INTENSITY MODULATED RADIATION THERAPY (IMRT)

This Model Policy addresses coverage for Intensity Modulated Radiation Therapy (IMRT).

DESCRIPTION
Intensity Modulated Radiation Therapy (IMRT) is a technology for delivering highly conformal external beam radiation to specified targets with radiation beams whose intensity varies throughout the individual treatment fields. IMRT is particularly useful for delivering highly conformal radiation dose to targets positioned near sensitive normal tissues. Several methods can be used to perform IMRT, including step-and-shoot, sliding window, and volumetric modulated arc therapy (VMAT) approaches.

TREATMENT
IMRT Treatment Planning
IMRT treatment plans are tailored to target volumes and are geometrically more accurate than conventional, two-dimensional, or three-dimensional conformal radiation therapy plans. IMRT planning determines the gantry angles, fluences, and other beam parameters necessary to achieve desired radiation dose distributions.

IMRT treatment planning is a multi-step process:

1. Imaging: Three-dimensional image acquisition of the target and adjacent regions during simulation with immobilization devices employing CT, MR, PET scanners or similar technology is an essential prerequisite to IMRT treatment planning. If respiratory or other normal organ motion is expected to produce significant movement of the target during radiotherapy delivery, the radiation oncologist may elect to order breath hold or multi-phasic treatment planning image sets to help account for motion when specifying targets.

2. Contouring: Defining the target and avoidance structures is a multi-step process:
   a. The radiation oncologist reviews the three-dimensional images and outlines the anatomic target(s) of treatment on each slice of the image set. These contours can consist of Gross Tumor Volumes (GTVs), Clinical Target Volumes (CTVs) and/or Internal Target Volumes (ITVs). GTVs represent macroscopic tumor apparent on exam or imaging and CTVs represent areas at risk of harboring microscopic disease. Some patients who have had previous treatment with surgery or chemotherapy may not have GTVs.

   b. If medically necessary, to assess and compensate for respiratory and other sources of motion, multiple image sets may be acquired, and appropriate targets made. The radiation oncologist may outline multiple GTVs at different phases of the respiratory cycle to help account for the effect of respiration on target location and shape. Likewise, the radiation oncologist may outline multiple CTVs to account for bladder filling or other causes of motion. Volumes created to account for respiratory or other motion are known as Internal Target Volumes (ITVs).

   c. To account for variation in daily patient set-up given a particular anatomic area and immobilization technique, the radiation oncologist adds an appropriate margin to create a Planning Target Volume (PTV).

   d. Many combinations of the GTV, CTV, ITV and/or PTV may be contoured depending on the clinical situation and intent of treatment.

   e. Normal structures that could potentially be harmed by radiation (i.e., “organs at risk”, or OARs) are also contoured.

1 ASTRO model policies were developed as a means to efficiently communicate what ASTRO believes to be correct coverage policies for radiation oncology services. The ASTRO Model Policies do not serve as clinical guidelines and they are subject to periodic review and revision without notice. The ASTRO Model Policies may be reproduced and distributed, without modification, for noncommercial purposes.

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3. **Planning Direction:** The radiation oncologist provides a list of objectives and parameters to guide the treatment planning team. Examples may include metrics that evaluate coverage of targets at specific isodose lines, proportion of target volume covered at a prescription dose, conformity metrics, measures of gradients, and heterogeneity. Additionally, differential dosing may be prescribed to different targets within the same treatment plan based on estimated probability of risk of tumor within a specific volume, or proximity of organs at risk. This can include the nominal quantity of dose to be delivered to various targets over a certain amount of treatments as well as accompanying descriptive metrics. In other cases, a highly heterogeneous dose profile with sharp fall off may be desired. Details regarding motion management and image guidance, limits that should not be exceeded, or constraints for OAR's, and the relative prioritization of objectives that may conflict are also provided. Given a patient's specific anatomy, a treatment plan that balances clinical and dosimetric objectives should maximize the potential for disease control and minimize the risk of injury to normal tissue.

