



Trends-in-Medicine

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By Lynne Peterson

SUMMARY

IMRT use is growing, and the trend is likely to continue. Eventually, sources expect almost everyone to convert to IMRT. Hospitals are not postponing IMRT purchase decisions, but IMRT purchasing decisions and implementation take much longer than many sources expected. IMRT is labor intensive, and many sites are currently under-utilizing the technology. Hospitals are willing to mix and match accelerators and IMRT planning systems, and sites are comparing different systems before making a choice. Varian appears to be losing market share, especially to ADAC due to features, cost and perhaps service.

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Stephen Snyder, Publisher

1879 Avenida Dracaena

Jensen Beach, FL 34957

772-334-7409 Fax 772-334-0856

www.trends-in-medicine.com

INTENSITY MODULATED RADIATION THERAPY UPDATE

Two years ago, radiation oncologists, physicists and radiation oncology technicians said intensity modulated radiation therapy (IMRT) was just starting to catch on, but they predicted it was the trend of the future. To check whether this technology actually became a trend, radiation oncology experts at 25 hospitals were questioned about their use of, or plans for, IMRT.

IMRT is a form of three-dimensional conformal radiation therapy (3D-CRT) that uses software to link treatment planning with the accelerator that deliver radiation therapy. Using IMRT, radiation oncologists can determine and deliver an optimal radiation dose for each cancer patient and each tumor. The radiation dose to the tumor is maximized, and the dose delivered to surrounding tissue is minimized.

A DEFINITE TREND

Sources agreed that IMRT is a trend, not a niche product; nearly everyone is either doing it, waiting for it to arrive, or putting it in the budget. A California source said, "This is cutting edge technology." Another source said, "It is truly a dramatic improvement." A third source said, "I'm a believer in IMRT. I don't think in 10 years, you will find people doing anything else. Practically everyone says they want to do it, so it is something that will become a standard tool. It has the potential of becoming just as cost-efficient as conventional, non-IMRT x-ray therapy."

Cost is an issue but not a major barrier for most sources. An upgrade can cost \$500,000, and a new accelerator with IMRT as much as \$1-1.5 million or more.

Reimbursement has been generous, but sources are not sure that will continue. A New York expert said, "IMRT is a moneymaker. It is reimbursable at this point, and you can make money on it, but since other hospitals will be adding it, and it is a big expense, you need a strong referral base to justify it." A New England source said, "Last year, reimbursement was incredible, but it is difficult getting reimbursed now...The problem that has delayed implementation for some people is that reimbursement wasn't quite there. We did a few cases this year, but we haven't seen reimbursement yet."

Among the 25 sites questioned:

- Six have had IMRT since 2001.
- Six implemented IMRT in 2002.
- Eight plan to implement IMRT this year, including one in April 2003.
- Two are trying to choose a system for implementation for 2003-2004.
- Three have no plans for IMRT in the foreseeable future.

No sources indicated they had postponed an IMRT purchase decision. However, implementation of IMRT is proving a longer process than some sources had expected. Once a site has IMRT, it can take up to two years before doctors really begin treating many patients, sources said. A Washington DC physicist said, "We have IMRT now, but it will take us a while to implement it. A suburban hospital has had IMRT for more than a year but is really just getting started. It also took them a while to get going. I know of several facilities in the area that are in the process of purchasing IMRT or have it and haven't been able to start using it yet." A South Carolina doctor said, "We got IMRT in 2001, and we experimented with it for a year and a half before it was fully operative." A Florida hospital source said, "We are just about to get a Varian IMRT planning system, but retrofitting it will take about a year."

IMRT also is very labor intensive, which has affected adoption rates. The head therapist at a major cancer center said, "Doing quality assurance (QA) to be sure you are delivering radiation where you want it is the tough part. We have a pretty inclusive QA program. IMRT is very labor intensive...Because of QA, we have only dedicated one machine to IM. You need more staff to do more IMRT planning – dosimetrists and physicists. But as we evolve over the next couple of years and get new machines, those will be IMRT compatible." A Virginia physicist said, "We've had IMRT since last year. It takes a huge amount of labor, and that hasn't gotten better with time. It takes a long time to treat patients. There is still a raging discussion in the profession about how much improvement you get vs. 3D conformal, and that has been point-counterpoint at all levels." A California physicist said, "IMRT is so automated that it has the potential to be cost-effective, but at this time it requires a lot of testing and QA. Once it matures, it will become more automatic."

