

Although much research is being conducted into intensity-modulated radiation therapy (IMRT), some basic variants of the procedure are being offered by most vendors of treatment planning software systems and treatment delivery systems. However, implementation of IMRT should be started with due consideration of the gravity of the task. In order to realize the benefits of IMRT, resources must be in place before embarking on an IMRT venture.

Radiation Safety. The impact of the larger workload for IMRT on the shielding barriers should be given due consideration. In general, the primary barriers will not be effected by IMRT implemented with dynamic MLCs. However, existing secondary barriers may be insufficient to dedicate a machine entirely to IMRT. An analysis that includes the door and maze should be performed. In addition, the patient's whole body exposure will increase. At high energies using techniques that require an increase of monitor units by an order of magnitude, the risk of inducing a second carcinoma may be significant.

Treatment Planning. IMRT depends on the acquisition of high resolution, accurate CT and MRI images. When acquiring these studies, immobilization and positioning issues must be resolved. MRI distortions should be known so that selection of treatment margins smaller than the distortions in the tumor volume can be avoided. A network path should be in place to move CT and MRI studies to the planning system and to transfer leaf sequences and treatment data to the therapy machines. Commissioning an IMRT treatment planning system cannot be accomplished adequately without sufficient human and technical resources. As with any new system, time will be required to learn the software and to develop skill at using it. Physicians must be prepared to make radical changes in their approach to prescribing and evaluating IMRT treatment plans.

Quality assurance procedures. An appropriate effort must be planned and executed to insure that the delivery system produces the planned doses and dose distributions. Checks on individual treatments should be carried out until confidence in the system is established. More human and technical resources will be required for IMRT than for conventional treatments for ongoing verifications of monitor units, treatment portals, and leaf sequences prior to treatment.

Treatment Delivery. Selecting, installing, and commissioning an IMRT delivery system requires its own defined effort. For treatments effected by respiration and internal organ motion, special techniques may be needed such as beam gating, ultrasonic soft tissue verification, and portal imaging. Training must be provided for therapists.

Research. IMRT cannot yet be considered to be a routine treatment procedure. IMRT is developing and should be implemented with sufficient attention to record keeping and quality assurance to discover systematic errors and to interpret the long-term results of the treatment. More than ordinary resources should be devoted to keeping records on the plans, delivery, and outcomes for IMRT patients.

Increases in reimbursement for IMRT should be used to provide these additional resources to insure that patients receive the potential benefits of this technique.