



Is IMRT Cost Effective for your Center?

How to Obtain Reimbursement for IMRT

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Is IMRT Cost Effective for Your Center? How to obtain reimbursement for IMRT

by Carl R. Bogardus, M.D.

Intensity modulated radiation therapy, also known as IMRT, is a relatively new technique. One of the causes of failure to control malignancy has been the limitations on specifically shaping and directing the treatment beams to the tumor volume of interest while sparing the normal adjacent tissues. 3-dimensional radiation therapy using conformal treatment has resulted in a significant improvement in this tumor-to-normal tissue protection ratio. IMRT takes this one step further by allowing us to use computer programs that not only design the dose distribution, but at the same time, control the radiation therapy treatment delivery system. The use of computer controlled multi-leaf collimation allows portions of the treatment portal to be shaped to follow the exact contour of the tumor volume, and also have the dose delivery across a treatment portal varied by shutting down portions of the treatment beam during treatment session. Therefore, this is named intensity modulated radiation therapy.

This improvement in precision dose delivery allows us to maximize the dosage within the tumor volume and minimize the dosage to surrounding normal tissues, which should logically lead to improved tumor control and a decrease in post-radiation complications. By exactly controlling the ratio between the tumor volume of treatment and the normal tissue volume of protection, dose escalation becomes a real possibility and with dose escalation comes a

higher likelihood of long-term tumor control.

Utilizing conventional radiation therapy, the only way that any type of beam modulation may be obtained is through the use of wedges or custom compensators. These devices vary the dosage across a treatment portal, but this is not a dynamic process, and each portal must be custom designed for a fixed-dose distribution. The mechanical limitations of conventional radiation therapy treatment delivery systems establish the upper limits of practicality for this type of dosage control. Optimal planning for IMRT requires the calculation of thousands of specific dose points across a treatment volume, a daunting task that can be accomplished only by sophisticated computer programs that design the treatment beams as well as control the equipment delivering the radiation. Conventional treatment with multi-leaf collimation (MLC) utilizes static positions of the collimator leaves, whereas IMRT requires the dynamic motion of the various collimator leaves during each session of therapy. IMRT allows and requires a larger number of beams than conventional or conformal radiation therapy. The larger the number of beams, the greater the number of parameters to adjust, and therefore, the greater the control over dose distribution, but the greater the requirement for additional intense physics and physician involvement into the final plans.

EQUIPMENT AND PERSONNEL

Here are basic requirements for IMRT:

- **Linear Accelerator.** Most radiation therapy centers have a significant investment in a modern Linac. Although MLC is not a common

accessory on most older equipment, many new linear accelerators are equipped with MLC. An older unit would need to be retrofitted to use IMRT. An average cost is about \$500,000, if the machine is capable of being retrofitted.

- **Conventional or CT Simulation Capabilities.** Initial simulation is needed for the localization of the general areas of treatment prior to the 3-dimensional planning simulation. Conventional simulation is usually done post 3-D for conventional therapy to establish the final accuracy of blocking. This is not an option with IMRT as the blocking is performed by the linear accelerator and conventional block design, or block checking, cannot be used.

- **3-Dimensional Treatment Planning & Simulation Capabilities.** This is an essential factor for both conventional conformal treatment delivery as well as IMRT. The equipment requires a higher level of programming and greater computer power to design the IMRT dose distributions. Even the most sophisticated treatment planning systems are not usually equipped with an IMRT calculation package. The software and additional hardware can cost from \$250,000 to \$500,000 per center for this upgrade.

- **Physics & Dosimetry Staff.** A highly skilled physics and dosimetry staff is required for either of these options, but IMRT requires the additional expertise of individuals with experience in this treatment modality. For an average of 50 cases per year, each case will require 8 to 12 hours of additional physics and dosimetry time beyond the usual workload.

- **Physician Capabilities.** The physician must be experienced in the clinical indications for IMRT to

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deliver a treatment advantage over conventional therapy and be experienced in the utilization of this highly complex mode of therapy. The average physician time spent per case will range between two and three hours per case. This is used in the initial planning and setup stage as well as in the final approval of the IMRT treatment plan.

PATIENT LOAD

For any highly complex and very expensive treatment modality, an adequate number of patients requiring this form of therapy must be available, otherwise, cost amortization becomes a goal that cannot be achieved.

The best estimates at this time indicate about 8 percent of our current patient load include patients that would significantly benefit by the additional time and effort required to treat them with IMRT. A center treating 300 patients per year would only generate 24 patients in one year requiring IMRT. Logically then, 600 patients per year would generate 48 patients requiring IMRT. Your center may then use these general caseload values to study the additional costs required for IMRT over conventional 3-dimensional conformal treatment delivery.