4. **Dosimetric Planning and Calculations:** The medical physicist or dosimetrist utilizes specialized treatment planning software to iterate combinations of radiation beams or arcs to meet the radiation oncologist's specified objectives. Cross-sectional imaging overlaid with isodose lines and dose-volume histograms are prepared for the radiation oncologist's evaluation. The essential feature of an IMRT plan is that it describes the means to deliver treatment utilizing non-uniform beam intensities. Each radiation beam and/or arc is, in effect, a collection of numerous “beamlets,” each with a different level of radiation intensity; the summation of these “beamlets” delivers characteristic conformal IMRT dose distributions. The physicist and dosimetrist perform basic dose calculations for each of the modulated beams and/or arcs and verify monitor unit computations through an independent secondary dose calculation method.

5. **Radiation Dose Prescription:** The radiation oncologist approves the treatment plan and formally prescribes radiation to the target volumes, specifying the anatomic treatment site, type and method of radiation treatment delivery, total dose, dose per fraction, number of fractions, frequency of treatment, and image guidance to be used during the course of treatment.

6. **Patient Specific Dose Verification:** The calculated beams or arcs are delivered to a phantom or other dose measuring device to confirm that the dose distribution intended for the patient is physically verified as technically deliverable. Additional detail can be found in the ASTRO IMRT Quality and Safety White Paper (General Reference #13), which critically evaluates guidance and literature on the safe delivery of IMRT, with a primary focus on recommendations to prevent human error and methods to reduce or eliminate mistakes or machine malfunctions that can lead to treatment delivery failures.

Documentation of all aspects of the treatment planning process is essential.

**IMRT Treatment Delivery**
The basic requirement for all forms of IMRT treatment delivery is that the technology must accurately produce the calculated dose distribution described by the IMRT plan in the immobilized patient. IMRT treatment delivery may be accomplished via various combinations of gantry motion, table motion, slice-by-slice treatment (e.g., TomoTherapy), multi-leaf collimators (MLC) and/or solid compensators to modulate the intensity of the radiation beams or arcs.

The highly conformal dose distribution produced by IMRT results in sharper spatial dose gradients than conventional or three-dimensional conformal radiation therapy. Consequently, small changes in patient position or target position within the body can cause significant changes in the dose delivered to the PTV and organs at risk; thus reproducible patient immobilization is essential for IMRT. Imaging techniques such as stereoscopic kilovoltage or megavoltage X-ray, ultrasound, cone beam or megavoltage cone beam CT, MRI, and optical surface monitoring systems (collectively referred to as Image Guided Radiation Therapy or IGRT) may be utilized to mitigate inter and intra-fractional motion and ensure accurate delivery of the radiation.
**Documentation Requirements**

Documentation in the patient’s medical records must support:

1. The reasonable and necessary requirements as outlined under the “Indications and Limitations of Coverage and/or Medical Necessity” section of this policy.

2. Planning direction which defines the goals and requirements of the treatment plan, including specific dose objectives for the target and nearby critical structures.

3. A note of medical necessity for IMRT by the treating physician.

4. Signed IMRT plan that corresponds with the approved prescription.

5. The medical record must include the following:
   a. Documentation of clinically appropriate GTV/CTV/ITV/PTV
   b. Documentation of dose volume histograms for targets and OAR’s.
   c. Documentation of immobilization and patient positioning.

6. Independent basic dose calculations of monitor units have been performed for each beam before the patient’s first treatment.

7. Documentation of fluence distributions (re-computed and measured in a phantom or dosimetry measuring device) is required.

8. Documentation supporting identification of structures that traverse high-and low-dose regions created by respiration is indicated when billing for respiratory motion management simulation.

**INDICATIONS AND LIMITATIONS OF COVERAGE AND/OR MEDICAL NECESSITY**

**Indications For Coverage**

As IMRT technology was introduced and the appropriate clinical applications were being established, earlier versions of this model policy identified specific disease sites for which IMRT was considered a standard option. The maturation and dissemination of IMRT capabilities with improved clinical outcomes has expanded to the point that a definitive list of “approved sites” driven solely by diagnosis codes (ICD-10) is no longer sufficient. However, it is important to note that normal tissue dose volume histograms (DVHs) or dosimetry must be demonstrably improved with an IMRT plan to validate coverage. Therefore, coverage decisions must extend beyond ICD-10 codes to incorporate additional considerations of clinical scenario and medical necessity with appropriate documentation. For some anatomical sites such as head and neck malignancies prostate, anus, central nervous system and thoracic malignancies, IMRT is commonly performed. In all cases, documentation of the medical necessity is required.
INTENSITY MODULATED RADIATION THERAPY (IMRT)

