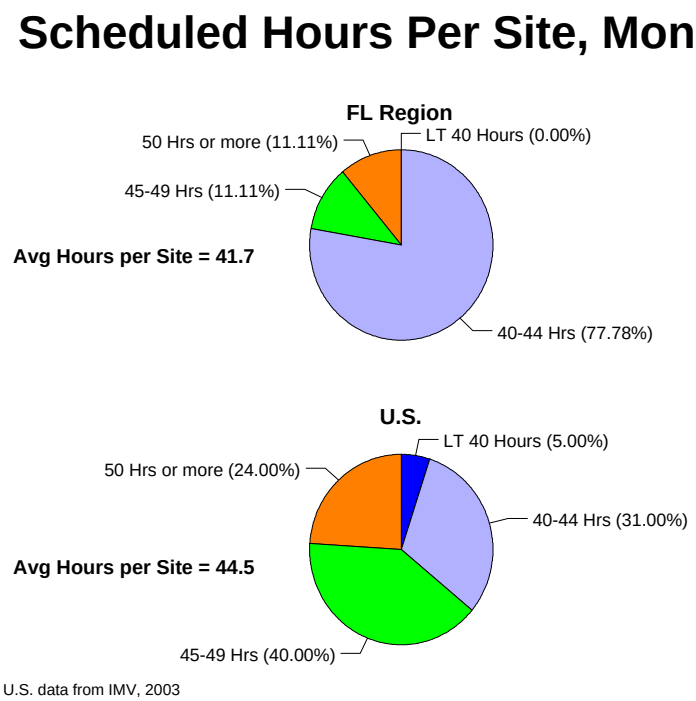
Radiation therapy is considered a referral service. While there may be some clinical discretion possible–for instance, more aggressive care (more treatments) could be given to palliative care patients–for the most part the amount of radiation given is determined by how many patients are referred to the radiation oncologists. Thus, the relatively low use of radiation

among inner-city residents probably is more a reflection of lack of primary care, or cultural differences in knowledge of or approach to cancer, than disparities in care of patients after referral to radiation. It is uncertain why the Central Finger Lakes counties exhibit a higher use rate, but may reflect aggressive education of referring physicians on the role of radiation in care of cancer patients and transportation efforts to improve access to radiation therapy.

Although Rochester providers have been charged with development of dedicated transportation for cancer patients during Certificate of Need reviews, such a transportation system does not yet exist. Patients are able to use the Rochester/Genesee Region Transportation Authority's Liftline system, which provides door-to-door transport by appointment and which accepts Medicaid reimbursement, but this may not meet the needs of sick radiation patients.

Figure 14

None of the radiation therapy providers in the region routinely offer services on the weekends. Most (78%) operate on a 40-hour per week schedule, with 2 programs offering more extended hours. In contrast, nationally 64% of providers operate more than 45 hours per week.



U.S. data from IMV, 2003

VII. Conclusions and Recommendations

From the information given, the following conclusions can be drawn:

- Cancer **rates** may have peaked, although actual **numbers** of cancer cases may continue to increase due to the aging of the population.

- In the past decade, area providers have invested in technology upgrades which have provided substantial increases in the accuracy of delivery of radiation to tumors. This increase in accuracy may allow delivery of higher total doses of radiation to the tumor, leading to improved treatment outcomes.

- There are a number of indicators that the region has adequate capacity for radiation therapy:
  - Below benchmark measures of cancer patients per megavoltage radiation therapy unit;
  - Below benchmark measures of treatments per unit;
  - No calculated unmet need per state or local calculation methods.

- Area providers deliver fewer treatments per population than statewide or national averages.

- Residents of inner city Rochester receive fewer radiation therapy treatments than would be projected given their demographics and their health status. As radiation therapy is primarily a referral service, this suggests a disparity in receipt of primary care and cancer screening rather than a disparity in willingness to provide radiation therapy to disadvantaged patients. It may also indicate a transportation barrier to receipt of radiation treatment.

