# Table of Contents

## Use of AIM’s Diagnostic Imaging Guidelines

- Use of AIM’s Diagnostic Imaging Guidelines ................................................................. 4
- Administrative Guidelines ................................................................................................ 5
- Guideline: Simultaneous Ordering Of Multiple Imaging Tests ........................................... 6

## Head & Neck Imaging

- **CT of the Head** ........................................................................................................... 8
- **CTA of the Head: Cerebrovascular** ............................................................................. 14
- **MRI of the Head** ....................................................................................................... 17
- **MRA of the Head: Cerebrovascular** ........................................................................... 23
- **Functional Brain MRI** ................................................................................................ 26
- **PET Brain Imaging** ..................................................................................................... 28
- **CT of the Orbit, Sella Turcica, Posterior Fossa and the Temporal Bone, including Mastoids** .............................................................................................................................. 30
- **MRI of the Orbit, Face, Neck** .................................................................................... 33
- **CT of the Paranasal Sinus Maxillofacial Area** ................................................................ 36
- **MRI of the Temporomandibular Joints** ......................................................................... 39
- **CT of the Neck (Soft Tissue)** ...................................................................................... 41
- **CTA of the Neck** ........................................................................................................ 43
- **MRA of the Neck** ........................................................................................................ 46

## Chest Imaging

- **CT of the Chest** ........................................................................................................... 49
- **CTA of the Chest** ....................................................................................................... 54
- **MRI of the Chest** ....................................................................................................... 58
- **MRA of the Chest** ....................................................................................................... 61
- **MRI of the Breast** ...................................................................................................... 65

## Cardiac Imaging

- **Nuclear Cardiology - Myocardial Perfusion Imaging** .................................................. 68
- **Nuclear Cardiology - Cardiac Blood Pool Imaging** ...................................................... 75
- **Nuclear Cardiology - Infarct Imaging** ........................................................................ 79
- **Stress Echocardiography** ........................................................................................... 81
- **Transesophageal Echocardiography (TEE)** ................................................................. 88
- **Resting Transthoracic Echocardiography (TTE)** .......................................................... 90
- **CT Cardiac (Structure)** .............................................................................................. 98
- **CCTA Coronary Artery** ............................................................................................ 102
- **CT - Evaluation of Coronary Calcification** ................................................................ 105
MRI - Cardiac .............................................................................................................................................. 107
PET Myocardial Imaging............................................................................................................................ 112

Abdominal & Pelvic Imaging

CT of the Abdomen .................................................................................................................................... 114
MRI of the Abdomen ................................................................................................................................. 120
CTA/MRA of the Abdomen ......................................................................................................................... 124
CTA of the Abdominal Aorta - Lower Extremity Run-off ........................................................................ 128
CT of the Pelvis ........................................................................................................................................ 130
MRI of the Pelvis ...................................................................................................................................... 135
CTA/MRA of the Pelvis ............................................................................................................................... 139
CT of the Abdomen & Pelvis Combination ............................................................................................... 142
CT Colonography .................................................................................................................................... 147

Spine Imaging

CT of the Cervical Spine ............................................................................................................................. 149
MRI of the Cervical Spine ......................................................................................................................... 152
CT of the Thoracic Spine ........................................................................................................................... 155
MRI of the Thoracic Spine ....................................................................................................................... 158
CT of the Lumbar Spine ............................................................................................................................. 161
MRI of the Lumbar Spine .......................................................................................................................... 164
MRA of the Spinal Canal ............................................................................................................................ 168

Upper Extremity Imaging

CT of the Upper Extremity .......................................................................................................................... 169
MRI of the Upper Extremity (Any Joint) ................................................................................................. 171
MRI of the Upper Extremity (Non-Joint) ................................................................................................. 176
CTA/MRA Upper Extremity ...................................................................................................................... 179

Lower Extremity Imaging

CT of the Lower Extremity .......................................................................................................................... 181
MRI of the Lower Extremity (Joint & Non-Joint) .................................................................................... 183
CTA/MRA of the Lower Extremity ............................................................................................................. 188
PET Imaging - Other Including Oncologic

PET - Other PET Applications Including Oncologic Tumor Imaging ..................................................... 191

Other

Magnetic Resonance Spectroscopy (MRS) .............................................................................................. 200
MRI - Bone Marrow Blood Supply ........................................................................................................ 201
Quantitative CT - Bone Mineral Densitometry ...................................................................................... 203
Clinical Guidelines
Website Disclaimer

BY ACCEPTING THESE DOCUMENTS, I ACKNOWLEDGE ACCEPTANCE OF THE FOLLOWING TERMS AND CONDITIONS FOR ACCESS AND USE OF THE CLINICAL GUIDELINES:

American Imaging Management, Inc. (AIM) has developed proprietary Diagnostic Imaging Utilization Management Clinical Guidelines (together with any updates, referred to collectively as the “Guidelines”). The Guidelines are designed to evaluate and direct the appropriate utilization of high technology diagnostic imaging services. They are based on data from the peer-reviewed scientific literature, from criteria developed by specialty societies and from guidelines adopted by other health care organizations. Access to these Guidelines is being provided for informational purposes only. AIM is under no obligation to update its Guidelines. Therefore, these Guidelines may be out of date.

The Guidelines are protected by copyright of AIM as permitted by and to the full extent of the law. These rights are not released, transferred, or assigned as a result of allowing access. You agree that you do not have any ownership rights to the Guidelines and you are expressly prohibited from selling, assigning, leasing, licensing, reproducing or distributing the Guidelines, unless authorized in writing by AIM.

The Guidelines do not constitute medical advice and/or medical care, and do not guarantee results or outcomes. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient’s care or treatment. The Guidelines do not address coverage, benefit or other plan specific issues.

The Guidelines are provided “as is” without warranty of any kind, either expressed or implied. AIM disclaims all responsibility for any consequences or liability attributable or related to any use, non-use or interpretation of information contained in the Guidelines.
AIM’s Proprietary Clinical Practice Guidelines are designed to evaluate and direct the appropriate utilization of elective, high technology diagnostic imaging services. In the process, multiple functions are accomplished:

△ To promote the most efficient and cost-effective use of diagnostic imaging services
△ To assist the practitioner as an educational tool
△ To encourage standardization of medical practice patterns and reduce variation in clinical evaluation
△ To curtail the performance of inappropriate, elective diagnostic imaging studies
△ To reduce the performance of duplicative diagnostic imaging studies
△ To advocate biosafety issues, including unnecessary radiation exposure (for CT and plain film radiography) and MRI safety concerns
△ To enhance quality of healthcare for elective diagnostic imaging studies, using evidence-based medicine and outcomes research from numerous resources

**AIM Guideline Development Process and Resources:**

The development of AIM’s proprietary practice guidelines involves integration of medical information from multiple sources, to support the reproducible use of high quality and state-of-the-art advanced diagnostic imaging services. The process for criteria development is based on technology assessment, peer-reviewed medical literature including clinical outcomes research and consensus opinion in medical practice.

The primary resources used for AIM guideline development include:

- American College of Radiology (ACR) Appropriateness Criteria
- American College of Cardiology (ACC) Appropriateness Criteria
- American Heart Association (AHA)
- American Institute of Ultrasound in Medicine (AIUM)
- American Cancer Society (ACS)
- American Academy of Neurology (AAN)
- American Academy of Pediatrics (AAP)
- Society of Interventional Radiology (SIR)
- Society of Nuclear Medicine (SNM)
- Agency for Healthcare Research and Quality (AHRQ)
- **National Guideline Clearinghouse**
- Centers for Medicare and Medicaid Services (CMS) *When variances occur Medicare NCD and LCD determinations will be used instead of AIM guidelines for medicare advantage patients*

**Guideline review:**

AIM’s proprietary guidelines for appropriate diagnostic imaging utilization are reviewed routinely by:

1. Independent Physician Review Board: AIM’s Physician Specialty Advisory Panel
2. Health Plan Medical Directors
3. Local Imaging Advisory Council (representing local physician communities)
4. Physician Review Panels, under the governance of our clients’ State Regulatory Agencies
Guideline: Simultaneous Ordering of Multiple Imaging Tests

Modality: ALL
Body Part: ALL
CPT Codes: ALL

STANDARD ANATOMIC COVERAGE:

The major area of concern is contiguous body parts where clinical signs and symptoms may be coming from abnormalities involving either region, or different modalities can be considered to evaluate the same anatomy for the same clinical problem. These are areas where ordering multiple tests before the results of any of the tests are known lead to inappropriate imaging.

GENERAL CONSIDERATIONS:

Rapid breakthroughs in technology, with attendant rise of new imaging tests available to improve patient management, have created a dilemma for clinicians. Many factors in choosing the right test now come into play. One must consider basic data in the decision-making process. Considerations include the possible effect on patient management, the pretest probability that the patient is affected by a particular disease, the prevalence of the disease in the population, and the accuracy [sensitivity\ specificity] of the test. When a screening approach is adopted, rather than targeting the particular test or anatomic site with the highest pretest probability of success, the possibility of one or more of the tests being superfluous and not contributing meaningfully to patient management increases to an unacceptable level.

For this reason, simultaneous ordering of multiple examinations may subject these examinations to more intensive levels of review than would be the case if these same tests were ordered sequentially. Depending on the clinical situation, one or more of the requested studies might not meet medical necessity criteria until the results of the lead study are known.

COMMON DIAGNOSTIC INDICATIONS FOR MULTIPLE SIMULTANEOUS IMAGING REQUESTS:

- The initial diagnosis/staging or follow-up of oncology patients
- Follow-up of patients who have had operative procedures on multiple anatomic sites
- Patients in whom the suspected anatomic abnormality might extend into multiple regions, such as diverticulitis or suspected syringomyelia

COMMON INAPPROPRIATE MULTIPLE SIMULTANEOUS IMAGING REQUESTS:

- Brain MRA ordered routinely with brain MRI without vascular indications
- Brain CT ordered simultaneously with sinus CT for headache
- Multiple levels of spine MRI’s or CT’s for diffuse back pain or radicular symptoms
- Cervical spine and shoulder MRI’s ordered simultaneously for shoulder pain
- Pelvic or hip MRI’s ordered simultaneously with lumbar spine MRI for hip pain
- Pelvic CT ordered routinely with abdominal CT for suspected upper quadrant disease processes

REFERENCE/LITERATURE REVIEW:

1. Kuhns M. D., Lawrence R., Thomberry M.D., John R., Freyback Ph.D., Dennis, Decision-making Imaging. YEARBOOK medical publishers 1989
**REFERENCE/LITERATURE REVIEW:**

4. Hollingsworth W. and Jarvik J. G. Technology Assessment in Radiology: Rutting the Evidence in Evidence-Based Radiology. Radiology,: 244 (1) PAGES 31-38, July 1, 2007


Computed Tomography (CT)

Head

CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>70450</td>
<td>CT of Head, without contrast</td>
</tr>
<tr>
<td>70460</td>
<td>CT of Head, with contrast</td>
</tr>
<tr>
<td>70470</td>
<td>CT of Head, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- From the skull base to vertex, covering the entire calvarium and intra-cranial contents.
- Scan coverage may vary, depending on the specific clinical indication.

IMAGING CONSIDERATIONS:

- Radiation Dosimetry: CT of Head, either without or with contrast, has a typical effective dose of approximately 2.3 milliSieverts (mSv) or 115 Chest X-Ray equivalents.
- MRI of the head is preferable to CT in most clinical scenarios, due to its superior contrast resolution and lack of beam-hardening artifact adjacent to the petrous bone (which may limit visualization in portions of the posterior fossa and brainstem on CT). Notable exceptions to the use of head MRI as the neuroimaging procedure of choice are: acute intra-cranial hemorrhage (parenchymal, subarachnoid, subdural, epidural); initial evaluation of recent craniocerebral trauma; osseous assessment of the calvarium, skull base and maxillofacial bones, including detection of calvarial and facial bone fractures; and evaluation of calcified intracranial lesions.
- CT of the head is an alternative exam in patients who cannot undergo MRI. Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices that are unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast-enhanced CT may be contraindicated in certain circumstances, such as a documented allergy to intravenous contrast material and renal insufficiency. Special consideration should also be given to patients with multiple myeloma.
- For CT imaging of the orbits, internal auditory canals (IACs) or temporal bones, see CPT codes 70480-70482.
- According to Medicare's Correct Coding Edits, a CT of the Head is not usually performed with a CT of the Orbits. These studies are generally considered mutually exclusive procedures.
- Imaging studies of the head and neck are inherently bilateral. Duplicate requests for bilateral studies to image the right and left side of the head are inappropriate.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR HEAD CT:

The following diagnostic indications for Head CT are accompanied by pre-test considerations as well as clinical supporting data and prerequisite information:

CT is the imaging modality of choice for evaluation of:

- Acute intra-cranial hemorrhage (parenchymal, subarachnoid, subdural and epidural hematomas);
- Recent head trauma;
- Osseous evaluation of the calvarium, skull base and facial bones, including detection of calvarial and facial bone fractures as well as assessment of the temporal bones for conductive hearing loss and an abnormal otoscopic exam;
COMMON DIAGNOSTIC INDICATIONS FOR HEAD CT:

- Calcified lesions
- MRI is the preferred technique for most other indications, unless contraindicated. This includes assessment of the cerebral parenchyma, cerebellum, brainstem and pituitary gland.

ABNORMALITIES DETECTED ON OTHER IMAGING STUDIES WHICH REQUIRE ADDITIONAL CLARIFICATION TO DIRECT TREATMENT

CNS FINDINGS/DEFICITS – NEW ONSET OR PROGRESSIVELY WORSENING NEUROLOGICAL ABNORMALITY

- Including but not limited to the following clinical symptoms and findings:
  - Anosmia (loss or impairment in sense of smell)
  - Ataxia (inability to coordinate voluntary muscular movements)
  - Bell’s Palsy
  - Dysgeusia (dysfunction in sense of taste)
  - Facial Numbness
  - Gait Disorder
  - Other Movement Disorders
  - Nystagmus (rapid, involuntary, oscillating ocular movements)
  - Paresis or Paralysis
  - Tinnitus (ringing or roaring auditory sensation; may be either unilateral or bilateral; pulsatile or non-pulsatile; transient or persistent)
  - Other cranial nerve impairment

Note: Contrast-enhanced MRI, unless contraindicated, is generally recommended for evaluation of cranial nerve impairment.