IMRT offers advantages as well as added complexity over conventional or three-dimensional conformal radiation therapy. Before applying IMRT techniques, a comprehensive understanding of the benefits and consequences is required. The radiation oncologist’s decision to employ IMRT requires an informed assessment of benefits and risks including:

- Determination of patient suitability for IMRT allowing for reproducible treatment delivery.
- Adequate definition of the target volumes and organs at risk.
- Equipment capability, including ability to account for organ motion when a relevant factor.
- Physician and staff training.
- Adequate quality assurance procedures.

IMRT is considered reasonable and medically necessary in instances where sparing the surrounding normal tissue is of added clinical benefit to the patient. This may include instances in which clinically relevant tolerances of normal tissues are exceeded for a single plan or in the re-irradiation setting. IMRT is also indicated if the patient’s general medical condition (namely, the performance status) justifies aggressive local therapy to one or more deposits of metastatic cancer in an effort either to achieve total disease clearance in the setting of oligometastatic disease. Based on this principle, several common indications for IMRT are included below. This is not an exhaustive list but represents situations in which IMRT is usually of clinical benefit based on normal anatomy and typical prescribed doses.

<table>
<thead>
<tr>
<th>General</th>
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</thead>
<tbody>
<tr>
<td>Medically inoperable patients with a diagnosis of cancer typically treated with surgery where dose escalation is required due to the inability to receive surgery</td>
</tr>
<tr>
<td>Re-irradiation cases (where cumulative critical structure dose would exceed tolerance dose)</td>
</tr>
<tr>
<td>Primary malignant or benign bone tumors</td>
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<table>
<thead>
<tr>
<th>Central Nervous System</th>
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<tbody>
<tr>
<td>Ocular tumors, including intraocular melanomas</td>
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<tr>
<td>Tumors that approach or are located at the base of skull</td>
</tr>
<tr>
<td>Primary CNS tumors, primary spine, or metastatic tumors to the spine or spinal cord where organ at risk tolerance may be exceeded with 3-D conformal treatments</td>
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<tr>
<td>Primary and metastatic tumors requiring craniospinal irradiation</td>
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<tr>
<td>Brain metastases requiring hippocampal-sparing whole brain radiotherapy</td>
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</tbody>
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<thead>
<tr>
<th>Head and Neck</th>
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<tbody>
<tr>
<td>Definitive, adjuvant, or palliative treatment of primary/secondary head and neck cancers or draining lymphatics of the neck including (but not limited to) cancers of the nasopharynx, nasal cavity, paranasal sinuses, oropharynx, oral cavity, hypopharynx, larynx, thyroid, or salivary glands</td>
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<tr>
<td>Cutaneous tumors with cranial nerve invasion to the base of skull, cavernous sinus, and/or brainstem</td>
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<tr>
<td>Mucosal Melanoma</td>
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<tr>
<td>Occult (or unknown) primary malignancies of the head and neck</td>
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<table>
<thead>
<tr>
<th>Breast</th>
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<tbody>
<tr>
<td>Bilateral breast cancers requiring nodal treatment on at least one side</td>
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<tr>
<td>Breast cancer patients being treated with definitive intent and who have unfavorable anatomy (e.g. pectus excavatum) that would deliver unacceptably high doses to organs-at-risk</td>
</tr>
<tr>
<td>Early-stage breast cancer in which dose to the heart is unacceptably high with conventional photon or photon/electron using cardiac sparing techniques.</td>
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<tr>
<td>Accelerated partial breast irradiation (APBI), regardless of laterality.</td>
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<tr>
<td>Patients in whom internal mammary lymph nodes are targeted.</td>
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<tr>
<td>Breast cancer patients who have limited ipsilateral arm range of motion and require treatment in the arms down position</td>
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## INTENSITY MODULATED RADIATION THERAPY (IMRT)