CLINICAL EXAMPLE AND REIMBURSEMENT

This case demonstrates a mesothelioma involving the chest wall, ICD-9 code 195.1. The nature of this tumor requires the treatment of the chest wall while protecting the underlying lung. To accomplish this, two separate methodologies will be compared.

1. Conventional radiation treatment delivery utilizing 3-dimensional conformal therapy and six separate portals, each with custom blocking and wedges.
2. The use of IMRT and 16 sepa-

your center is treating
no more than 25
IMRT patients per
year, this can result in
a net revenue gain of
between \$50,000 and
\$150,000.

rate treatment portals, each with conformal blocking and intensity modulation of treatment beam delivery.

The calculations in Table 1 (see page 14) follow standard Medicare rules for reimbursement of these treatments. Almost all commercial insurance carriers now follow Medicare guidelines. I have used relative value units as a standard for comparison of reimbursement. The conversion factor of 34.73 is the Y2000 Medicare conversion factor. This conversion factor will be different for commercial insurance, managed care plans as well as other types of insurance plans.

The chances of a specific code for IMRT being approved by CPT and ultimately adopted by the

Health Care Financing Administration is extremely remote. Therefore, we must consider reimbursement for IMRT based upon conventional billing scenarios. In Table 1, I have used all of the CPT procedures that would be expected for the treatment of this case, both by conventional radiation therapy utilizing 3-dimensional conformal treatment and the use of IMRT.

I have indicated the number of treatment blocks and dosimetry, one for each of the treatment portals. Be aware that many Medicare carriers will limit the total number of these procedures and you may be unable to be reimbursed for these larger numbers of procedures for IMRT. In the last column, I have used modifiers. The -51 modifier is for multiple procedures. This will almost always be required when submitting a high number of procedure counts to Medicare. The -22 modifier is for unusual procedural service. This modifier can be used if the additional intensity of the treatment can be shown to be required. Certainly for IMRT, additional time and effort will be required in treatment planning, physics consultation, special procedures, treatment management and delivery. I have arbitrarily doubled the number of RVUs for those particular codes so designated as unusual procedural services. Be aware that these charges also may be denied by Medicare and will certainly require paper-claim submission and elaborate documentation of medical necessity prior to Medicare approving payment for the additional value.

A final comparison is done of the relative value units required for conventional therapy and the relative value units required for IMRT as well as the "hoped for" increase in RVUs using the -22 modifier.

If your center is treating no
continued on page 14

Table 1: Reimbursement for Mesothelioma Involving Chest Wall, A Case Study†

CPT Code	Description	Number Done	RVU Conversion Tx	Number Done	RVU IMRT	Mod.	RVU x 2 Mod IMRT
99245	High level E/M	1	5.28	1	5.28		5.28
77263	Treatment Planning	1	4.69	1	4.69	-22	9.38
77290	Pre-CT Setup Simulation	1	9.38	1	9.38		9.38
76370	CT for Treatment Planning	1	NA	1	NA		NA
77295	3-D Simulation	1	36.99	1	36.99		36.99
77290	Post 3-D Final Simulation	1	9.38	*	*	*	*
77334	Blocks	6	32.10	16	85.60	-51	85.60
77300	Basic Dosimetry	6	14.22	16	37.92	-51	37.92
77331	Micro-Dosimetry	6	11.04	*	*	*	*
77336	Continuing Physics	6	19.38	6	19.38		19.38
77370	Physics Consult	1	3.78	1	3.78	-22	7.56
77470	Special Procedure	1	15.16	1	15.16	-22	30.32
77413	Complex Treatment	30	75.90	30	75.90	-22	151.80
77417	Port Films	6	3.84	6	3.84		3.84
77427	Treatment Management	6	27.00	6	27.00	-22	54.00
TOTAL RVU			268.14		324.92		451.45
Medicare payment CF 34.73			\$9,312		\$11,284		\$15,679

Key: *not done with IMRT -22—unusual procedural services -51—multiple procedures \$—global center payment
 †See clinical example on page 12

more than 25 IMRT patients per year, this can result in a net revenue gain of between \$50,000 and \$150,000; with 50 patients per year, it can result in \$100,000 to \$300,000 revenue gain. If these numbers can be used to offset the additional

costs incurred by upgrading your equipment and the increased physics and physician work requirements, then IMRT will be a cost-effective alternative for the small number of your patients requiring this highly complex

service. If you cannot cost justify the equipment, then you should be aware of the additional non-reimbursed costs that this will place on your center. In today's world of reimbursement, the bottom line is the bottom line. ☐