CEREBROVASCULAR ACCIDENT (CVA OR STROKE) AND TRANSIENT ISCHEMIC ATTACK (TIA)

- May present with a variety of signs and symptoms, including sudden onset of weakness, focal sensory loss or speech disorder
- Among patients being evaluated for CVA and possible thrombolytic therapy, unenhanced CT is often performed as the initial modality (within the initial 24 hours after symptom onset), to detect a possible hemorrhagic stroke or mass lesion.

CONGENITAL ANOMALY

- Including but not limited to the following conditions:
  - Chiari Malformations
  - Dandy-Walker Spectrum
  - Encephalocele
  - Holoprosencephaly
  - Macrocephaly
  - Microcephaly
  - Schizencephaly
  - Septo-optic Dysplasia

CRANIOSYNOSTOSIS

DEMENTIA

- Initial evaluation, if MRI is contraindicated, or
- Rapid progression, if MRI is contraindicated

DEVELOPMENTAL DELAY

- In developmental delay, MRI is the preferred imaging modality over CT
- The likelihood of making a specific neuroimaging diagnosis increases in the presence of physical exam abnormalities such as focal motor findings or microcephaly

EVALUATION OF ABNORMAL FINDINGS DETECTED ON OTHER IMAGING STUDIES - SUCH AS A MASS LESION OR ABNORMAL INTRACRANIAL CALCIFICATION
# COMMON DIAGNOSTIC INDICATIONS FOR HEAD CT:

## HEADACHE IN ADULT – WHEN ANY ONE OF THE FOLLOWING CRITERIA ARE MET:  
- Sudden onset and severe, including thunderclap or worst headache of life; or  
- Increased frequency and severity; or  
- With new focal neurologic signs, particularly papilledema, visual field defects and nuchal rigidity; or  
- New-onset headaches after age 50 years, as a recommendation; age is not an absolute requirement; or  
- New-onset headaches in cancer or immunodeficient patient; or  
- With mental status changes; or  
- With fever, nuchal rigidity and other meningeal signs; or  
- With nausea and vomiting; or  
- With exertion; or  
- Frequently awakened from sleep

*Note: Current evidence does not support CT evaluation for chronic headache or migraines, when the patient's neurological status is unchanged.*

## HEADACHE IN PEDIATRIC PATIENT – WHEN ANY ONE OF THE FOLLOWING CRITERIA ARE MET:  
- Sudden onset and severe, including thunderclap or worst headache of life; or  
- Associated with neurological abnormalities such as nystagmus, papilledema, gait or motor disturbances; or  
- With fever, nuchal rigidity and other meningeal signs; or  
- Awakened repeatedly from sleep or develop upon awakening; or  
- Persistent headache with confusion, disorientation or vomiting; or  
- Persistent headaches of < 6 months duration and not responsive to medical treatment; or  
- Persistent headaches, without a family history of migraines; or  
- Familial or personal history of disorders with predisposition to CNS lesions and clinical/laboratory findings that suggest CNS involvement;

## HEMORRHAGE/HEMATOMA  
- Refers to non-traumatic, non-CVA and non-tumor-related intra-cranial bleed. Examples include hypertensive hemorrhage and hemorrhage secondary to anti-coagulation or blood dyscrasia  
- CT is the preferred technique for evaluation of acute intra-cranial hemorrhage  
- MRI is usually preferred for evaluation of subacute and chronic hemorrhage

## HYDROCEPHALUS (VENTRICULOMEGALY)  
- MRI is often the preferred for initial evaluation of patients with hydrocephalus. For patients with an indwelling shunt, CT is usually adequate in the diagnostic follow-up of hydrocephalus.

## INCREASED INTRACRANIAL PRESSURE OR HERNIATION

## INFECTIOUS OR INFLAMMATORY PROCESS  
- Including but not limited to the following:  
  - Cerebral or Cerebellar Abscess  
  - Encephalitis  
  - Meningitis  
  - Neurocysticercosis  
  - Opportunistic Infection, particularly with immunosuppressed or other immunodeficient conditions  
  - Subdural Empyema

## MENTAL STATUS CHANGES, WITH DOCUMENTED OBJECTIVE EVIDENCE FROM NEUROLOGIC EXAM

## MOVEMENT DISORDERS  
- Including Parkinson’s disease (particularly atypical cases with poor response to levodopa, in which there may be an underlying structural disorder producing parkinsonian features); Huntington’s disease; idiopathic sporadic cerebellar ataxia (olivopontocerebellar atrophy); and other conditions.
### COMMON DIAGNOSTIC INDICATIONS FOR HEAD CT:

#### MULTIPLE SCLEROSIS AND OTHER WHITE-MATTER DISEASES, WHEN MRI IS CONTRAINDICATED OR NOT TOLERATED

- Initial diagnosis; or periodic scans to assess asymptomatic progression in multiple sclerosis during the early course of disease; or tracking the progress of multiple sclerosis to establish a prognosis or evaluation of response to treatment; or to evaluate changes in neurologic signs and symptoms; or to assess for asymptomatic progression early in the course of the disease if this information would be used to make treatment determination.

#### NEUROCUTANEOUS DISORDERS

- Including but not limited to the following:
  - Neurofibromatosis
  - Sturge-Weber Syndrome
  - Tuberous Sclerosis
  - Von Hippel-Lindau Disease (VHL)

#### NEUROENDOCRINE ABNORMALITY SUGGESTIVE OF A PITUITARY LESION

- MRI is usually preferred over CT for evaluation of pituitary lesions
- Relevant laboratory and clinical abnormalities are required

#### PAPILLEDEMA (refers to swelling and elevation of optic disc – a sign of increased intracranial pressure)

#### PRE- AND POST-NEUROSURGICAL EVALUATION

#### PRIOR TO LUMBAR PUNCTURE

#### SEIZURE DISORDER – new onset or increasing frequency and severity

#### SENSORINEURAL HEARING LOSS, DOCUMENTED BY AUDIOLOGY

- As work-up for Acoustic Neuroma (Vestibular Schwannoma) – also see Primary Intra-cranial Tumors

*Note: Contrast-enhanced MRI, unless contraindicated, is generally recommended for evaluation of sensorineural hearing loss.*

#### SYNCOPE

- Syncope (partial or complete loss of consciousness) and near syncope (lightheadedness) are infrequently of primary neurological origin, particularly in the absence of abnormal neurological findings.
- Neurological consultation (for assessment of possible vertebrobasilar TIAs) and cardiovascular evaluation should be considered.

#### TRAUMA TO HEAD

- CT is usually preferred for the initial evaluation of acute head trauma, due to the high sensitivity for hemorrhage and ability to display fractures
- Particularly when associated with:
  - Calvarial fracture (as demonstrated on plain film radiography)
  - Change in Mental Status or Amnesia
  - Focal Neurological Deficits
  - Loss of Consciousness
  - Seizures
  - Signs of Increased Intracranial Pressure
  - Nausea / Vomiting
  - Worsening Headaches
- Suspected hemorrhage, or subdural or epidural hematoma

#### TUMOR EVALUATION – BENIGN AND MALIGNANT

Including but not limited to the following lesions:

- Primary Intra-cranial Tumors
  1. Intra-axial Neoplasms of the Cerebrum and Cerebellum
## COMMON DIAGNOSTIC INDICATIONS FOR HEAD CT:

2. Extra-axial Tumors, including Meningiomas and Schwannomas, such as:
   - Cerebello- pontine Angle (CPA) and internal auditory canal (IAC) Vestibular Schwannoma of CN 8 (also referred to as an Acoustic Neuroma), and
   - Non-Acoustic Neuromas at the CPA involving cranial nerves (CN) 5, 7, 9, 10, 11 and 12, such as a CN 7 Schwannoma
3. Pituitary Tumors, including Macroadenomas and Microadenomas
   - Metastatic Disease

## UNEXPLAINED MASS LESION IDENTIFIED ON PRIOR IMAGING – SURVEILLANCE, WITHOUT PATHOLOGIC TISSUE CONFIRMATION.

- Examples include suspected Arachnoid Cyst or Epidermoid Cyst

## VASULAR ABNORMALITIES

- Including but not limited to:
  - Aneurysm
  - Arterio-Venous Malformation (AVM)
  - Cavernous Malformation
  - Cerebral Vein Thrombosis
  - Dural Arteriovenous Fistula (DAVF)
  - Dural Venous Sinus Thrombosis
  - Venous Angioma

- Either CTA or MRA are usually the imaging modalities of choice for some of these vascular abnormalities, such as aneurysm evaluation.

## VENTRICULAR SHUNT ASSESSMENT

## VERTIGO AND DIZZINESS

- With recurrent or persistent symptoms and when evaluation for other etiologies has not been revealing
- Abnormal hearing test or Auditory Brainstem Response

## VISUAL DISTURBANCE – SUCH AS VISUAL FIELD LOSS, DIPLOPIA AND OTHER ALTERATIONS IN VISION THAT ARE UNEXPLAINED BY OPHTHALMOLOGIC EXAM AND PATIENT HISTORY

## WHEN THE PATIENT’S CONDITION MEETS THE HEAD MRI GUIDELINES, BUT MRI IS EITHER CONTRAINDICATED OR THE PATIENT IS CLAUSTROPHOBIC AND CANNOT TOLERATE MRI EXAMINATION

## REFERENCE/LITERATURE REVIEW:


CT Angiography (CTA)
Head: Cerebrovascular

CPT CODES:

70496.................Computed tomographic angiography, head, with contrast material(s), including noncontrast images, if performed, and image postprocessing

STANDARD ANATOMIC COVERAGE:

- CTA may be performed to assess the major intra-cranial arteries of the anterior and posterior circulations (including the Circle of Willis) as well as the venous structures (major veins and dural venous sinuses).
- For specific clinical indications, exams may be tailored to the region of interest.

IMAGING CONSIDERATIONS:

- CTA studies are typically performed through acquisition of thin CT sections, during intravenous bolus infusion of iodinated contrast material.
- During diagnostic interpretation, it is extremely useful to have images displayed on a workstation capable of multiplanar reformations and three-dimensional reconstructions.
- Multi-detector row CT is preferred but not required in the performance of CTA, when compared with single detector CT.
- Contrast-enhancement for CTA may be contraindicated in certain circumstances, such as a documented allergy to intravenous contrast material and renal insufficiency. Special consideration should also be given to patients with multiple myeloma.
- CT Angiography (CTA) utilizes the data obtained from standard CT imaging. Request for a CT exam, in addition to a CT Angiography of the same anatomic area and during the same imaging session, is inappropriate.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR HEAD CTA:

The following diagnostic indications for Head CTA are accompanied by pre-test considerations as well as clinical supporting data and prerequisite information:

ANEURYSM 1-5

- Including but not limited to:
  - Follow-up of known or suspected intra-cranial aneurysm, or
  - Family history of intra-cranial aneurysm, or
  - Associated hereditary disorders, such as autosomal dominant Polycystic Kidney Disease (10-20% occurrence of aneurysm), Ehlers Danlos syndrome type IV and Neurofibromatosis type 1

ARTERIOVENOUS MALFORMATION (AVM) 6-7

CONGENITAL ANOMALIES OF THE CEREBRAL CIRCULATION

DURAL ARTERIOVENOUS FISTULA (DAVF) 8

DISSECTION

ENDOVASCULAR NEURO-INTERVENTIONAL PROCEDURE FOR INTRA-CRANIAL ANEURYSM, ARTERIOVENOUS MALFORMATION (AVM) AND DURAL ARTERIOVENOUS FISTULA (DAVF): FOR POST-TREATMENT EVALUATION

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# Common Diagnostic Indications for Head CTA:

## Headache: Sudden Onset of Worst Headache of Life; Exertional Headache; Positional Headache

## Intra-Cranial Hemorrhage
- For identification of the source of hemorrhage

## Intramural Hematoma

## Pre-Procedural for Neurosurgical Operative or Percutaneous Vascular Intervention

## Pulsatile Tinnitus, for Vascular Etiology

## Recent Cerebrovascular Accident (CVA)
- Demonstrated on head CT or MRI

## Stenosis or Occlusion of Carotid and Cerebral Arteries
- In patients with clinically suspected or known stenocclusive disease
- In adult patients (atherosclerotic disease being a common etiology) and pediatric population (etiologies include Moyamoya or idiopathic progressive arteriopathy of childhood)
- Common clinical manifestations may include:
  - Confusion
  - Difficulty speaking or understanding speech
  - Dizziness
  - Gait Disturbance
  - Loss of Balance or Coordination
  - Loss of Consciousness
  - Numbness, weakness or paralysis of the face, arm or leg, on one side of the body
  - Sudden severe headache, that is unexplained
  - Visual disturbance, particularly in one eye

## Stenosis or Occlusion of Vertebral and Basilar Arteries
- In patients with signs and symptoms of Vertebrobasilar Insufficiency (VBI) or Vertebral Basilar Ischemia.
- Symptoms of VBI are usually temporary, due to diminished blood flow in the posterior circulation of the brain.
- Common clinical manifestations may include:
  - Acute Sensorineural Hearing Loss
  - Ataxia
  - Diplopia
  - Dysarthria
  - Dysphagia
  - Facial Numbness and Paresthesias
  - Limb and Trunk Sensory Deficits
  - Loss of Taste Sensation
  - Motor Paresis
  - Nystagmus
  - Syncope
  - Vertigo
  - Visual Field Defects

## Thromboembolic Disease of Major Intra-Cranial Arterial and/or Venous Systems, Including Dural Vena Cava Thrombosis

## Traumatic Vascular Injury

## Vascular Abnormalities Associated with Sickle Cell Disease in Children
COMMON DIAGNOSTIC INDICATIONS FOR HEAD CTA:

VASCULAR SUPPLY TO TUMORS

VASCULITIS

REFERENCE/LITERATURE REVIEW:

Magnetic Resonance Imaging (MRI)  
Head

<table>
<thead>
<tr>
<th>CPT CODES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>70551.............MRI Head, without contrast</td>
</tr>
<tr>
<td>70552.............MRI Head, with contrast</td>
</tr>
<tr>
<td>70553.............MRI Head, without contrast, followed by re-imaging with contrast</td>
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<th>STANDARD ANATOMIC COVERAGE:</th>
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<tr>
<td>● From skull base to vertex, covering the entire calvarium and intra-cranial contents, including the internal auditory canals.</td>
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<td>● MRI of the head is preferable to CT in most clinical scenarios, due to its superior contrast resolution and lack of beam-hardening artifact adjacent to the petrous bone (which may limit visualization in portions of the posterior fossa and brainstem on CT). Exceptions to the use of brain MRI as the neuroimaging procedure of choice and situations with preferred head imaging using CT include: osseous assessment of the calvarium, skull base and maxillofacial bones, including detection of calvarial and facial bone fractures; calcified lesions; initial evaluation of recent craniocerebral trauma; and acute intra-cranial hemorrhage (parenchymal; subarachnoid; subdural; epidural).</td>
</tr>
<tr>
<td>● MRI is more sensitive for detection of shearing trauma to the brain and diffuse axonal injury. It is also the preferred technique for assessment of subacute and chronic intra-cranial hemorrhage.</td>
</tr>
<tr>
<td>● CT of the head is an alternative exam in patients who cannot undergo MRI. Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks). Performance of an MRI examination may also be unsuccessful, for example secondary to claustrophobia.</td>
</tr>
<tr>
<td>● The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI exams of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.</td>
</tr>
<tr>
<td>● Images of the pituitary gland, maxillary sinuses or internal auditory canals (IACs) are included within the single assigned CPT code for MRI imaging of the head and are not separately billable as multiple concurrent head MRI exams.</td>
</tr>
<tr>
<td>● MRI studies of the head and neck are inherently bilateral. Duplicate imaging requests for these studies are inappropriate.</td>
</tr>
</tbody>
</table>

Patient Compatibility Issues:
● Artifact due to patient motion may have a particularly significant impact on exam quality.
● Metallic implants presence in spine and brain.
● Eye and brain for metallic foreign bodies.
● Breath hold requirements:
  – Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
● Claustrophobic patients:
  – Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.
**IMAGING CONSIDERATIONS:**

**Biosafety Issues:**
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

**Ordering Issues:**
- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the head.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRI:**

*The following diagnostic indications for Head MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:*

**MRI is the modality of choice for most advanced neuroimaging indications in the head.**

- Acute intra-cranial hemorrhage (parenchymal, subarachnoid, subdural and epidural hematomas)
- Recent head trauma
- Skull base and facial bone assessment, including detection of calvarial and facial bone fractures as well as assessment of the temporal bones for conductive hearing loss and an abnormal otoscopic exam
- Calcified lesions

**ABNORMALITIES DETECTED ON OTHER IMAGING STUDIES WHICH REQUIRE ADDITIONAL CLARIFICATION TO DIRECT TREATMENT**

**ARNOLD CHIARI I AND II MALFORMATIONS**

**CEREBRAL PALSY**

**CNS FINDING/DEFICIT – NEW ONSET OR PROGRESSIVE NEUROLOGICAL ABNORMALITIES**
- Including but not limited to the following clinical symptoms and findings:
  - Anosmia (loss or impairment in sense of smell)
  - Ataxia (inability to coordinate voluntary muscular movements)
  - Bell’s Palsy
  - Dysgeusia (dysfunction in sense of taste)
  - Facial Numbness
  - Gait Disorder
  - Other Movement Disorders
  - Nystagmus (rapid, involuntary, oscillating ocular movements)
  - Paresis or Paralysis
  - Tinnitus (ringing or roaring auditory sensation; may be unilateral or bilateral; either pulsatile or non-pulsatile)
  - Any other cranial nerve impairment
### COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRI:

<table>
<thead>
<tr>
<th>Indication</th>
<th>Details</th>
</tr>
</thead>
</table>
| **CONGENITAL ANOMALY** | Including but not limited to the following conditions:  
- Chiari Malformations  
- Dandy-Walker Spectrum  
- Encephalocele  
- Holoprosencephaly  
- Macrocephaly  
- Microcephaly  
- Schizencephaly  
- Septo-optic Dysplasia |
| **CEREBROVASCULAR ACCIDENT (CVA OR STROKE) AND TRANSIENT ISCHEMIC ATTACK (TIA)** | May present with a variety of signs and symptoms, including sudden onset of weakness, focal sensory loss or speech disorder |
| **DEMENTIA** | Initial evaluation, or  
Rapid progression |
| **DEVELOPMENTAL DELAY** | MRI is the preferred imaging modality over CT, in developmental delay.  
The likelihood of making a specific neuroimaging diagnosis increases in the presence of physical exam abnormalities such as focal motor findings or microcephaly |
| **ENCEPHALOPATHY** |  |
| **HEADACHE IN ADULT – WHEN ANY ONE OF THE FOLLOWING CRITERIA ARE MET:** | Sudden onset and severe, including thunderclap or worst headache of life; or  
Increased frequency and severity; or  
With new focal neurologic signs, particularly papilledema, visual field defects and nuchal rigidity; or  
New-onset headaches after age 50 years; age is not an absolute requirement; or  
New-onset headaches in cancer or immunodeficient patient; or  
With mental status changes; or  
With fever, nuchal rigidity and other meningeal signs; or  
With nausea and vomiting; or  
With exertion; or  
Frequently awakened from sleep |
| **HEADACHE IN PEDIATRIC PATIENT – WHEN ANY ONE OF THE FOLLOWING CRITERIA ARE MET:** | Sudden onset and severe, including thunderclap or worst headache of life; or  
Associated with neurological abnormalities such as nystagmus, papilledema, gait or motor disturbances; or  
With fever, nuchal rigidity and other meningeal signs; or  
Awakened repeatedly from sleep or develop upon awakening; or  
Persistent headache with confusion, disorientation or vomiting; or  
Persistent headaches of < 6 months duration and not responsive to medical treatment; or  
Persistent headaches, without a family history of migraines; or  
Familial or personal history of disorders with predisposition to CNS lesions and clinical/laboratory findings that suggest CNS involvement |
| **HEARING LOSS - PROGRESSIVE ASYMMETRICAL HEARING DEFICIT, ASSOCIATED WITH:** | Abnormal neurological evaluation; and/or |

**Note:** Current evidence does not support MRI evaluation for chronic headache or migraines, when the patient’s neurological status is unchanged.
**COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRI:**

- Abnormal ear, nose and throat (ENT) evaluation such as, audiometry or auditory brainstem response (ABR)

**HEMORRHAGE/HEMATOMA**
- Refers to non-traumatic, non-CVA and non-tumor-related intra-cranial bleed. Examples include hypertensive hemorrhage and hemorrhage secondary to anti-coagulation or blood dyscrasia
- MRI is usually preferred for evaluation of subacute and chronic hemorrhage
- CT is the preferred technique for evaluation of acute intra-cranial hemorrhage

**HYDROCEPHALUS (VENTRICULOMEGALY)**
- MRI is often the preferred for initial evaluation of patients with hydrocephalus. For patients with an indwelling shunt, CT is usually adequate in the diagnostic follow-up of hydrocephalus.

**HYPOXIC ISCHEMIC ENCEPHALOPATHY**

**INFECTIOUS OR INFLAMMATORY PROCESS**
- Including but not limited to the following:
  - Cerebral or Cerebellar Abscess
  - Encephalitis
  - Meningitis
  - Neurocysticercosis
  - Opportunistic Infection, particularly with immunosuppressed or other immunodeficient conditions
  - Subdural Empyema

**MENTAL STATUS CHANGES, WITH DOCUMENTED OBJECTIVE EVIDENCE FROM NEUROLOGIC EXAM**

**MOVEMENT DISORDERS**
- Including Parkinson’s disease (particularly atypical cases with poor response to levodopa, in which there may be an underlying structural disorder producing parkinsonian features); Huntington’s disease; idiopathic sporadic cerebellar ataxia (olivopontocerebellar atrophy); hemifacial spasm; and other conditions.

**MULTIPLE SCLEROSIS AND OTHER WHITE-MATTER DISEASES**
- Initial diagnosis; or periodic scans to assess asymptomatic progression in multiple sclerosis during the early course of disease; or tracking the progress of multiple sclerosis to establish a prognosis or evaluation of response to treatment; or to evaluate changes in neurologic signs and symptoms; or to assess for asymptomatic progression early in the course of the disease if this information would be used to make treatment determination

**NEUROCUTANEOUS DISORDERS**
- Including but not limited to the following:
  - Neurofibromatosis
  - Sturge-Weber Syndrome
  - Tuberous Sclerosis
  - Von Hippel-Lindau Disease (VHL)

**NEUROENDOCRINE ABNORMALITY SUGGESTIVE OF A PITUITARY LESION**
- Relevant laboratory and clinical abnormalities are required

**PAPILLEDEMA** (refers to swelling and elevation of optic disc – a sign of increased intracranial pressure)

**PRE- AND POST-NEUROSURGICAL EVALUATION**

**SEIZURE DISORDER** – new onset or increasing frequency and severity

**SENSORINEURAL HEARING LOSS, DOCUMENTED BY AUDIOLOGY**
- As work-up for Acoustic Neuroma (Vestibular Schwannoma) – also see Primary Intra-cranial Tumors

**SYNCOPE**
- With persistent symptoms and when evaluation for other etiologies (e.g., cardiac disease, metabolic disorder) have not
## COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRI:

- **TRAUMA TO HEAD**
  - MRI is generally used to evaluate suspected shearing lesions and diffuse axonal injury in closed head trauma as well as assessment of the subacute or chronic sequelae of head injury.
  - CT is often performed as the initial imaging exam in acute head trauma, particularly when associated with:
    - Calvarial Fracture
    - Change in Mental Status or Amnesia
    - Focal Neurological Deficits
    - Loss of Consciousness
    - Seizures
    - Signs of Increased Intracranial Pressure
    - Nausea / Vomiting
    - Worsening Headaches
  - Suspected hemorrhage, or subdural or epidural hematoma

- **TRIGEMINAL NEURALGIA (PARTICULARLY WHEN ATYPICAL) OR ATYPICAL FACIAL PAIN WITHOUT FOCAL OBJECTIVE SIGNS**
  - Atypical manifestations of trigeminal neuralgia include facial burning, boring crushing or pulsating sensations, which may be relatively constant.
  - Typical features of trigeminal neuralgia include the sudden, extremely sharp, stabbing, shock-like or throbbing pain in the facial region.

- **TUMOR EVALUATION – BENIGN AND MALIGNANT:**
  - Primary Intra-cranial Tumors
    - Intra-axial Neoplasms of the Cerebrum and Cerebellum
    - Extra-axial Tumors, including Meningiomas and Schwannomas, such as:
      - Cerebello-pontine Angle (CPA) and internal auditory canal (IAC) Vestibular Schwannoma of CN 8 (also referred to as an Acoustic Neurona), and
      - Non-Acoustic Neuromas at the CPA involving cranial nerves (CN) 5, 7, 9, 10, 11 and 12, such as a CN 7 Schwannoma
    - Pituitary Tumors, including Macroadenomas and Microadenomas
  - Metastatic Disease

- **VASCULAR ABNORMALITIES**
  - Aneurysm
  - Arterio-Venous Malformation (AVM)
  - Cavernous Malformation
  - Cerebral Vein Thrombosis
  - Dural Arteriovenous Fistula (DAVF)
  - Dural Venous Sinus Thrombosis
  - Venous Angioma
  - Dural Arteriovenous Fistula (DAVF)

- **UNEXPLAINED MASS LESION IDENTIFIED ON PRIOR IMAGING – SURVEILLANCE, WITHOUT PATHOLOGIC TISSUE CONFIRMATION**
  - Examples include suspected Arachnoid Cyst or Epidermoid Cyst
## COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRI:

- Either CTA or MRA are usually the imaging modalities of choice for some of the vascular abnormalities, such as aneurysm evaluation.

## VENTRICULAR SHUNT ASSESSMENT

## VERTIGO AND DIZZINESS

- With recurrent or persistent symptoms and when evaluation for other etiologies has not been revealing
- Abnormal hearing test or Auditory Brainstem Response

## VISUAL DISTURBANCE - SUCH AS VISUAL FIELD LOSS, DIPLOPIA AND OTHER ALTERATIONS IN VISION THAT ARE UNEXPLAINED BY OPHTHALMOLOGIC EXAM AND PATIENT HISTORY

## VASCULITIS

## REFERENCE/LITERATURE REVIEW:

MR Angiography (MRA)  
Head: Cerebrovascular

<table>
<thead>
<tr>
<th>CPT CODES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>70544..............Magnetic resonance angiography, head, without contrast</td>
</tr>
<tr>
<td>70545..............Magnetic resonance angiography, head, with contrast</td>
</tr>
<tr>
<td>70546..............Magnetic resonance angiography, head, without contrast, followed by re-imaging with contrast</td>
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</tbody>
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<table>
<thead>
<tr>
<th>STANDARD ANATOMIC COVERAGE:</th>
</tr>
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<tbody>
<tr>
<td>● MRA may be performed to assess the major intra-cranial arteries of the anterior and posterior circulations (including the Circle of Willis) as well as the venous structures (major cerebral veins and dural venous sinuses).</td>
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<tr>
<td>● For specific clinical indications, exams may be tailored to the region of interest.</td>
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<thead>
<tr>
<th>IMAGING CONSIDERATIONS:</th>
</tr>
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<tbody>
<tr>
<td>● MRA refers to a group of diverse MR pulse sequences. These include Time-of-Flight (TOF) imaging, Phase Contrast (PC) techniques and Three-Dimensional (3-D), T1-weighted gradient echo acquisitions obtained during intravenous bolus infusion of a paramagnetic contrast agent (Gadolinium chelate).</td>
</tr>
<tr>
<td>● A workstation is necessary for most MRA studies, to acquire multiplanar reformations, shaded surface displays, volume renderings and maximum intensity projection (MIP) images. Post-processing of MRA data with a MIP reconstruction algorithm allows for 3-dimensional images to be rotated and viewed in different planes, improving visualization of superimposed vessels.</td>
</tr>
<tr>
<td>● Ordering and imaging providers are responsible for considering biosafety issues prior to MRA examination, to ensure patient safety. Among the generally recognized contraindications to MRA exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks).</td>
</tr>
<tr>
<td>● An MRA of the head includes imaging of the entire arteriovenous system of the brain. Separate requests for concurrent imaging of the arteries and the veins in the head are not appropriate.</td>
</tr>
<tr>
<td>● Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.</td>
</tr>
<tr>
<td>● Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.</td>
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<thead>
<tr>
<th>COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRA:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following diagnostic indications for Head MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:</td>
</tr>
</tbody>
</table>

**ANEURYSM** 8-9

● Including but not limited to:
  - Follow-up of known or suspected intra-cranial aneurysm, or
  - Family history of intra-cranial aneurysm, or
  - Associated hereditary disorders, such as autosomal dominant Polycystic Kidney Disease (10-20% occurrence of aneurysm), Ehlers Danlos syndrome type IV and Neurofibromatosis type 1.