<table>
<thead>
<tr>
<th><strong>Thoracic</strong></th>
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<tbody>
<tr>
<td>Primary or secondary tumors of the mediastinum, including thymic tumors, mediastinal tumors, mediastinal lymphomas and thoracic sarcomas</td>
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<tr>
<td>Early-stage lung cancer for which SBRT is not feasible secondary to anatomic considerations.</td>
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<tr>
<td>Locally advanced lung cancer in which IMRT significantly reduces dose to normal tissues. (e.g. bilateral mediastinal disease, paraspinal tumors, N3 disease, reducing esophageal dose).</td>
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<tr>
<td>Malignant pleural mesothelioma</td>
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<tr>
<th><strong>Gastrointestinal</strong></th>
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<tbody>
<tr>
<td>Hepatocellular cancer, bile duct, gallbladder and cholangiocarcinoma cancers</td>
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<tr>
<td>Primary cancers of the esophagus and GE junction</td>
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<tr>
<td>Abdominal malignancies, including primary pancreatic, gastric, and adrenal cancers</td>
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<tr>
<td>Primary and Secondary liver cancers</td>
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<tr>
<td>Anal &amp; colorectal cancers</td>
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<tr>
<th><strong>Sarcomas</strong></th>
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<tr>
<td>Retroperitoneal sarcomas</td>
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<tr>
<td>Desmoid tumors</td>
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<tr>
<td>Extremity sarcomas</td>
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<tr>
<th><strong>Pelvic/Gynecological</strong></th>
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<tr>
<td>Cervical cancer</td>
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<tr>
<td>Vulvar and Vaginal cancers</td>
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<tr>
<th><strong>Genitourinary</strong></th>
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<tr>
<td>Prostate Cancer</td>
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<tr>
<td>Renal cancer</td>
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<td>Bladder cancer</td>
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<td>Penile cancer</td>
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<tr>
<td>Ureteral cancer</td>
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</table>

The final determination of the appropriateness and medical necessity for IMRT resides with the treating radiation oncologist who should document the justification for IMRT for each patient.
ICD-10-CM Codes that may be Associated with Medical Necessity

Note: Diagnosis codes are based on the current ICD-10-CM codes that are effective at the time of the Model Policy publication. Any updates to ICD-10-CM codes will be reviewed by ASTRO, and coverage should not be presumed until the results of such review have been published/posted. These ICD codes may support medical necessity under this Model Policy.

<table>
<thead>
<tr>
<th>Site</th>
<th>ICD-10</th>
<th>Description</th>
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<tbody>
<tr>
<td>Central Nervous System</td>
<td></td>
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<tr>
<td>Ocular tumors, including intraocular melanomas</td>
<td>C69.00 - C69.82</td>
<td>Malignant neoplasm of ocular structures</td>
</tr>
<tr>
<td>Tumors that approach or are located at the base of skull</td>
<td>C41.0 - C41.2, C75.1, C75.2, C75.4, C75.5, D16.4, D16.6, D35.3</td>
<td>Malignant neoplasm of bones of skull and face, mandible, vertebral column; Malignant neoplasm of other endocrine glands and related structures; Benign neoplasm of bone; Benign neoplasm of craniopharyngeal duct</td>
</tr>
<tr>
<td>Primary CNS tumors, primary spine, or metastatic tumors to the spine or spinal cord where organ at risk tolerance may be exceeded with 3-D conformal treatments</td>
<td>C41.2, C41.4, C70.1, C72.0, C72.1, D16.6, D16.8, D32.1, D33.4, D33.0-D33.2, D43.0-D43.2</td>
<td>Malignant neoplasm of bones of vertebral column, sacrum, and coccyx; Malignant neoplasm of spinal meninges; Malignant neoplasm of spinal cord and cauda equina; Benign neoplasm of vertebral column, sacrum, coccyx, spinal meninges, spinal cord Benign neoplasm of brain Neoplasm of uncertain behavior of brain</td>
</tr>
<tr>
<td>Primary and metastatic tumors requiring craniospinal irradiation</td>
<td>C70.0 - C72.59, C75.3</td>
<td>Malignant neoplasm of meninges, brain, cranial nerves, spinal cord, pineal gland</td>
</tr>
<tr>
<td>Brain metastases requiring hippocampal-sparing whole brain radiotherapy</td>
<td>C79.31-C79.32, C79.49</td>
<td>Secondary malignant neoplasm of brain, Secondary malignant neoplasm of cerebral meninges, Secondary malignant neoplasm of other parts of nervous system</td>
</tr>
<tr>
<td>Head and Neck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary/Secondary head and neck cancers or draining lymphatics of the neck</td>
<td>C11.0 - C11.8, C30.0, C30.1, C31.0 - C31.8, C00.0 - C14.8, C32.0-C32.8, C73, C75.0, C76.0, C77.0</td>
<td>Malignant neoplasm of nasopharynx; Malignant neoplasm of nasal cavity and middle ear; Malignant neoplasm of accessory sinuses; Malignant neoplasm of head and neck sites Malignant neoplasm of glottis, larynx Malignant neoplasm of thyroid gland Malignant neoplasm of parathyroid gland Malignant neoplasm of head, face and neck Secondary and unspecified malignant neoplasm of lymph nodes of head, face and neck</td>
</tr>
<tr>
<td>Mucosal Melanoma</td>
<td>C06.0</td>
<td>Malignant neoplasm of cheek mucosa</td>
</tr>
<tr>
<td>Breast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast cancer</td>
<td>C50-C50.822</td>
<td>Malignant neoplasm of female, male breast</td>
</tr>
</tbody>
</table>
### Thoracic