Eight of the sites which have IMRT now or are installing it soon consider themselves early adopters. A New England physicist said, "This technology is still on the move." A Washington DC physicist said, "Today only one or two centers in the Greater Washington-Baltimore area have IMRT, but in a year, probably everyone will have it." A California source said, "We are a leader in the area. Another hospital has been trying to get its program off the ground." Another California source said, "We are definitely a leader in this area,

but others are gradually getting it. IMRT is rapidly becoming expected." A New York source said, "We are one of two sites in our area offering IMRT."

However, sources cautioned that IMRT is not for everyone. A Massachusetts physicist said, "IMRT is not a cure-all. It is good for head and neck cancer, but lung cancer is a problem with IMRT." An Indiana physicist said, "IMRT can be over-rated. It's just another tool, and it's not made for everyone." An Arizona technician said, "IMRT is not appropriate for every patient because it is very labor intensive."

MORE PLAYERS IN THE MARKET

The primary accelerator manufacturers in the U.S. are Varian Medical Systems, Siemens Medical Systems and Elekta (formerly Philips Medical Systems), in that order. In 2001, the two leading providers of IMRT inverse treatment planning software were Varian Medical Systems and Nomos, which had a non-exclusive alliance with Siemens. Today, several other companies have made inroads in the IMRT planning system market, particularly Computerized Medical Systems (CMS), Royal Philips Electronics' ADAC Laboratories, Radionics and MDS Nordion (a Canadian company).

The leading IMRT planning systems are:

- ADAC's Pinnacle.
- CMS's Focus
- Nomos' Corvus
- Varian's SmartBeam

Varian, as the leading accelerator manufacturer had expected to trade on that market position and capture a significant share of the IMRT software planning market as well. However, doctors and physicists appear quite willing to mix-and-match accelerators and planning systems.

Accelerator Use and Planning Systems Chosen

2001		2002		2003 *	
Accelerator	IMRT	Accelerator	IMRT	Accelerator	IMRT
Elekta	ADAC	Siemens	CMS	Siemens	ADAC or CMS
Proprietary	Proprietary	Siemens	ADAC	Siemens	ADAC or Nomos
Varian	Varian	Siemens	Nomos	Varian	CMS
Varian	Varian	Varian	Varian	Varian	ADAC
Varian	Nomos	Varian	ADAC	Varian	ADAC
		Varian	Nomos	Varian	Varian
				Varian	Varian

* One source did not specify accelerator or planning system.

Varied reasons were cited for choosing a particular system.

➤ **ADAC users said:**

- “I chose ADAC because it had better features at a lower cost (than Varian).”
- “Our Physicians didn’t like the Varian planning system as much as the ADAC system”
- “I chose ADAC because of the features, not cost. The Varian system wasn’t as advanced as ADAC’s.”

➤ **Varian users said:**

- “Varian is the standard for the industry.”
- “Varian has a better interface, is reliable, has superior technology, and is more dependable.”
- “We got a Varian planning system in 2001 because we had a Varian accelerator, and the Varian IMRT offered superior quality, reproducibility, and great functionality.”

➤ **CMS users said:**

- “CMS is a biggie, and ADAC’s Pinnacle is very good. Some of the things Varian promised others has been slow in coming, but Varian is an up and comer. The Nomos system is very adaptive.”
- “We got a new, next generation Varian accelerator, but CMS’s planning system offering both features and cost. We did not feel we had to get a Varian planning system with a Varian accelerator.”

➤ **Nomos users said:**

- “We have an older Varian accelerator, and we chose a Nomos planning system because of price.”

Not all the IMRT being offered in the marketplace is true IMRT. A New England source said, “Others are not doing real IMRT, just 3d conformal radiation, but they’re billing for IMRT.” A Massachusetts physicist said, “Fifty percent of clinics claim to do some version of IMRT.” The head therapist at a major cancer center explained, “There are different levels of IMT that can be done. Some places do a poor man’s version of IMRT. We use IMRT where we move the machine (gantry) in a fixed position and then the beams go on. The MLC are constantly moving to shape the beam. With the poor man’s IMRT, nothing is moving during treatment. They rotate the gantry, turn the beam on for a short time, shut it off, then change the ML position, then beam again in the same gantry position. Others move both the leaves and the gantry at the same time.” ♦