FLHSA recommends:

1) Unless supported by volumes of procedures using radiation in non-routine fashions, no additional radiation therapy capacity should be added in the region until patient or treatment volume per unit increases.

2) Given the finding of apparent under-utilization of radiation therapy in the Rochester area, oncology-related specialty committees associated with the IPAs and Medical Society should investigate if surgical, chemotherapy and radiation therapy are being utilized locally in optimum combinations, compared to national patterns and professional literature.

3) The radiation therapy care providers serving inner city Rochester residents should work with the African American and Hispanic Health Conference Committee to analyze the barriers to accessing cancer treatment services and develop interventions.

4) Organizations such as the American Cancer Society should increase education and outreach efforts in the inner city.

5) Rochester's radiation therapy providers should work together to develop a dedicated transportation system for radiation therapy patients.

6) Radiation therapy volume should be monitored on a more consistent basis.

Table 1: CANCER INCIDENCE AND INCIDENCE RATES, 1997-2001

Source: NYSDOH, Jan. 2004

MALES	MON	LIV	ONT	SEN	WAY	YAT	CHE	SCH	STE	REGION**	UPSTATE	NYS	U.S.
Total Number	1892.2	158.8	271.4	99.2	241.4	73.0	278.8	53.0	272.2	3340.0	29,443	45,977	699,560
Total Rates*	601.8	605.3	587.9	575.3	597.6	561.5	624.4	548.2	536.2	593.7	587.5	570.2	560.0
Rates*													
Colon	52.8	46.4	45.3	44.1	62.6	76.4	54.5	62.7	37.2	51.8	52.9	52.6	{ 67.7
Rectum	24.3	27.9	23.1	25.9	26.5	17.7	23.4	13.8	19.9	23.8	22.3	21.3	
Lung/Bronchus	84.8	94.3	101.2	103.3	96.7	91.8	111.6	119.3	100.7	92.3	92.3	86.3	91.5
Prostate	179.3	164.6	182.1	183.0	152.3	157.7	173.0	129.4	137.0	171.3	166.7	163.6	160.4
Bladder	48.0	59.4	47.6	46.4	47.1	40.3	52.1	43.1	43.0	48.0	46.2	41.1	39.0
FEMALES													
Total Number	1926.8	149.0	267.8	83.4	223.8	72.8	259.0	58.8	267.6	3309.0	29,271	46,943	668,470
Total Rates*	456.9	465.4	466.7	417.1	446.0	485.7	446.2	498.1	439.8	455.2	453.7	434.1	419.9
Rates*													
Colon	37.7	42.8	38.4	*40.1*	44.6	47.9	33.7	60.7	39.2	38.9	41.5	40.9	{ 48.9
Rectum	15.3	15.3	14.3	9.1	15.9	17.9	13.5	24.1	11.6	14.8	13.5	13.2	
Lung/Bronchus	55.1	53.8	60.3	72.4	48.7	66.1	67.0	77.6	62.8	57.7	60.8	54.0	53.4
Breast	149.7	140.2	148.1	116.1	139.2	148.0	129.0	129.2	127.9	143.7	139.0	131.4	131.7
Uterus	30.1	33.6	27.0	26.7	31.3	25.0	27.2	30.9	28.6	29.5	28.1	27.2	24.6
Cervix Uteri	7.5	6.7	9.4	6.9	6.9	9.2	7.7	6.1	13.2	8.1	8.2	10.1	6.4

* Rates per 100,000 population, age adjusted to the 2000 U.S. population
Underlined rates are based on fewer than 20 reported cases. USE WITH CAUTION.
REGION** rates are from calculated populations and numbers. U.S. Data are for 1996-2000, from "Cancer Facts & Figures, 2004", American Cancer Society