**ARTERIOVENOUS MALFORMATION (AVM)** 10-11

**CONGENITAL ANOMALIES OF THE CEREBRAL CIRCULATION**

**DURAL ARTERIOVENOUS FISTULA (DAVF)** 12-13
### COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRA:

#### DISSECTION

**ENDOVASCULAR NEURO-INTERVENTIONAL PROCEDURE FOR INTRA-CRANIAL ANEURYSM, ARTERIOVENOUS MALFORMATION (AVM) AND DURAL ARTERIOVENOUS FISTULA (DAVF): FOR POST-TREATMENT EVALUATION**

**HEADACHE: SUDDEN ONSET OF THE WORST HEADACHE OF LIFE; EXERTIONAL HEADACHE; POSITIONAL HEADACHE**

**INTRA-CRANIAL HEMORRHAGE**
- For identification of the source of hemorrhage

**INTRAMURAL HEMATOMA**

**PRE-PROCEDURE FOR NEUROSURGICAL OPERATIVE OR PERCUTANEOUS VASCULAR INTERVENTIONS**

**PULSATILE TINNITUS, FOR VASCULAR ETIOLOGY**

**RECENT CEREBROVASCULAR ACCIDENT**
- Demonstrated on head CT or MRI

**STENOSIS OR OCCLUSION OF CAROTID AND CEREBRAL ARTERIES**
- In patients with clinically suspected or known steno-occlusive disease
- In adult patients (atherosclerotic disease being a common etiology) and pediatric population (etiologies include Moyamoya or idiopathic progressive arteriopathy of childhood)
- Common clinical manifestations may include:
  - Confusion
  - Difficulty speaking or understanding speech
  - Dizziness
  - Gait Disturbance
  - Loss of Balance or Coordination
  - Loss of Consciousness
  - Numbness, weakness or paralysis of the face, arm or leg, on one side of the body
  - Sudden severe headache, that is unexplained
  - Visual disturbance, particularly in one eye

**STENOSIS OR OCCLUSION OF VERTEBRAL AND BASILAR ARTERIES**
- In patients with signs and symptoms of Vertebrobasilar Insufficiency (VBI) or Vertebral Basilar Ischemia
- Symptoms of VBI are usually temporary, due to diminished blood flow in the posterior circulation of the brain.
- Common clinical manifestations may include:
  - Acute Sensorineural Hearing Loss
  - Ataxia
  - Diplopia
  - Dysarthria
  - Dysphagia
  - Facial Numbness and Paresthesias
  - Limb and Trunk Sensory Deficits
  - Loss of Taste Sensation
  - Motor Paresis
  - Nystagmus
  - Syncope
  - Vertigo
  - Visual Field Defects

**ARTERIAL THROMBOEMBOLIC DISEASE**
## COMMON DIAGNOSTIC INDICATIONS FOR HEAD MRA:

<table>
<thead>
<tr>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>VENOUS THROMBOSIS (INCLUDING DURAL VENOUS SINUS THROMBOSIS) OR VENOUS COMPRESSION</td>
</tr>
<tr>
<td>TRAUMATIC VASCULAR INJURY</td>
</tr>
<tr>
<td>VASCULAR ABNORMALITIES ASSOCIATED WITH SICKLE CELL DISEASE IN CHILDREN</td>
</tr>
<tr>
<td>VASCULAR SUPPLY TO TUMORS</td>
</tr>
<tr>
<td>VASCULITIS</td>
</tr>
</tbody>
</table>

### Reference/Literature Review:

## Functional Magnetic Resonance Imaging (fMRI)

### CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70554</td>
<td>Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration</td>
</tr>
<tr>
<td>70555</td>
<td>Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, requiring physician or psychologist administration of entire neurofunctional testing</td>
</tr>
</tbody>
</table>

### STANDARD ANATOMIC COVERAGE:

- From the skull base to vertex, covering the intra-cranial contents.
- Scan coverage may vary, depending on the specific clinical indication.

### IMAGING CONSIDERATIONS:

- Functional MRI of the brain may be used to localize eloquent areas in the brain, prior to resection of neoplasm or medically intractable epileptogenic foci.
- Studies have shown excellent agreement in language localization, when comparing functional brain MRI with the Wada test and direct electrical stimulation.
- Advantages of functional brain MRI over a Wada test include the non-invasive technique (not requiring catheter placement and contrast injection), lack of ionizing radiation, shorter time-requirement, lower cost and quicker post-procedural recovery. Additionally, the Wada test is considered limited in right hemisphere dominance.
- Advantages of functional brain MRI over intraoperative electrocortical stimulation include its non-invasive technique and more extensive anatomic brain mapping. Direct electrical stimulation is an invasive procedure, which usually evaluates only one hemisphere (limiting assessment for partial or bilateral language dominance) and usually identifies only eloquent brain regions on the surface of the brain.
- Functional MRI may successfully map primary brain activities related to motor, sensory and language functions. Examples of tasks which may be used include sentence completion (to map language) and bilateral hand squeeze task (for sensory motor mapping).

### Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

### Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.
IMAGING CONSIDERATIONS:

Ordering Issues:
- This guideline does not supersede the enrollee’s health plan medical policy specific to Functional Brain MRI.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

INDICATIONS FOR FUNCTIONAL BRAIN MRI:

The following diagnostic indications for Functional MRI (fMRI) of the Brain are accompanied by pre-test considerations and supporting clinical data

- For Pre-operative Neurosurgical Planning in Patients with Brain Tumors, as a replacement for a Wada test or direct electrical stimulation mapping.
- For Pre-operative Neurosurgical Planning in Patients with Seizures Refractory to Medical Treatment, as a replacement for a Wada test or direct electrical stimulation mapping.

REFERENCE/LITERATURE REVIEW:

Positron Emission Tomography (PET)  
Brain Imaging

CPT CODES:
78608..............PET brain, metabolic evaluation

COMMONLY USED RADIOPHARMACEUTICAL:
● 2-(fluorine-18) fluoro-2-deoxy-d-glucose (FDG) Scan coverage may vary, depending on the specific clinical indication.

IMAGING CONSIDERATIONS:
● This guideline does not supersede the enrollee’s health plan medical policy specific to PET Neuroimaging.
● Enrollee coverage for PET imaging of Alzheimer’s disease or Fronto-Temporal Lobe Dementia may be limited to one (1) per lifetime.
● Coding conventions call for this code to be used for oncologic scanning of Brain tumors.
● Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
● Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR BRAIN PET:
The following diagnostic indications for Brain PET are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

BRAIN TUMORS
● For initial strategy (diagnosis, staging)
● For subsequent strategy follow up when being used to differentiate post treatment (radiation, surgery, chemotherapy) scarring versus residual / recurrent disease

REFRACTORY SEIZURES/EPILEPSY
● Pre-surgical evaluation to locate the foci of intractable seizure activity, in patients who have failed conventional medical therapy and who are undergoing pre-surgical evaluation.

FRONTO-TEMPORAL LOBE DEMENTIA AND ALZHEIMER’S DISEASE
● Use of PET is approved only to differentiate between Fronto-Temporal Dementia (FTD) and Alzheimer’s Disease, when the patient’s clinical presentation fits both diagnoses and other conventional testing has been unable to reveal a definitive diagnosis and when all of the following conditions are met; or
● Use of PET is approved when part of a CMS approved clinical trial specific to diagnosis and treatment of dementing neurodegenerative disease.

CONDITIONS:
The use of FDG-PET scan in the diagnosis of Alzheimer’s disease and Fronto-Temporal Lobe Dementia is medically necessary and appropriate provided all of the following conditions are met:
● The patient has a recent diagnosis of Alzheimer’s disease or frontal-temporal lobe dementia and a documented cognitive decline of at least six (6) months duration and meets the diagnostic criteria for Alzheimer’s disease or frontal-temporal lobe dementia.
● The patient’s clinical presentation includes such symptoms as:
  – Social disinhibition
  – Awkwardness
**CONDITIONS:**

- **Difficulties with language,** or
- **Loss of Executive Function**

- The patient has had a comprehensive clinical evaluation which has included:
  - A comprehensive medical history including an assessment of activities of daily living from a well-acquainted informant other than the patient;
  - A physical and mental status examination formally documenting the patient’s cognitive decline for a minimum of six (6) months; and
  - Cognitive scales or neuropsychological testing, laboratory testing, and structural imaging such as MRI or CT, to aid in identifying structural, metabolic, and chemical abnormalities as a cause for cognitive impairment.

- The patient is evaluated by a physician experienced in the diagnosis and assessment of Alzheimer’s disease and fronto-temporal lobe dementia.

- The results of previous physical and mental examinations, laboratory testing, and structural imaging have not clearly determined either a specific neurodegenerative disease or other cause for the clinical symptoms and the results of the FDG-PET will help clarify the diagnosis of Alzheimer’s disease or fronto-temporal lobe dementia, to guide future treatment.

- A brain SPECT scan has not been obtained for the same indication.

- The referring (ordering) provider submits the following medical information regarding the enrollee:
  - Date of onset of the cognitive decline
  - Clinical documentation supporting the diagnosis of a clinical syndrome such as Alzheimer’s disease or fronto-temporal lobe dementia
  - Results of a mini-mental status exam (MMSE) or similar test score
  - Differential diagnosis of Alzheimer’s disease or fronto-temporal lobe dementia
  - Results of all neuropsychological testing performed
  - Results of all CT and/or MRI structural imaging performed
  - Results of recent B12 and Thyroid Hormone laboratory blood tests
  - Name(s) of currently prescribed medications

**REFERENCE/LITERATURE REVIEW:**

2. CMS National Coverage Indication for PET for Dementia and Neurodegenerative Diseases (NCD 220.6.13), effective 04/18/2005
Computed Tomography (CT)
Orbit, Sella Turcica, Posterior Fossa, Temporal Bone, including Mastoids

CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70480</td>
<td>CT of orbit, sella or posterior fossa and outer, middle or inner ear, without contrast</td>
</tr>
<tr>
<td>70481</td>
<td>CT of orbit, sella or posterior fossa and outer, middle or inner ear, with contrast</td>
</tr>
<tr>
<td>70482</td>
<td>CT of orbit, sella or posterior fossa and outer, middle or inner ear, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- The anatomic coverage and protocol specifications will vary, depending on the clinical indication. Anatomic evaluation includes the internal auditory canals (IACs), posterior fossa, sella turcica, orbits and temporal bone, with the mastoid air cells.
- Targeted evaluation, such as CT of the temporal bones, involves collimated views through the region of interest, often in two imaging planes: axial images (petrous bones through mastoid tips) and coronal views (temporomandibular joints through temporal bones).

IMAGING CONSIDERATIONS:

- CT is often the preferred study for suspected fracture or follow-up of a known fracture, foreign body detection, assessment of calcified lesions and temporal bone evaluation.
- With capability for high-resolution osseous imaging, CT can provide detailed anatomic depiction of the temporal bone anatomy, including the middle and inner ear structures.
- MRI (unless contraindicated) is usually preferred over CT for evaluation of the sella turcica, internal auditory canal regions and visual pathways, as well as for most soft tissue tumor evaluation.
- Bony changes from a sellar, para-sellar or orbital mass or infectious process are usually well demonstrated by CT.
- Ordering a CT of the head (CPT codes 70450-70470) in addition to a CT of the orbits is not necessary in most cases. According to Medicare’s Correct Coding Edits, CT of the head and CT of the orbits are mutually exclusive procedures.
- This exam is inherently a bilateral procedure. Duplicate requests for imaging the right and left orbits should not be authorized.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR ORBIT, SELLA TURCICA, POSTERIOR FOSSA, & TEMPORAL BONE (INCLUDING THE MASTOIDS) CT:

The following diagnostic indications for CT of the Orbit, Sella, Posterior Fossa and Temporal Bone are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

CHOLESTEATOMA

- Includes both acquired and congenital types of Cholesteatoma
- Acquired (Secondary) Cholesteatoma: more common form (98%), presenting as a mass comprised of keratin debris and lined by squamous epithelium
- Congenital (Primary) Cholesteatoma (Epidermoid): uncommon lesion (2%), arising from aberrant embryonic ectodermal rests in middle ear, mastoids or petrous bone

COCHLEAR IMPLANT – PRE-OPERATIVE EVALUATION
### COMMON DIAGNOSTIC INDICATIONS FOR ORBIT, SELLA TURCICA, POSTERIOR FOSSA, & TEMPORAL BONE (INCLUDING THE MASTOIDS) CT:

#### CONDUCTIVE HEARING LOSS

#### CONGENITAL ANOMALIES OF THE ORBIT, TEMPORAL BONE, SELLA TURCICA AND POSTERIOR FOSSA

### FOREIGN BODY:
- Evaluation for metallic foreign bodies in the orbits should be initiated with conventional radiographs, which detect the majority of radiopaque foreign bodies
- CT may be performed if radiographs are inconclusive or if there remains high clinical suspicion for a foreign body