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<tr>
<th>Description</th>
<th>Codes</th>
<th>Description</th>
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<tbody>
<tr>
<td>Primary or secondary tumors of the mediastinum, including thymic tumors, mediastinal tumors, mediastinal lymphomas, and thoracic sarcomas</td>
<td>C33, C37, C38.0 - C38.8, C81.00-C81.79, C82.01-C82.99, C83.01-C83.89, C84.01-C84.79, C76.1, C77.1</td>
<td>Malignant neoplasm of trachea; Malignant neoplasm of thymus; Malignant neoplasm of heart, mediastinum, and pleura; Nodular lymphocyte predominant Hodgkin lymphoma, intrathoracic lymph nodes; Nodular sclerosis Hodgkin lymphoma, intrathoracic lymph nodes; Mixed cellularity Hodgkin lymphoma, intrathoracic lymph nodes; Lymphocyte depleted Hodgkin lymphoma, intrathoracic lymph nodes; Lymphocyte-rich Hodgkin lymphoma, intrathoracic lymph nodes; Other Hodgkin lymphoma, intrathoracic lymph nodes; Follicular lymphoma grade Illa, intrathoracic lymph nodes; Follicular lymphoma grade Illb, intrathoracic lymph nodes; Small cell B-cell lymphoma, intrathoracic lymph nodes; Mantle cell lymphoma, intrathoracic lymph nodes; Diffuse large B-cell lymphoma, intrathoracic lymph nodes; Lymphoblastic (diffuse) lymphoma, intrathoracic lymph nodes; Burkitt lymphoma, intrathoracic lymph nodes; Other non-follicular lymphoma, intrathoracic lymph nodes; Malignant neoplasm of thorax Secondary and unspecified malignant neoplasm of intrathoracic lymph nodes</td>
</tr>
</tbody>
</table>

Malignant pleural mesothelioma C45.0-C45.7 Mesothelioma of pleura, other sites

Lung cancer C34.00-C34.92, C78.01-C78.02, C78.2, C78.39 Malignant neoplasm of bronchus, lung Secondary malignant neoplasm of lung Secondary malignant neoplasm of pleura, other respiratory organs

### Gastrointestinal

<table>
<thead>
<tr>
<th>Description</th>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatocellular cancer, bile duct, gallbladder and cholangiocarcinoma cancers</td>
<td>C22.0 - C22.7, C23.0, C24-C24.9</td>
<td>Liver cell carcinoma, liver sarcomas, intrahepatic bile duct carcinoma Malignant neoplasm of gallbladder Malignant neoplasm of bile duct, biliary tract</td>
</tr>
</tbody>
</table>

Primary cancers of the esophagus and GE Junction C15.3 - C15.8 Malignant neoplasm of esophagus
### Abdominal malignancies, including primary pancreatic, gastric, and adrenal cancers
- C16.0-C16.8
- C17.0-C17.8
- C25.0-C25.8
- C74.01-C74.92
- C76.2
- C77.2
- C78.4
- C78.5