Table 2: Megavoltage Radiation Therapy Units in the Finger Lakes Region, 2004

Treatment Units				
Sponsor	Unit Manufacturer Model	Power Range Megavoltage	Date Installed	Expected Replacement Date
RGH	Varian	6 PB	Mar-92	2002
RGH	Elekta Precise	6-10 PB, 6-18 EB	2003	
Strong	Varian 2300	6-15 PB, 6-20 EB	1997	2007
Strong	Varian 21EX	6-15 PB, 6-20 EB	2001	2010
Strong	Novalis	6 PB	2001	2008
Highland	Varian	6-18 PB, 6-20 EB	1989	2005
Highland	Varian	6 PB	1982	2005
HH @ Park Ridge	Varian	6 PB	1997	2004
HH @ FFThompson (Sands Cancer Ctr.)	Varian	6-10 PB, 6-20 EB	1990	2007
Pluta Cancer Ctr.	Elekta	6-18 PB, 6-18 EB	2003	
Finger Lakes Radiation Oncology (FLRO)	Varian 6/100	6PB	1985 (rebuilt 2000)	2008
FLRO	Varian 2300	6-15 PB, 6-22 EB	2002	2012
Arnot Ogden	Siemans MD	6-15 PB, 6-14 EB	1988	2006
Arnot Ogden	Siemans Primus	6-18 PB, 6-21 EB	2000	
CTS Hornell	Information not provided; thought to have one megavoltage unit of 6 PB			
Guthrie Corning	Varian	6-10 PB, 6-18 EB	1998	
Guthrie (Sayre, Pa)	Siemans	6-23 PB, 6-21 EB	2000	
Guthrie (Sayre, Pa)	Varian	6 PB	1990	
Note: PB – Photon Beam; EB – Electron Beam				

Table 3: Other Capabilities of Megavoltage Radiation Therapy Units in the FL Region, 2004

Treatment Units						
Sponsor	Unit Manufacturer Model	Multileaf Collimator?	# of Leaves	Independent Collimators?	Dynamic Wedge?	Special Capabilities
RGH	Varian			Y		
RGH	Elekta	Y	80	Y	Y	IMRT
Strong	Varian 2300	Y	80	Y	Y	IMRT
Strong	Varian 21EX	Y	80	Y	Y	IMRT
Strong	Novalis			Y		IMRT, STRS, SRT
Highland	Varian			Y		STRS
Highland	Varian					
HH @ Park Ridge	Varian	Y	80	Y	Y	
HH @ FFThompson (Sands Cancer Ctr.)	Varian			Y	Y	
Pluta Cancer Ctr.	Elekta	Y	80	Y		IMRT
FLRO	Varian 6/100	Y	40			IMRT
FLRO	Varian 2300			Y	Y	
Arnot Ogden	Siemans MD					
Arnot Ogden	Siemans Primus	Y	58	Y	Y	IMRT
CTS Hornell						
Guthrie Corning	Varian			Y		
Guthrie (Sayre, Pa)	Siemans	Y	58	Y		IMRT
Guthrie (Sayre, Pa)	Varian			Y		

Note: IMRT – Intensity-Modulated Radiation Therapy; STRS – Stereotactic Radiation Therapy (single fraction); SRT – Stereotactic Radiation Therapy (fractionated)

Multileaf collimators, Independent collimators, and dynamic wedges are all mechanisms to modify the radiation therapy beam, both as to its shape and intensity. Dynamic wedges, for instance, replace shaped lead blocks which were previously used to shield parts of the body from the radiation beam. Multileaf collimators, which can change the shape and intensity of the beam as the linac rotates around the body, are used for intensity-modulated radiation therapy. Single dose stereotactic rad therapy is also known as “radio-surgery”.