### INFECTIOUS OR INFLAMMATORY PROCESS

#### ORBITAL/OCULAR EVALUATION OF SYMPTOMS AND OBJECTIVE FINDINGS

- Exophthalmos – abnormal protrusion of the eyeball
- Extraocular myopathy
- Nystagmus – rapid, involuntary, oscillating ocular movements
- Optic Neuritis
- Papilledema
- Proptosis – forward displacement of the eyeball
- Strabismus – inability of one eye to accomplish binocular vision with the other, due to extra-ocular muscle imbalance
- Thyroid ophthalmopathy
- Visual Field Defect
- Visual loss unexplained by ophthalmic evaluation

### ORBITAL PSEUDOTUMOR

### OSSEOUS LESION EVALUATION

- Such as Fibrous Dysplasia, Paget’s disease and Otosclerosis

### LOCALIZED FACIAL PAIN – WHEN PERSISTENT AND UNEXPLAINED

### PRE-OPERATIVE EVALUATION, PRIOR TO MASTOIDECTOMY

### SENSORINEURAL HEARING LOSS

- Documented by audiology
- As work-up for Acoustic Neuroma (Vestibular Schwannoma) – also see Primary Intra-cranial Tumors

### SKULL BASE EVALUATION – for suspected or known tumors

### TINNITUS

### TRAUMA

- Including but not limited to the following:
  - Soft tissue injury
  - Fracture

### TUMOR EVALUATION – BENIGN AND MALIGNANT

Including but not limited to the following lesions:
COMMON DIAGNOSTIC INDICATIONS FOR ORBIT, SELLA TURCICA, POSTERIOR FOSSA, & TEMPORAL BONE (INCLUDING THE MASTOIDS) CT:

- Primary Intra-cranial Tumors
  1. Intra-axial Neoplasms of the Cerebrum and Cerebellum
  2. Extra-axial Tumors, including Meningiomas and Schwannomas, such as:
     - Cerebello-pontine Angle (CPA) and internal auditory canal (IAC) Vestibular Schwannoma of CN 8 (also referred to as an Acoustic Neuroma), and
     - Non-Acoustic Neuromas at the CPA involving cranial nerves (CN) 5, 7, 9, 10, 11 and 12, such as a CN 7 Schwannoma
  3. Pituitary Tumors, including Macroadenomas and Microadenomas
- Metastatic Disease

VERTIGO AND DIZZINESS

- With recurrent or persistent symptoms and when evaluation for other etiologies has not been revealing
- Abnormal hearing test or Auditory Brainstem Response

ABNORMALITIES NOTED ON OTHER IMAGING STUDIES WHICH REQUIRE ADDITIONAL CLARIFICATION – SUCH AS SURVEILLANCE OF AN UNEXPLAINED MASS LESION, WITHOUT PATHOLOGIC TISSUE CONFIRMATION

REFERENCE/LITERATURE REVIEW:

Magnetic Resonance Imaging (MRI)
Orbit, Face & Neck (Soft Tissues)

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70540</td>
<td>MRI Orbit, Face and Neck, without contrast</td>
</tr>
<tr>
<td>70542</td>
<td>MRI Orbit, Face and Neck, with contrast</td>
</tr>
<tr>
<td>70543</td>
<td>MRI Orbit, Face and Neck, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Scan coverage is dependent on the specific anatomic area of clinical interest. Exams usually include multi-planar imaging, using different pulse sequences.

IMAGING CONSIDERATIONS:

- MRI is usually preferred over CT for evaluation of the sella turcica and visual pathways, unless contraindicated.
- CT is generally the modality of choice for traumatic injury, calcified lesions, localized infection (for example, orbital extension of an adjacent complicated sinusitis), and foreign body evaluation, after initial radiographic evaluation for a radiopaque foreign body.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging authorization request.
- Duplicate exam requests for two or more MRI studies of the head (for example, bilateral head MRIs for right and left orbital evaluation) or neck are inappropriate. These exams are inherently bilateral.
- An MRI of the orbit, face and neck is not allowed for imaging the IACs. See MRI of the brain (CPT codes 70551 – 70553).

Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI Orbit, Face and Neck.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
### COMMON DIAGNOSTIC INDICATIONS FOR ORBIT, FACE & NECK (SOFT TISSUES) MRI:

The following diagnostic indications for MRI of the Orbit, Face and Neck (Soft Tissues) are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

<table>
<thead>
<tr>
<th>COMMON DIAGNOSTIC INDICATIONS FOR ORBIT, FACE &amp; NECK (SOFT TISSUES) MRI:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONGENITAL ANOMALIES</td>
</tr>
<tr>
<td>GLOTTIC LESION</td>
</tr>
<tr>
<td>● Further assessment following endoscopic detection</td>
</tr>
<tr>
<td>INFECTIOUS OR INFLAMMATORY PROCESS</td>
</tr>
<tr>
<td>● Including but not limited to the following conditions:</td>
</tr>
<tr>
<td>– Abscess</td>
</tr>
<tr>
<td>– Cellulitis (for example, Orbital Cellulitis)</td>
</tr>
<tr>
<td>– Osteomyelitis</td>
</tr>
<tr>
<td>LYMPHADENOPATHY – suspected or known</td>
</tr>
<tr>
<td>● When persistent and unexplained</td>
</tr>
<tr>
<td>NASAL INDICATIONS – NOT LISTED ELSEWHERE:</td>
</tr>
<tr>
<td>– Anosmia</td>
</tr>
<tr>
<td>– Recurrent Epistaxis</td>
</tr>
<tr>
<td>– Nasal airway obstruction or polyposis refractory to medical therapy</td>
</tr>
<tr>
<td>MASS LESION – PALPABLE ON PHYSICAL EXAM</td>
</tr>
<tr>
<td>MASS LESION – NON-PALPABLE AND UNEXPLAINED ON PRIOR IMAGING EXAM – FOR SURVEILLANCE, WITHOUT PATHOLOGIC TISSUE CONFIRMATION</td>
</tr>
<tr>
<td>NECK MASSES SUCH AS BRANCHIAL CLEFT CYST, THYROGLOSSAL DUCT CYST AND LYMPHANGIOMA / CYSTIC HYGROMA</td>
</tr>
<tr>
<td>OBSTRUCTIVE THYROID NODULE OR THYROMEGALY (GOITER)</td>
</tr>
<tr>
<td>● Following thyroid US or thyroid scintigraphy</td>
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<tr>
<td>● When associated with mass effect on the upper airway or esophagus</td>
</tr>
<tr>
<td>● For pre-operative evaluation</td>
</tr>
<tr>
<td>ORBITAL INDICATIONS – NOT LISTED ELSEWHERE:</td>
</tr>
<tr>
<td>● Including but not limited to:</td>
</tr>
<tr>
<td>– Extraocular Myopathy</td>
</tr>
<tr>
<td>– Extraocular Weakness or Non-conjugate Eye Movements</td>
</tr>
<tr>
<td>– Nystagmus</td>
</tr>
<tr>
<td>– Optic Neuritis</td>
</tr>
<tr>
<td>– Orbital Pseudotumor</td>
</tr>
<tr>
<td>– Papilledema (refers to swelling and elevation of optic disc – a sign of increased intracranial pressure)</td>
</tr>
<tr>
<td>– Proptosis</td>
</tr>
<tr>
<td>– Strabismus</td>
</tr>
<tr>
<td>– Thyroid Ophthalmopathy</td>
</tr>
<tr>
<td>– Visual loss unexplained by ophthalmic evaluation</td>
</tr>
<tr>
<td>PERSISTENT HOARSENESS</td>
</tr>
<tr>
<td>● Unexplained, following endoscopic examination and/or prior non-diagnostic imaging of neck/upper chest (extending</td>
</tr>
</tbody>
</table>

**IMAGING CONSIDERATIONS:**

- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
**COMMON DIAGNOSTIC INDICATIONS FOR ORBIT, FACE & NECK (SOFT TISSUES) MRI:**

- Along the course of the recurrent laryngeal nerves

**STRIDOR**
- For subacute and chronic stridor, advanced imaging may follow neck (soft tissue) radiographs and ENT evaluation

**TUMOR EVALUATION – PRIMARY NEOPLASM AND METASTATIC DISEASE**

- Including but not limited to the following anatomic structures:
  - Facial Structures
  - Larynx and Subglottic Regions
  - Nasopharynx, Oropharynx and Hypopharynx
  - Neck Soft Tissues, surrounding the airway and glands
  - Optic Nerve
  - Orbit
  - Salivary Glands
  - Sella Turcica (Pituitary tumors including Macroadenoma and Microadenoma)
  - Sinuses
  - Thyroid and Parathyroid Glands

**TRAUMA TO THE SOFT TISSUES OF THE NECK**

**TRAUMA TO THE ORBIT AND FACE**
- CT preferable for bony assessment

**UPPER AIRWAY OBSTRUCTION**
- Including but not limited to Tracheal Stenosis

**VOCAL CORD PARALYSIS**
- Unexplained, following endoscopic diagnosis
- May be unilateral or bilateral

**WEGENER’S GRANULOMATOSIS – suspected or known**
- Initial diagnosis may be established with an elevated ANCA (cytoplasmic pattern - antineutrophil cytoplasmic antibody) and biopsy showing non-caseating, multinucleated, giant cell granulomas

**ABNORMALITIES DETECTED ON OTHER DIAGNOSTIC EXAMS, WHICH REQUIRE FURTHER EVALUATION**

**REFERENCE/LITERATURE REVIEW:**

Computed Tomography (CT)
Paranasal Sinus &
Maxillofacial Area

CPT CODES:

70486..............CT of Maxillofacial area, without contrast
70487..............CT of Maxillofacial area, with contrast
70488..............CT of Maxillofacial area, without contrast, followed by re-imaging with contrast

STANDARD ANATOMIC COVERAGE:

● Includes the sinuses, facial structures and maxillary regions. Individual scan coverage depends on the specific clinical request, but generally includes images through the entire frontal, ethmoid, maxillary and sphenoid sinuses. CT sections may be obtained in one or two (usually coronal and axial) planes.

IMAGING CONSIDERATIONS:

● Radiation Dosimetry: Approximately 50 Chest X-Ray equivalent dosage
● The prevalence of sinus inflammatory disease is high, estimated to affect approximately 33 million US citizens.¹
● This guideline includes reference to rhinosinusitis in the evaluation of sinus inflammatory disease, since sinusitis usually involves the nasal passage as well as the paranasal sinuses.²
● A common classification of sinusitis / rhinosinusitis is based on duration of symptoms, as follows:
  – Acute sinusitis / rhinosinusitis – symptoms last for less than 4 weeks and include persistent symptoms of an upper respiratory tract infection, purulent rhinorrhea, postnasal drainage, anosmia, nasal congestion, facial pain, headache, fever, cough, and/or purulent discharge.
  – Subacute sinusitis / rhinosinusitis – symptoms last from 4 to 12 weeks.
  – Chronic sinusitis / rhinosinusitis – the same symptoms as in acute sinusitis that persist for at least 12 weeks, with varying severity. Chronic sinusitis may sometimes present with vague or insidious symptoms.
  – Recurrent sinusitis / rhinosinusitis – 3 or more episodes of acute sinusitis per year; individual episodes may be caused by different organisms.
● Clinicians should distinguish presumed acute bacterial rhinosinusitis from acute rhinosinusitis due to viral upper respiratory infections and noninfectious conditions.²
● Acute sinusitis is considered a self-limiting disease, since most patients improve within 2 weeks, despite the etiology and treatment option used.
● Chronic sinusitis is reported by the Centers for Disease Control and Prevention (CDC) to be the most commonly encountered condition below the age of 45 years and the second most common condition between 45-64 years, following hypertension.¹
● Sinus CT is not usually performed at the time of initial clinical presentation with acute uncomplicated sinusitis.
● Sinus CT is often reserved for difficult cases or delineation of anatomy prior to planned sinus surgery, as follows:
  – Limited (coronal) Sinus CT – typically used for recurrent or refractory sinus inflammatory disease, or if the diagnosis is in doubt.
  – Full Sinus CT – generally performed for surgical planning to interrogate for osteomeatal obstruction, fungal sinusitis, facial or orbital cellulitis complicating sinusitis and suspected malignancy.
● CT of the paranasal sinuses is appropriately coded to CPT 70486. There are no required number of slices or phases for contrast-enhanced exams that constitute a paranasal sinus and maxillofacial CT study. This code may be used to describe limited or complete imaging of the sinuses.
● CT of the maxillofacial area is a bilateral study. Separate requests to image the right and left facial area are not allowed.
● For Temporomandibular joints CT may be used after MRI if diagnosis still in doubt or when MRI cannot be done.
### IMAGING CONSIDERATIONS:

- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

### COMMON DIAGNOSTIC INDICATIONS FOR SINUS CT:

The following diagnostic indications for Sinus CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

#### SINUSITIS / RHINOSINUSITIS

**Acute, Uncomplicated Sinusitis / Rhinosinusitis**
- Defined as symptoms that last for less than 4 weeks. Common symptoms include purulent rhinorrhea, postnasal drainage, anosmia, nasal congestion, facial pain, headache, fever, cough, purulent discharge and/or findings of an upper respiratory tract infection.
- No radiographic imaging is usually necessary for immunocompetent patients with acute rhinosinusitis, unless a complication or alternative diagnosis is suspected that requires imaging.
- CT may be performed if symptoms persist beyond 3-4 weeks of adequate treatment, which may include antibiotics, nasal steroids and/or decongestants. Under these circumstances, a complication of acute sinusitis/rhinosinusitis or an alternative diagnosis may warrant CT imaging of the paranasal sinuses.