- Malignant neoplasm of stomach
- Malignant neoplasm of intestines
- Malignant neoplasm of pancreas
- Malignant neoplasm of adrenal gland(s)
- Malignant neoplasm of abdomen
- Secondary and unspecified malignant neoplasm of intra-abdominal lymph nodes

### Primary and Secondary liver cancers
- C22.8, C22.9
- C78.7

- Malignant neoplasm of liver, primary & secondary

### Anal & colorectal cancers
- C18.0-C18.8
- C19, C20
- C21.0-C21.8

- Malignant neoplasm of colon
- Malignant neoplasm of rectum
- Malignant neoplasm of anus, anal canal

### Sarcomas

#### Retroperitoneal sarcomas
- C48.0 - C48.8
- C78.6

- Malignant neoplasm of retroperitoneum and peritoneum

#### Desmoid tumors
- D48.110-D48.119

- Various regions

### Extremity sarcomas
- C76.40-C76.52

- Malignant neoplasm of upper, lower limbs

### Pelvic/Gynecological

#### Endometrial cancer
- C54.1, C54.2

- Malignant neoplasm of endometrium, myometrium

#### Cervical cancer
- C53.0-C53.8

- Malignant neoplasm of cervix

#### Vulvar and vaginal cancers
- C51.0-C51.8
- C52

- Malignant neoplasm of vulva
- Malignant neoplasm of vagina

### Genitourinary

#### Prostate cancer
- C61

- Malignant neoplasm of prostate

#### Renal cancer
- C65.1-C65.2
- C64.1, C64.2

- Malignant neoplasm of renal pelvis
- Malignant neoplasm of kidney(s)

#### Bladder cancer
- C67.0-C67.8
- C68.0-C68.8
- C79.11

- Malignant neoplasm of bladder
- Malignant neoplasm of urethra

#### Penile cancer
- C60-C60.8
- C63.00-C63.9

- Malignant neoplasm of penis

#### Ureteral cancer
- C54.0, C54.3, C54.8
- C55
- C56.1-C56.3
- C57.01-C57.02
- C57.11-C57.22
- C57.3
- C57.7-C57.8
- C66.1-C66.2

- Malignant neoplasm of uteri
- Malignant neoplasm of uterus
- Malignant neoplasm of ovaries
- Malignant neoplasm of fallopian tubes
- Malignant neoplasm of broad, round ligament(s)
- Malignant neoplasm of parametrium
- Malignant neoplasm of other, overlapping specified female genital organs
- Malignant neoplasm of ureter

### Skeletal

#### Primary malignant or benign bone tumors
- C40.0 - C40.8;
- C41.0 - C41.9
- D16.0 - D16.8

- Malignant neoplasm of bone and articular cartilage;
- Benign neoplasm of bone and articular cartilage
Reirradiation

| Various regions | Z92.3
T66.XXXA* | Personal history of irradiation |

*ICD-10-CM T66.XXXA (Effects of Radiation, Unspecified) may only be used where prior radiation therapy to the site is the governing factor necessitating IMRT in lieu of other radiotherapy. An ICD diagnosis code for the anatomic diagnosis must also be used.
Limitations of Coverage
IMRT is not considered reasonable and medically necessary unless at least one of the criteria listed in the “Indications of Coverage” section of this policy is present.

Clinical scenarios that would not typically support the use of IMRT include:

1. Where IMRT does not offer an advantage over conventional or three-dimensional conformal radiation therapy techniques that deliver good clinical outcomes and low toxicity.

PHYSICIANS’ CURRENT PROCEDURAL TERMINOLOGY (CPT®)/HCPCS
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CPT®/HCPCS codes

<table>
<thead>
<tr>
<th>CPT Code for IMRT Treatment Planning</th>
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</thead>
</table>
| 77301 | Intensity Modulated Radiation Therapy (IMRT) plan, including dose-volume histograms for target and critical structure partial tolerance specifications. 
"This code is typically reported only once per course of IMRT." |
| +77293 | Respiratory motion management simulation (List separately in addition to code for primary procedure).
"This is an add-on code and cannot be billed on its own. It should be billed with either CPT code 77295 or 77301." |