Table 4

Other Treatment Capabilities at Centers

Sponsor	Superficial/ Orthovoltage/ Endotherapy Units	High-Dose Brachytherapy	Multi-modality Center e.g., chemo,surgery
RGH	N	Nucletron	Y
Strong	N	Nucletron (01/2005)	Y
Highland	Y-50 Kvp	Nucletron (10/2004)	Y
HH @ Park Ridge	N		Y
HH @ FF Thompson (Sands)	N		Y
Pluta	N	Nucletron (01/2002)	N
FLRO	Y-50 Kvp		Y
Arnot	N	Nucletron (1992)	Y
CTS Hornell	Information not provided		Y
Guthrie Corning	N		N
Guthrie	N	Nucletron (04/2000)	Y

Table 5

Simulators

Sponsor	Type	Manufacturer	Date Installed	Expected Replacement Date
RGH	F	none		
	CT	Philips	Jan-03	
Strong	F	Varian	Jun-95	2007
	CT	GE	Jan-00	2004
Highland	F	Oldelft	Jun-92	
	CT	none		
HH @ Park Ridge	F	none		
	CT	none		to be installed in 2005
HH @ FF Thompson (Sands)	F	none		
	CT	none		to be installed in 2006
Pluta	F	Nucletron	Jan-02	
	CT	none		
FLRO	F	Toshiba	Mar-85	2006
	CT	GE	Apr-04	2014
Arnot	F	Kermath	1991	2005
	CT	GE	Feb-01	
CTS Hornell		Information not provided		
Guthrie Corning	F	Varian	Feb-98	
	CT	none		
Guthrie	F	Oldelft/Nucletron	Oct-95	2004
	CT	Use CT in diagnostic Radiology, but anticipate acquiring dedicated unit		

F= Fluoroscopic/Diagnostic Simulators;
CT = Computed Tomography Simulator

Table 6

Computerized Treatment Planning

Sponsor	Manufacturer	Model	# of Workstations	Special Capabilities
RGH	Theratronics	Theraplan	3	3-D conformal, Brachytherapy
RGH	Varian	Variseed	1	Seed implants
RGH	Nomos	Corvus	1	IMRT
RGH	Nucletron		1	HDR Brachytherapy
Strong	ROCs	ROCs	4	3-D conformal
Strong	Varian	Cadplan	4	3-D conformal, IMRT, STRS, SRT
Strong	Novalis	Brainlab	2	3-D conformal, IMRT, STRS, SRT
Strong	Nucletron			HDR Brachytherapy moving to Highland in 2005
Strong	Piper			Prostate Implant
Highland	One indicated, but capabilities not specified			
HH @ Park Ridge	All treatment planning done at Highland			
HH @ FF Thompson (Sands)	All treatment planning done at Highland			
Pluta	Phillips/ADAC	Pinnacle	2	3-D conformal, IMRT, STRS, Brachytherapy
Pluta	Nucletron	Plato	1	HDR Brachytherapy
FLRO	Prowess	Prowess	1	3-D conformal
FLRO	Nomos	Corvus	1	IMRT
FLRO	ROCs	ROCs	1	Brachytherapy
FLRO	Varian	Variseed	1	Prostate Implant
Arnot	Phillips/ADAC	Pinnacle	4	3-D conformal, IMRT, Brachytherapy
CTS Hornell				
Guthrie Corning	CMS	CMS	1	3-D conformal, Brachytherapy
Guthrie	Philips/ADAC	Pros Pinnacle	3	3-D conformal, IMRT
Guthrie	Nucletron	Plato	1	Brachytherapy
Guthrie	Varian	Veriseed	1	Brachytherapy

Table 7

Other Treatment Precision Capabilities at Center

Sponsor	Custom Blocks	Block Former	Immobilization Devices	Compensators
RGH	Y	Y	Y	N
Strong	Y	Y	Y	Y
Highland	Y	Y	Y	Y
HH @ Park Ridge	Y	@ Highland	Y	Y
HH @ FF Thompson (Sands)	Y	@ Highland	Y	Y
Pluta	Y	Y	Y	N
FLRO	Y	Y	Y	Y
Arnot	Y	Y	Y	Y
CTS Hornell	Information not provided			
Guthrie Corning	Y	Y	Y	N
Guthrie	Y	Y	Y	Y