**Acute Recurrent Sinusitis / Rhinosinusitis**
- Defined as 3 or more separate episodes of sinusitis during the past year
- Imaging used to corroborate the diagnosis and/or investigate for underlying causes of acute recurrent sinusitis
- Clinicians should assess patients with recurrent acute sinusitis / rhinosinusitis for factors that modify management, such as allergic rhinitis, cystic fibrosis, immunocompromised states, ciliary dyskinesia and anatomic variations

**Chronic Sinusitis / Rhinosinusitis**
- Defined as signs and symptoms of sinusitis that last for 12 weeks or longer
- Imaging used to corroborate the diagnosis and/or investigate for underlying causes of chronic sinusitis
- Clinicians should assess patients with chronic sinusitis / rhinosinusitis for factors that modify management, such as allergic rhinitis, cystic fibrosis, immunocompromised states, ciliary dyskinesia and anatomic variations

**Peri-Orbital Swelling Associated with Sinus Infection**

**Barosinusitis / Headache Refractory to Antibiotics and Responding only to Decongestants / Oral Steroids**

#### ANOSMIA

#### CONGENITAL ANOMALIES

#### FOREIGN BODY IN THE MAXILLOFACIAL REGION

#### FUNGAL AND OTHER COMPLEX SINUS INFECTIONS

#### MUCOCELE OF PARANASAL SINUSES

#### NASAL AIRWAY OBSTRUCTION REFRACORY TO MEDICAL THERAPY

#### OSTEOMYELITIS OF THE FACIAL BONES

#### POLYPOSIS

#### PRE-OPERATIVE EVALUATION FOR SINUS SURGERY

#### POST-OPERATIVE SINUS SURGERY, WITH NEW OR WORSENING SYMPTOMS AND CLINICAL FINDINGS
<table>
<thead>
<tr>
<th>COMMON DIAGNOSTIC INDICATIONS FOR SINUS CT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECURRENT EPISTAXIS</td>
</tr>
<tr>
<td>TRAUMA TO THE FACIAL BONES – SIGNIFICANT INJURY</td>
</tr>
<tr>
<td>TUMOR OR MASS LESION IN THE SINO-NASAL REGION</td>
</tr>
<tr>
<td>WEGENER'S GRANULOMATOSIS</td>
</tr>
<tr>
<td>● Initial diagnosis may be established with an elevated ANCA (cytoplasmic pattern – antineutrophil cytoplasmic antibody) and biopsy showing non-caseating, multinucleated, giant cell granulomas</td>
</tr>
<tr>
<td>ABNORMALITIES IDENTIFIED ON ENDOSCOPIC OR OTHER IMAGING STUDIES, REQUIRING FURTHER EVALUATION WITH CT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REFERENCE/LITERATURE REVIEW:</th>
</tr>
</thead>
</table>
Magnetic Resonance Imaging (MRI)
Temporomandibular Joints (TMJ)

CPT CODES:

70336.................MRI of Temporomandibular Joint(s)

STANDARD ANATOMIC COVERAGE:

- Bilateral study, including open and closed mouth views, often performed with surface coils.
- Images may be obtained in axial, (oblique) sagittal and (oblique) coronal planes.

IMAGING CONSIDERATIONS:

- Conventional radiographs and/or Panorex films should be used for initial evaluation of bony abnormalities.
- Some of the common causes for temporomandibular joint dysfunction include direct trauma, habitual misuse of the TMJs and various arthritides, including degenerative joint disease.
- For a known or suspected fracture of the mandibular condyles and TMJ regions, further evaluation following initial radiographs is usually undertaken with CT.
- MRI may be used to evaluate for internal derangements and articular disc dysfunction in the TMJs.
- Dynamic Ultrasound is an alternative technique for detecting disc displacement in the TMJs.¹
- MRI of the temporomandibular joint(s) is inherently a bilateral procedure. Separate entries for the right and left temporomandibular joints are not allowed.
- CT may be used after MRI if diagnosis still in doubt or when MRI cannot be done.

Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of Temporomandibular Joint(s).
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to
COMMON DIAGNOSTIC INDICATIONS FOR TEMPOROMANDIBULAR JOINTS (TMJ) MRI:

The following diagnostic indications for Temporomandibular Joints (TMJ) MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

PERSISTENT SYMPTOMS OF TEMPOROMANDIBULAR JOINT DYSFUNCTION, AFTER FAILED CONSERVATIVE TREATMENT – WITH NSAIDS AND/OR ACETAMINOPHEN, A SHORT-TERM TRIAL OF SOFT DIET AND PROPER CHEWING TECHNIQUES AS WELL AS AN ORAL APPLIANCE (SUCH AS A BITE BLOCK)

- Common symptoms include but are not limited to the following: 2-3
  - Clicking sensation, particularly during jaw movement
  - Persistent orofacial pain
  - Locking
  - Facial asymmetry and/or deformity (stable or changing)
  - Unstable occlusion, with or without other symptoms
  - Other functional impairments with mastication
- Often preceded by conventional radiographs and/or Panorex views of the TMJs

FROZEN JAW

PRE-OPERATIVE EVALUATION OF INTERNAL TMJ DERANGEMENT

PRE- AND POST-OPERATIVE EVALUATION

- With new or recurrent signs and symptoms

TRAUMA TO THE TEMPOROMANDIBULAR JOINTS

- For assessment of meniscal position and integrity
- Often preceded by conventional radiographs, Panorex views and/or CT of the TMJs

ARTHROPATHY OF THE TEMPOROMANDIBULAR JOINTS

- Often preceded by conventional radiographs and/or Panorex views of the TMJs
- Including but not limited to the following:
  - Inflammatory arthritis (rheumatoid arthritis is the most common)
  - Infectious arthritis
  - Post-traumatic arthritis

REFERENCE/LITERATURE REVIEW:

Computed Tomography (CT)
Neck for Soft Tissue Evaluation

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70490</td>
<td>CT Soft Tissues of Neck, without contrast</td>
</tr>
<tr>
<td>70491</td>
<td>CT Soft Tissues of Neck, with contrast</td>
</tr>
<tr>
<td>70492</td>
<td>CT Soft Tissues of Neck without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Axial images from the skull base to the clavicles.
- CT of the neck for soft tissue evaluation generally includes imaging of the following anatomic structures:
  - Pharynx, Larynx and Upper Trachea
  - Salivary Glands
  - Thyroid Gland
  - Cervical lymph nodes in the neck

IMAGING CONSIDERATIONS:

- Radiation Dosimetry is approximately 200 Chest X-Ray equivalent dosage.
- CT is generally the modality of choice for the following indications: detection of sialolithiasis (salivary gland calculi); following trauma to the soft tissues of the neck; and during foreign body evaluation, after initial radiographic assessment for a radiopaque foreign body.
- For many other soft tissue abnormalities of the neck, MRI is preferred, unless there is a contraindication to this imaging modality (due to pacemaker, implantable cardioverter-defibrillator (ICD), and other non-compatible device unsafe for use in an MRI scanner) or if MRI is not tolerated by the patient (usually secondary to claustrophobia).
- CT of the neck for soft tissue evaluation is not used for targeted imaging of the cervical spine. For spine imaging, see CT of the cervical spine (72125-72127).
- CT soft tissue neck is inherently a bilateral study. Separate requests to image both sides of the neck are not allowed.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR NECK CT:

The following diagnostic indications for Neck CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

FOREIGN BODY IN THE UPPER AERO-DIGESTIVE TRACT OR SURROUNDING NECK TISSUES
- Following neck radiographs (for soft tissue evaluation)

GLOTTIC LESION
- Further assessment following endoscopic detection

INFECTIOUS OR INFLAMMATORY PROCESS
- Including but not limited to the following:
  - Abscess
  - Cellulitis
  - Osteomyelitis

MASS LESION – PALPABLE NECK MASS
### COMMON DIAGNOSTIC INDICATIONS FOR NECK CT:

**MASS LESION – NON-PALPABLE AND UNEXPLAINED ON PRIOR IMAGING EXAM – FOR SURVEILLANCE, WITHOUT PATHOLOGIC TISSUE CONFIRMATION**

**NECK MASSES SUCH AS BRANCHIAL CLEFT CYST, THYROGLOSSAL DUCT CYST AND LYMPHANGIOMA / CYSTIC HYGROMA**

**OBSTRUCTIVE THYROID NODULE OR THYROMEGALY (GOITER)**
- Following thyroid US or thyroid scintigraphy
- When associated with mass effect on the upper airway or esophagus
- For pre-operative evaluation

**PERSISTENT HOARSENESS**
- Unexplained, following endoscopic examination and/or prior non-diagnostic imaging of neck/upper chest (extending along the course of the recurrent laryngeal nerves)

**LARYNGEAL EDEMA**

**LYMPHADENOPATHY**
- When persistent and/or unexplained

**SALIVARY / PAROTID GLAND DUCTAL CALCULI (SIALOLITHIASIS)**

**STRIDOR**
- For subacute and chronic stridor, advanced imaging may follow neck (soft tissue) radiographs and ENT evaluation

**TRAUMATIC INJURY TO THE SOFT TISSUES OF THE NECK**

**TUMOR EVALUATION – BENIGN AND MALIGNANT (PRIMARY NEOPLASM AND METASTATIC DISEASE):**
- For diagnosis, staging, evaluation of response to treatment and pre-operative assessment

**UPPER AIRWAY OBSTRUCTION**
- Including but not limited to Tracheal Stenosis

**VOCAL CORD PARALYSIS**
- Unexplained, following endoscopic diagnosis
- May be unilateral or bilateral; CT may aid in localizing the side and level of vocal cord paralysis

**ABNORMALITIES DETECTED ON OTHER DIAGNOSTIC EXAMS, WHICH REQUIRE FURTHER EVALUATION**

### REFERENCE/LITERATURE REVIEW:

CT Angiography (CTA) 
Neck

<table>
<thead>
<tr>
<th>CPT CODES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>70498.............CTA of Neck, with contrast material(s), including noncontrast images, if performed, and image postprocessing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD ANATOMIC COVERAGE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>● CTA of the neck involves image acquisition from the aortic arch to the skull base, to visualize major vessels which include the extracranial carotid arteries and vertebral arteries. The major venous structures may also be interrogated with CT angiographic technique.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMAGING CONSIDERATIONS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Duplex Doppler examination of the extracranial carotid arteries is often performed prior to CTA.</td>
</tr>
<tr>
<td>● Advantages of CTA over MRA include higher sensitivity for detection of mural calcification; usually shorter scan time, which results in less motion, pulsation and turbulent flow artifact; avoidance of MRA in-plane flow as a cause of apparent exaggerated stenosis; more facile detection of surgical clips and stents.</td>
</tr>
<tr>
<td>● Disadvantages of CTA include radiation exposure and use of intravascular iodinated contrast material.</td>
</tr>
<tr>
<td>● Contrast-enhancement for CTA may be contraindicated in certain circumstances, such as a documented allergy to intravenous contrast material and renal insufficiency. Special consideration should also be given to patients with multiple myeloma.</td>
</tr>
<tr>
<td>● CT Angiography (CTA) utilizes imaging data from standard CT acquisitions. Request for a CT exam, in addition to CT Angiography of the same anatomic area during the same imaging session, is inappropriate.</td>
</tr>
<tr>
<td>● Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.</td>
</tr>
<tr>
<td>● Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMMON DIAGNOSTIC INDICATIONS FOR NECK CTA:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following diagnostic indications for Neck CTA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STENOSIS OR OCCLUSION OF THE EXTRACRANIAL CAROTID ARTERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Following work-up with duplex Doppler examination of the carotid arteries, unless diagnosis is substantiated by clinical exam findings.</td>
</tr>
<tr>
<td>● Common clinical manifestations may include:</td>
</tr>
<tr>
<td>– Confusion</td>
</tr>
<tr>
<td>– Difficulty speaking or understanding speech</td>
</tr>
<tr>
<td>– Dizziness</td>
</tr>
<tr>
<td>– Gait Disturbance</td>
</tr>
<tr>
<td>– Loss of Balance or Coordination</td>
</tr>
<tr>
<td>– Loss of Consciousness</td>
</tr>
<tr>
<td>– Numbness, weakness or paralysis of the face, arm or leg, on one side of the body</td>
</tr>
<tr>
<td>– Sudden severe headache, that is unexplained</td>
</tr>
<tr>
<td>– Visual disturbance, particularly in one eye</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STENOSIS OR OCCLUSION OF VERTEBRAL ARTERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>● In patients with signs and symptoms of Vertebrobasilar Insufficiency (VBI) or Vertebral Basilar Ischemia.</td>
</tr>
</tbody>
</table>
COMMON DIAGNOSTIC INDICATIONS FOR NECK CTA:

- Symptoms of VBI are usually temporary, due to diminished blood flow in the posterior circulation of the brain.
- Common clinical manifestations may include:
  - Acute Sensorineural Hearing Loss
  - Ataxia
  - Diplopia
  - Dysarthria
  - Dysphagia
  - Facial Numbness and Paresthesias
  - Limb and Trunk Sensory Deficits
  - Loss of Taste Sensation
  - Motor Paresis
  - Nystagmus
  - Syncope
  - Vertigo
  - Visual Field Defects

FOLLOW-UP OF ABNORMAL OR INCONCLUSIVE FINDINGS ON CAROTID DOPPLER ULTRASOUND, PARTICULARLY WHEN VASCULAR CALCIFICATIONS PRECLUDE ADEQUATE VISUALIZATION OF THE LUMEN

ANEURYSM

ARTERIOVENOUS MALFORMATION

CONGENITAL ANOMALIES OF THE CAROTID AND VERTEBROBASILAR CIRCULATIONS

DISSECTION

INTRAMURAL HEMATOMA

ARTERIAL THROMBOEMBOLISM

VENOUS THROMBOSIS OR COMPRESSION

VASCULOPATHY, INCLUDING FIBROMUSCULAR DYSPLASIA (FMD)

TRAUMATIC VASCULAR INJURY TO THE EXTRACRANIAL CAROTID AND VERTEBRAL ARTERIES

PRE-OPERATIVE VASCULAR DELINEATION OF BLOOD SUPPLY TO TUMORS, SUCH AS CAROTID BODY (GLOMUS) TUMORS

POST-OPERATIVE EVALUATION, FOLLOWING CAROTID ENDARTERECTOMY

- With new sign and symptoms
- As a substitute for catheter angiography, when otherwise indicated

REFERENCE/LITERATURE REVIEW:

MR Angiography (MRA)  
Neck

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70547</td>
<td>MRA of Neck without contrast</td>
</tr>
<tr>
<td>70548</td>
<td>MRA of Neck with contrast</td>
</tr>
<tr>
<td>70549</td>
<td>MRA of Neck without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Acquisitions from the aortic arch to the skull base, to visualize the major vessels including the extracranial carotid arteries and vertebral arteries. The major venous structures may also be interrogated with MR angiographic techniques.