CPT Codes for IMRT Treatment Delivery

<table>
<thead>
<tr>
<th>CPT Code for IMRT Treatment Delivery</th>
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</table>
| 77385 | Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; simple 
"Use with any of the following: prostate, breast, and all sites using physical compensator based IMRT." |
| 77386 | Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex 
"Includes all other sites if not using physical compensator based IMRT." |
| G6015 | Intensity modulated treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session 
"Report in freestanding centers under the Medicare Physician Fee Schedule to payers that do not accept CPT codes 77385 or 77386." |
| G6016 | Compensator-based beam modulation treatment delivery of inverse planned treatment using three or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session 
"Report in freestanding centers under the Medicare Physician Fee Schedule to payers that do not accept CPT codes 77385 or 77386." |
Medical Radiation Physics, Dosimetry and Treatment Devices

Basic Radiation Dosimetry

Basic radiation dosimetry is a separate and distinct service from IMRT planning and should be reported accordingly. The radiation dose delivered by each IMRT beam must be individually calculated and verified before the course of radiation treatment begins. Thus, multiple basic dosimetry calculations (up to 10) are typically performed and reported on a single day. Supporting documentation should accompany a claim for more than ten (10) calculations on a single day.

CPT® Code for IMRT Dosimetry

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>77300</td>
<td>Basic radiation dosimetry calculation central axis depth dose calculation, TDF, NSD, gap calculation, off axis factor, tissue inhomogeneity factors, calculation of non-ionizing radiation surface and depth dose, as required during course of treatment, only when prescribed by the treating physician. This code can generally be billed once for each IMRT beam or arc up to a limit of ten. This code is used to report dosimetry calculations that arrive at the relationship between monitor units (or time) and dose, and the physician’s verification, review and approval. The documentation should contain the independent check of each field, separate from the computer-generated IMRT plan.</td>
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</table>

Treatment Devices

There are several categories of treatment devices used in conjunction with the delivery of IMRT radiotherapy. Immobilization treatment devices are commonly employed to ensure that the beam is accurately on target. In addition, the radiation oncologist is responsible for the design of treatment devices that define the beam geometry. The beam or arc aperture, the dose constraints per beam, the couch and gantry angles for each beam position or arc start/stop location, and the coverage requirements all must be evaluated in order to guide the generation of the multi-leaf collimator (MLC) segments. CPT® code 77338 was established to report multileaf collimator (MLC) design and construction for IMRT. It captures the physician work associated with design and fabrication of the device, the practice expense associated with staff (physicists and dosimetrists) and the equipment used to design, analyze and fabricate the device. While 77334 was previously billed once for each gantry angle, 77338 is billed only once per IMRT plan. There is no separate accounting for gantry angles or other beam arrangements. CPT code 77334 may be used in the IMRT process of care to report the immobilization device constructed at time of the simulation. Additional IMRT plans during a course of care merit additional reporting of 77338.

CPT Codes for IMRT Treatment Devices

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>77332</td>
<td>Treatment devices, design and construction; simple Simple treatment devices include simple multi-use shaped blocks, bolus and passive, mutliuse devices.</td>
</tr>
<tr>
<td>77333</td>
<td>Treatment devices, design and construction; intermediate Intermediate treatment devices include pre-cast or pre-made standard-shaped blocks, stents, and special bolus and bite blocks.</td>
</tr>
<tr>
<td>77334</td>
<td>Treatment devices, design and construction; complex Complex treatment devices include custom-fabricated cast blocks, immobilization devices, wedges, compensators and eye shields.</td>
</tr>
<tr>
<td>77338</td>
<td>Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan Report once per IMRT plan.</td>
</tr>
</tbody>
</table>
Image Guided Radiation Therapy
Image Guided Radiation Therapy (IGRT) utilizes imaging technology to modify treatment delivery to account for changes in the position of the intended target. IGRT is indicated for use in patients whose tumors are located near or within critical structures and/or in tissue with inherent setup variation. The new IMRT delivery codes (77385 and 77386) include the technical component of guidance and tracking if performed. The G-codes listed below can be used to report the professional component of IGRT in instances where a payer does not accept 77387-26.

CPT® and HCPCS Codes for IGRT

<table>
<thead>
<tr>
<th>CPT® Code</th>
<th>CPT Code Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>77387</td>
<td>Guidance for localization of target volume for delivery of radiation treatment delivery, includes intrafraction tracking, when performed</td>
</tr>
<tr>
<td>G6001</td>
<td>Ultrasonic guidance for placement of radiation therapy fields</td>
</tr>
<tr>
<td></td>
<td>Report under the Medicare Physician Fee Schedule to payers that do not accept CPT code 77387.</td>
</tr>
<tr>
<td>G6002</td>
<td>Stereoscopic X-ray guidance for localization of target volume for the delivery of radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Report under the Medicare Physician Fee Schedule to payers that do not accept CPT code 77387.</td>
</tr>
<tr>
<td>77014</td>
<td>Computed tomography guidance for placement of radiation therapy fields</td>
</tr>
<tr>
<td></td>
<td>Report under the Medicare Physician Fee Schedule to payers that do not accept CPT code 77387.</td>
</tr>
</tbody>
</table>

ADDITIONAL INFORMATION
Per CMS, payment for the services identified by CPT codes 77014, 77280, 77285, 77290, 77295, 77306, 77307, 77321, and 77331, are included in the payment for CPT code 77301 (IMRT planning). These codes should not be reported in addition to CPT code 77301, when provided prior to, or as part of, the development of the IMRT plan. They may, however, be reported as needed during the course of IMRT treatment delivery (i.e., with CPT codes 77385, 77386, G6015 or G6016). Additionally, CPT codes 77280-77290 Simulation aided field settings should not be reported for verification of the treatment field during the course of IMRT.

<table>
<thead>
<tr>
<th>CPT® Code</th>
<th>CPT Code Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>77014</td>
<td>Computed tomography guidance for placement of radiation therapy fields</td>
</tr>
<tr>
<td>77280</td>
<td>Therapeutic radiology simulation-aided field setting; simple</td>
</tr>
<tr>
<td></td>
<td>Criteria for level: Single treatment area. 77280 may be performed and reported separately from the IMRT plan to report verification of the field after the planning process is complete and prior to the initial treatment.</td>
</tr>
<tr>
<td>77285</td>
<td>Therapeutic radiology simulation-aided field setting; intermediate</td>
</tr>
<tr>
<td></td>
<td>Criteria for level: Two separate treatment areas.</td>
</tr>
<tr>
<td>77290</td>
<td>Therapeutic radiology simulation-aided field setting; complex</td>
</tr>
<tr>
<td></td>
<td>Criteria for level: Any of these factors present: Three or more treatment areas, or any number of treatment areas if the following are involved: particle therapy, rotation or arc therapy, complex blocking, custom shielding blocks, brachytherapy simulation, hyperthermia probe verification, and/or any use of contrast materials.</td>
</tr>
<tr>
<td>77295</td>
<td>3-dimensional radiotherapy plan, including dose-volume histograms</td>
</tr>
<tr>
<td></td>
<td>May be reported once per treatment course per treatment volume.</td>
</tr>
<tr>
<td>77321</td>
<td>Special teletherapy port plan, particles, hemibody, total body</td>
</tr>
<tr>
<td></td>
<td>Use for particle beam isodose planning. Use for electrons, protons and neutron therapy; half body or total body therapy.</td>
</tr>
<tr>
<td>77331</td>
<td>Special dosimetry (e.g., TLD, microdosimetry) (specify), only when prescribed by the treating physician</td>
</tr>
<tr>
<td></td>
<td>Explanation of medical necessity may be required.</td>
</tr>
<tr>
<td>77370</td>
<td>Special medical radiation physics consultation</td>
</tr>
<tr>
<td></td>
<td>The radiation oncologist makes a direct request to the qualified medical physicist for a special consultative report or for specific physics services for an individual patient.</td>
</tr>
</tbody>
</table>
REFERENCES

The medical literature regarding Intensity Modulated Radiation Therapy is extensive. The following list comprises a compilation of selected peer reviewed publications from the last 15 years reporting clinical outcomes in patients treated with IMRT, organized by disease site.

**General**


**Anus**


Breast


Central Nervous System


Cervix


Gynecologic


76. ....


Liver


Lung


Lymphoma


Ovary

Pancreas


**Prostate**


Rectum


Stomach


Testis


Uterus


**Vulva**