IMAGING CONSIDERATIONS:

- Duplex Doppler examination of the extracranial carotid arteries is often performed prior to MRA.
- Advantages of MRA, compared with CTA include avoidance of radiation exposure as well as intravascular administration of iodinated contrast material.
- Disadvantages of MRA, compared with CTA, include lower sensitivity for detection of mural calcification; usually longer scanning time, with potential for greater motion, pulsation and turbulent flow artifact; in-plane flow causing apparent exaggerated stenosis; greater difficulty in identifying surgical clips and stents.
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRA examination, to ensure patient safety. Among the generally recognized contraindications to MRA exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- An MRA of the neck is inherently bilateral. Duplicate requests to image the right and left side of the neck are not allowed.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR NECK MRA:

The following diagnostic indications for Neck MRA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

STENOSIS OR OCCLUSION OF THE EXTRACRANIAL CAROTID ARTERIES

- Following work-up with duplex Doppler examination of the carotid arteries, unless diagnosis is substantiated by clinical exam findings.
- Common clinical manifestations may include:
  - Confusion
  - Difficulty speaking or understanding speech
  - Dizziness
  - Gait Disturbance
  - Loss of Balance or Coordination
  - Loss of Consciousness
  - Numbness, weakness or paralysis of the face, arm or leg, on one side of the body
  - Sudden severe headache, that is unexplained
  - Visual disturbance, particularly in one eye
## STENOSIS OR OCCLUSION OF THE VERTEBRAL ARTERIES

- Symptoms of Vertebrobasilar Insufficiency are usually temporary, due to diminished blood flow to the posterior circulation of the brain.
- Common clinical manifestations may include:
  - Acute Sensorineural Hearing Loss
  - Ataxia
  - Diplopia
  - Dysarthria
  - Dysphagia
  - Facial Numbness and Paresthesias
  - Limb and Trunk Sensory Deficits
  - Loss of Taste Sensation
  - Motor Paresis
  - Nystagmus
  - Syncope
  - Vertigo
  - Visual Field Defects

## COMMON DIAGNOSTIC INDICATIONS FOR NECK MRA:

<table>
<thead>
<tr>
<th>Aneurysm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arteriovenous Malformation</td>
</tr>
<tr>
<td>Congenital Anomalies of the Carotid and Vertebrobasilar Circulations</td>
</tr>
<tr>
<td>Dissection</td>
</tr>
<tr>
<td>Intramural Hematoma</td>
</tr>
<tr>
<td>Arterial Thromboembolism</td>
</tr>
<tr>
<td>Venous Thrombosis or Compression</td>
</tr>
<tr>
<td>Vascular Pathology, Including Fibromuscular Dysplasia (FMD)</td>
</tr>
<tr>
<td>Traumatic Vascular Injury to the Extracranial Carotid and Vertebral Arteries</td>
</tr>
<tr>
<td>Pre-operative Vascular Delineation of Blood Supply to Tumors, Such as Carotid Body (Golms) Tumors</td>
</tr>
<tr>
<td>Post-operative Evaluation, Following Carotid Endarterectomy</td>
</tr>
</tbody>
</table>
  - With new signs and symptoms
  - As a substitute for catheter angiography, when otherwise indicated

## FOLLOW-UP OF ABNORMAL OR INCONCLUSIVE FINDINGS ON CAROTID DOPPLER ULTRASOUND, PARTICULARLY WHEN VASCULAR CALCIFICATIONS PRECLUDE ADEQUATE VISUALIZATION OF THE LUMEN |

<table>
<thead>
<tr>
<th>Reference/Literature Review:</th>
</tr>
</thead>
</table>
REFERENCE/LITERATURE REVIEW:


Computed Tomography (CT)
Chest

CPT CODES:
71250..............Chest CT without contrast
71260..............Chest CT with contrast
71270..............Chest CT without contrast, followed by re-imaging with contrast

STANDARD ANATOMIC COVERAGE:
● Lung apices through costophrenic sulci
● Scan coverage may vary, depending on the specific clinical indication

IMAGING CONSIDERATIONS:
● In the majority of clinical situations, Chest Radiographs should be performed prior to advanced imaging with CT, preferably within 30 days of the Chest CT exam request.
● Most health plans do not currently provide benefit coverage for screening studies using advanced imaging. For Chest CT imaging, this may include lung cancer screening. 1-2
● Radiation Dosimetry: For a conventional chest CT exam, the typical effective radiation dose is around 8 milliSieverts (mSv) or 400 Chest X-Ray equivalents.
● When the purpose of the study is imaging of the heart, including the coronary arteries, do not request both a chest CT and a dedicated cardiac/coronary artery CT.
● Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
● Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR CHEST CT:
The following diagnostic indications for Chest CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.
This section contains:
● Common Chest Indications
● Additional Pulmonary Indications
● Additional Mediastinal and Hilar Indications
● Additional Cardiac and Pericardial Indications
● Additional Pleural, Chest Wall and Diaphragmatic Indications

Common Thoracic Indications:

PULMONARY EMBOLISM 3-4

HEMOPTYSIS (COUGHING UP BLOOD) 5
● Initial evaluation should be performed with Chest X-Ray

COUGH PERSISTING 3 OR MORE WEEKS WITH NORMAL CHEST X-RAY
– Unresponsive to medical treatment and/or after evaluation for other causes (e.g. Postnasal drainage, asthma, gastroesophageal reflux disease 6-7 and medication effects.)
  Or
– Cough in immunosuppressed (e.g. HIV, after organ or bone marrow transplant, on infliximab other TNFα.) individual
**COMMON DIAGNOSTIC INDICATIONS FOR CHEST CT:**

<table>
<thead>
<tr>
<th>Or</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>– Other etiologies for chronic cough which include, but are not limited to: smoking, chronic bronchitis, cough-inducing medications (e.g., ACE Inhibitors), exposure to an environmental irritant, respiratory infection and neoplasm</strong></td>
</tr>
<tr>
<td><strong>– In immunocompromised individuals, a higher level of suspicion is warranted</strong></td>
</tr>
</tbody>
</table>

**PERSISTENT PNEUMONIA REFRACTORY TO MEDICAL TREATMENT OF ADEQUATE DURATION (AT LEAST FOUR WEEKS) OR SUSPECTED TO BE SECONDARY TO OBSTRUCTION OR RECURRENT PNEUMONIA IN THE SAME LOCATION WITHIN SIX MONTHS TO EVALUATE FOR OBSTRUCTIVE ETIOLOGY**

**OTHER INFECTION AND INFLAMMATORY PROCESSES**

- For initial evaluation and surveillance
- Including but not limited to the following thoracic abnormalities:
  - Lung Abscess
  - Mediastinitis
  - Sternal Infection (particularly following cardiac surgery)
  - Empyema
  - Mediastinal Abscess
  - Other infectious processes

**FEVER OF UNKNOWN ORIGIN**

- Lasting more than three weeks
- Following standard work-up to localize the source

**STRUCTURAL ABNORMALITIES ON CHEST X-RAY, WHICH REQUIRE FURTHER CLARIFICATION WITH CT**

**POSITIVE SPUTUM CYTOTOLOGY FOR MALIGNANCY**

**DOCUMENTED MALIGNANCY – PRIMARY NEOPLASM AND METASTATIC DISEASE**

- For staging and periodic follow-up

**PRE-OPERATIVE EVALUATION FOR THORACIC SURGERY**

**POST-OPERATIVE COMPLICATIONS**

- For suspected or known operative complications during the initial 6-8 weeks following cardio-thoracic surgery

**CONGENITAL THORACIC ANOMALIES**

**SARC OIDOSIS**

- Initial evaluation and periodic follow-up

**TRAUMA**

- Injury involving the Chest Wall, Cardiomediatinal Structures and/or Lungs

**UNEXPLAINED WEIGHT LOSS – SIGNIFICANT WEIGHT LOSS EXCEEDING 10% OF DESIRABLE BODY WEIGHT, OVER A SHORT TIME INTERVAL (6 MONTHS OR LESS)**

**Additional Pulmonary Indications:**

**PULMONARY NODULE(S) – WITH SUSPICION OF UNDERLYING MALIGNANCY**

- Initial evaluation and periodic surveillance of stable lesions for up to 2 years at approximately 6 month intervals
- Nodules are generally defined as < 3 cm in size

**PULMONARY MASS OR SUSPICIOUS PARENCHYMAL ABNORMALITY ON RECENT CHEST X-RAY OR OTHER IMAGING EXAM**

**BULLOUS EMPHYSEMA**

- Following initial evaluation with Chest Radiographs
- Consider High Resolution Chest CT (HRCT) Technique
<table>
<thead>
<tr>
<th>COMMON DIAGNOSTIC INDICATIONS FOR CHEST CT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRONCHIECTASIS</td>
</tr>
<tr>
<td>- Consider High Resolution Chest CT (HRCT) Technique 14</td>
</tr>
<tr>
<td>INTERSTITIAL LUNG DISEASE/PULMONARY FIBROSIS</td>
</tr>
<tr>
<td>- Consider High Resolution Chest CT (HRCT) Technique 14-15</td>
</tr>
<tr>
<td>HYPERLUCENT LUNG LESIONS IN PEDIATRIC PATIENTS</td>
</tr>
<tr>
<td>- Including but not limited to the following thoracic abnormalities:</td>
</tr>
<tr>
<td>- Congenital Lobar Emphysema</td>
</tr>
<tr>
<td>- Congenital Cystic Adenomatoid Malformation</td>
</tr>
<tr>
<td>PULMONARY SEQUESTRATION</td>
</tr>
<tr>
<td>ASBESTOS-RELATED BENIGN AND MALIGNANT LESIONS, involving the lungs and pleura: 16-17</td>
</tr>
<tr>
<td>- Pleural plaques</td>
</tr>
<tr>
<td>- Interstitial lung disease</td>
</tr>
<tr>
<td>- Malignant Mesothelioma</td>
</tr>
<tr>
<td>- Pleural effusion</td>
</tr>
<tr>
<td>- Lung cancer</td>
</tr>
<tr>
<td>OTHER PNEUMOCONIOSES</td>
</tr>
<tr>
<td>Additional Mediastinal and Hilar Indications:</td>
</tr>
<tr>
<td>EVALUATION OF THE THORACIC AORTA – ANEURYSM AND DISSECTION: 18-19</td>
</tr>
<tr>
<td>- In patients with suspected thoracic aortic aneurysm</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In patients with confirmed thoracic aortic aneurysm with new or worsening signs/symptoms</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- For ongoing surveillance of stable patients with confirmed thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding six months</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In patients with suspected aortic dissection</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In patients with confirmed aortic dissection who have new or worsening symptoms</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In patients with confirmed aortic dissection in whom surgical repair is anticipated (to assist in preoperative planning)</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- For ongoing surveillance of stable patients with confirmed aortic dissection who have not undergone imaging of the thoracic aorta within the preceding year</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In patients with confirmed aortic dissection or thoracic aortic aneurysm who have undergone surgical repair within the preceding year and have not undergone imaging of the thoracic aorta within the preceding six months</td>
</tr>
<tr>
<td>PENETRATING ATHEROSCLEROTIC AORTIC ULCER</td>
</tr>
<tr>
<td>TRAUMATIC AORTIC INJURY 19-20</td>
</tr>
<tr>
<td>VASCULITIS OF THE THORACIC AORTA OR BRANCH VESSEL</td>
</tr>
<tr>
<td>SUPERIOR VENA CAVA (SVC) SYNDROME</td>
</tr>
<tr>
<td>MEDIASTINAL WIDENING ON RECENT CHEST X-RAY</td>
</tr>
<tr>
<td>HILAR ENLARGEMENT ON RECENT CHEST X-RAY</td>
</tr>
</tbody>
</table>
### COMMON DIAGNOSTIC INDICATIONS FOR CHEST CT:

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWN HILAR AND/OR MEDIASTINAL LYMPHADENOPATHY / MASS</td>
</tr>
<tr>
<td>● Periodic follow-up</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOARSENESS OR VOCAL CORD WEAKNESS - SUSPECTED TO RESULT FROM RECURRENT LARYNGEAL NERVE INJURY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>THYMOMA</td>
</tr>
<tr>
<td>● Note that approximately 15% of patients with Myasthenia Gravis will have a Thymoma</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACHEOBRONCHIAL LESION EVALUATION</td>
</tr>
</tbody>
</table>

### Additional Cardiac and Pericardial Indications:

#### CONGENITAL HEART DISEASE 22
- For evaluation of suspected congenital heart disease in patients whose echocardiogram is technically limited or nondiagnostic
  - Or
- For initial evaluation of complex congenital heart disease in patients who have undergone echocardiography
  - Or
- For evaluation of complex congenital heart disease in patients who are less than one year post surgical correction
  - Or
- For evaluation of complex congenital heart disease in patients who have new or worsening symptoms
  - Or
- For evaluation of complex congenital heart disease in patients with a change in physical examination
  - Or
- To assist in surgical planning for patients with complex congenital heart disease
  - Or
- For surveillance in asymptomatic patients with complex congenital heart disease in patients who have not had cardiac MRI or cardiac CT within the preceding year

*Note: Cardiac MRI or transesophageal echocardiography may be preferable to chest CT in order to avoid radiation exposure*

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARDIAC ANEURYSM AND PSEUDOANEURYSM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRA-CARDIAC AND PARA-CARDIAC MASS(ES)</td>
</tr>
<tr>
<td>● Usually performed following echocardiography</td>
</tr>
</tbody>
</table>

### Additional Pleural, Chest Wall and Diaphragmatic Indications:

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABNORMAL PLEURAL FLUID COLLECTION, INCLUDING EFFUSION, HEMOTHORAX, EMPYEMA AND CHYLOTHORAX</td>
</tr>
<tr>
<td>CHEST WALL MASS</td>
</tr>
<tr>
<td>PLEURAL MASS</td>
</tr>
<tr>
<td>PNEUMOTHORAX – unexplained or recurrent</td>
</tr>
<tr>
<td>THORACIC OUTLET SYNDROME</td>
</tr>
<tr>
<td>DIAPHRAGMATIC HERNIA</td>
</tr>
<tr>
<td>UNEXPLAINED DIAPHRAGMATIC ELEVATION OR IMMOBILITY</td>
</tr>
</tbody>
</table>

### REFERENCE/LITERATURE REVIEW:

1. Swensen SJ. CT Screening for Lung Cancer. AJR 2002; 179: 833-836
REFERENCE/LITERATURE REVIEW:

CT Angiography (CTA)
Chest (Non-Coronal)

CPT CODES:

71275..............CTA of Chest (noncoronary), with contrast material(s), including noncontrast images, if performed, and image postprocessing

STANDARD ANATOMIC COVERAGE:

- Scan coverage varies depending on the clinical indication. This exam does not include cardiac and coronary artery indications.
- Chest CTA may be used for anatomic depiction from the pulmonary apices through the costophrenic sulci.

IMAGING CONSIDERATIONS:

Advantages of CTA:
- Rapidly acquired exam, with excellent anatomic detail afforded by most multidetector CT scanners.

Disadvantages of CTA:
- Potential complications from use of intravascular iodinated contrast administration (see biosafety issues, below) and ionizing radiation.

Biosafety Issues:
- Ordering and imaging providers are responsible for considering safety issues prior to the CTA exam. One of the most significant considerations is the requirement for intravascular iodinated contrast material, which may have an adverse effect on patients with a history of documented allergic contrast reactions or atopy, as well as on individuals with renal impairment, who are at greater risk for contrast-induced nephropathy.

Ordering Issues:
- Chest CTA does not cover cardiac and coronary artery imaging. Refer to the specific CPT codes for Cardiac and Coronary Artery CT/CTA evaluation.
- There are uncommon circumstances when both CTA and MRA of the chest should be ordered for the same clinical presentation. The specific rationale must be delineated at the time of request.
- In general, follow-up CTA exams should be performed only when there is a clinical change, with new signs or symptoms, or specific finding(s) requiring imaging surveillance.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

Other Comments:
- CT Angiography (CTA) utilizes the data obtained from standard CT imaging. Request for a CT exam, in addition to CT Angiography of the same anatomic area AND during the same imaging session, is inappropriate.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
# COMMON DIAGNOSTIC INDICATIONS FOR CHEST CTA:

The following diagnostic indications for Chest CTA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

**This section contains:**
- General Chest CTA Indications
- Additional Thoracic Aorta and Great Vessel Indications
- Additional Pulmonary Artery and Vein Indication

## General Chest CTA Indications:

## VASCULAR INVOLVEMENT FROM NEOPLASM IN THE CHEST

## SYSTEMIC VENOUS THROMBOSIS OR OCCLUSION, INCLUDING SUPERIOR VENA CAVA (SVC) SYNDROME

## SUBCLAVIAN STEAL SYNDROME

## THORACIC OUTLET SYNDROME

### DEVELOPMENTAL ANOMALIES OF THE THORACIC VASCULATURE

Examples of congenital thoracic vascular anomalies include but are not limited to the following:
- Aortic coarctation
- Double aortic arch
- Hypoplastic or atretic pulmonary arteries
- Inferior vena caval interruption
- Partial anomalous pulmonary venous return
- Patent ductus arteriosus
- Persistent left-sided superior vena cava
- Right-sided aortic arch
- Total anomalous pulmonary venous return
- Transposition of the Great Vessels
- Truncus arteriosus

## POST-TRAUMATIC VASCULAR INJURY

### Additional Thoracic Aorta and Great Vessel Indications

### EVALUATION OF THE THORACIC AORTA – ANEURYSM AND DISSECTION:

- In patients with suspected thoracic aortic aneurysm
  - Or
- In patients with confirmed thoracic aortic aneurysm with new or worsening signs/symptoms
  - Or
- For ongoing surveillance of stable patients with confirmed thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding six months
  - Or
- In patients with suspected aortic dissection
  - Or
- In patients with confirmed aortic dissection who have new or worsening symptoms
  - Or
- In patients with confirmed aortic dissection in whom surgical repair is anticipated (to assist in preoperative planning)
  - Or
- For ongoing surveillance of stable patients with confirmed aortic dissection who have not undergone imaging of the thoracic aorta within the preceding year
  - Or
- In patients with confirmed aortic dissection or thoracic aortic aneurysm who have undergone surgical repair within the preceding year and have not undergone imaging of the thoracic aorta within the preceding six months
COMMON DIAGNOSTIC INDICATIONS FOR CHEST CTA:

CONGENITAL HEART DISEASE

CARDIAC MASSES AND TUMORS

HEMATOMA

ATHEROMATOUS DISEASE, INCLUDING PENETRATING Atherosclerotic AORTIC ULCER

VASCULITIS

STENT GRAFT EVALUATION, INCLUDING DETECTION OF AN ENDOLEAK

● Pre-Procedure Assessment and Post-Procedure Follow-up

POST-OPERATIVE OR POST-INTERVENTIONAL VASCULAR PROCEDURE – FOR LUMINAL PATENCY VERSUS STENOSIS / OCCLUSION, AS WELL AS POST-PROCEDURE COMPLICATION

● Potential complications include but are not limited to the following:
  – Infection, such as abscess
  – Peri-anastomotic leak
  – Pseudoaneurysm

Additional Pulmonary Artery and Vein Indications: 4.8-13

PULMONARY EMBOLISM 4-9

● For clinically suspected pulmonary embolism or follow-up when recurrent thromboembolism is a concern in patients on adequate medical therapy

● Evaluation of candidates for pulmonary Thromboendarterectomy

PULMONARY ARTERIAL HYPERTENSION

PULMONARY ARTERIOVENOUS MALFORMATION (AVM)

PULMONARY SEQUESTRATION

EVALUATION OF CARDIAC VENOUS ANATOMY 11-13

● For localization of the pulmonary veins in patients with chronic or paroxysmal atrial fibrillation/flutter who are candidates for radiofrequency ablation and have undergone appropriate electrophysiology evaluation.

REFERENCE/LITERATURE REVIEW:


<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
<th>Journal/Volume/Publication details</th>
</tr>
</thead>
</table>
Magnetic Resonance Imaging (MRI)

Chest

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>71550</td>
<td>MRI chest, without contrast</td>
</tr>
<tr>
<td>71551</td>
<td>MRI chest, with contrast</td>
</tr>
<tr>
<td>71552</td>
<td>MRI chest, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Chest MRI studies are often performed as problem-solving exams, following Chest CT. In these circumstances, anatomic coverage will depend on the specific indication for the study.
- This Guideline excludes cardiac indications, which are covered under the Cardiac MRI section and corresponding CPT codes (75557-75564).

IMAGING CONSIDERATIONS:

Advantages of Chest MRI:
- Chest MRI may be helpful after a CT in the following scenarios:
  - Defining mediastinal and hilar lymphadenopathy (particularly after an unenhanced chest CT exam)
  - Determining direct lung tumor invasion into the mediastinum and hilar structures, without the need for iodinated contrast material in CT
  - Assessing spinal canal extension from a postero-medially located thoracic mass
  - Evaluating a suspected Pancoast tumor (also referred to as apical pleuro-pulmonary groove or superior pulmonary sulcus tumors) for direct chest wall extension, given the multiplanar capability of MRI

Disadvantages of Chest MRI:
- Lung lesions are usually better imaged with CT when compared with MRI, given the superior spatial resolution of CT.
- MRI should not be performed in patients with certain implanted devices that are not MRI compatible, such as pacemakers (see biosafety issues below).

Patient Compatibility Issues:
- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.
IMAGING CONSIDERATIONS:

Ordering Issues:
- This guideline does not supersede the enrollee’s health plan medical policy specific to chest MRI.
- For initial evaluation of most thoracic lesions, such as pulmonary nodules and masses, chest CT is considered the study of choice.
- Contrast utilization for Chest MRI is at the discretion of the ordering and imaging providers.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change with new signs or symptoms or as surveillance after treatment.

Other Comments:
- An MRI of the chest should not be entered for imaging of the heart, which is examined using the Cardiac MRI CPT codes 75557-75564.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR CHEST MRI:

The following diagnostic indications for Chest MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

DOCUMENTED MALIGNANCY – PRIMARY NEOPLASM AND METASTATIC DISEASE
- For staging and periodic surveillance
- To evaluate the mediastinum, hila, pericardium, heart, chest wall and paraspinal region

Pancoast Tumor
- To evaluate for chest wall extension at the superior pulmonary sulcus

Mediastinal and Hilar Mass Lesions – When Abnormal Findings Cannot Be Thoroughly Evaluated with CT
- Particularly in patients who have an allergic history to intravascular iodinated CT contrast material or who have renal insufficiency and thus are at greater risk for contrast-induced nephropathy
- Chest MRI may be helpful in the following circumstances:
  - To differentiate mediastinal and hilar lesions from vascular structures, or
  - To assess vascular invasion by tumor, or
  - To detect spinal extension from a postero-medially located chest mass

Thymoma Evaluation or History of Myasthenia Gravis
- Note that approximately 15% of patients with Myasthenia Gravis will have a Thymoma

Evaluation of the Thoracic Aorta – Aneurysm and Dissection: 18-19
- In patients with suspected thoracic aortic aneurysm
  Or
- In patients with confirmed thoracic aortic aneurysm with new or worsening signs/symptoms
  Or
- For ongoing surveillance of stable patients with confirmed thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding six months
  Or
- In patients with suspected aortic dissection
  Or
- In patients with confirmed aortic dissection who have new or worsening symptoms
COMMON DIAGNOSTIC INDICATIONS FOR CHEST MRI:

Or
- In patients with confirmed aortic dissection in whom surgical repair is anticipated (to assist in preoperative planning)
  Or
- For ongoing surveillance of stable patients with confirmed aortic dissection who have not undergone imaging of the thoracic aorta within the preceding year
  Or
- In patients with confirmed aortic dissection or thoracic aortic aneurysm who have undergone surgical repair within the preceding year and have not undergone imaging of the thoracic aorta within the preceding six months

DEVELOPMENTAL ANOMALIES OF THE THORACIC VASCULATURE

- Examples of congenital thoracic vascular anomalies include but are not limited to the following:
  - Aortic coarctation
  - Double aortic arch
  - Hypoplastic or atretic pulmonary arteries
  - Inferior vena caval interruption
  - Partial anomalous pulmonary venous return
  - Patent ductus arteriosus
  - Persistent left-sided superior vena cava
  - Right-sided aortic arch
  - Total anomalous pulmonary venous return
  - Transposition of the Great Vessels
  - Truncus arteriosus

PULMONARY NODULE(S) – WITH SUSPICION OF UNDERLYING MALIGNANCY

- Initial evaluation and periodic surveillance of stable lesions for up to 2 years at approximately 6 month intervals
  - Nodules are generally defined as < 3 cm in size

SUPERIOR VENA CAVA SYNDROME

THORACIC OUTLET SYNDROME

REFERENCE/LITERATURE REVIEW:

MR Angiography (MRA)
Chest

**CPT CODES:**
71555.................MRA of Chest (excluding the myocardium) without contrast, followed by re-imaging with contrast

**STANDARD ANATOMIC COVERAGE:**
- Scan coverage varies depending on the clinical indication.
- Chest MRA may be used for vascular anatomic depiction, from the pulmonary apices through the costophrenic sulci.

**IMAGING CONSIDERATIONS:**

**Advantages of Chest MRA:**
- Use of MR imaging is advantageous over CT in avoiding ionizing radiation and allowing for direct multiplanar imaging.

**Disadvantages of Chest MRA:**
- With MRA, artifact due to patient motion may have a particularly significant impact on exam quality.
- MRA cannot be performed in patients with certain implanted devices that are not MRI compatible, such as pacemakers (see biosafety issues below).

**Biosafety Issues:**
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRA examination, to ensure patient safety. Among the generally recognized contraindications to MRA exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks).

**Ordering Issues:**
- There are uncommon circumstances when both MRA and CTA should be ordered for the same clinical presentation. The specific rationale must be delineated at the time of request.
- In general, follow-up MRA exams should be performed only when there is a clinical change, with new signs or symptoms, or specific finding(s) requiring imaging surveillance.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**COMMON DIAGNOSTIC INDICATIONS FOR CHEST MRA:**
The following diagnostic indications for Chest MRA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

This section contains:
- Common Chest MRA Indications
- Additional Thoracic Aorta and Great Vessel Indications
- Additional Pulmonary Artery and Vein Indications

Common Chest MRA Indications: 1-3
COMMON DIAGNOSTIC INDICATIONS FOR CHEST MRA:

### VASCULAR INVOLVEMENT FROM NEOPLASM IN THE CHEST

### SYSTEMIC VENOUS THROMBOSIS OR OCCLUSION, INCLUDING SUPERIOR VENA CAVA (SVC) SYNDROME

### SUBCLAVIAN STEAL \(^3\)

### THORACIC OUTLET SYNDROME

### DEVELOPMENTAL ANOMALIES OF THE THORACIC VASCULATURE \(^2,4\)

Examples of congenital thoracic vascular anomalies include but are not limited to the following:
- Aortic coarctation
- Double aortic arch
- Hypoplastic or atretic pulmonary arteries
- Inferior vena caval interruption
- Partial anomalous pulmonary venous return
- Patent ductus arteriosus
- Persistent left-sided superior vena cava
- Right-sided aortic arch
- Total anomalous pulmonary venous return
- Transposition of the Great Vessels
- Truncus arteriosus

### POST-TRAUMATIC VASCULAR INJURY

### EVALUATION OF PERICARDIAL CONDITIONS (PERICARDIAL EFFUSION, CONSTRUCTIVE PERICARDITIS, OR CONGENITAL PERICARDIAL DISEASES)

- In patients with suspected pericardial constriction
  - Or
- In patients with suspected congenital pericardial disease
  - Or
- In patients with suspected pericardial effusion (including hemopericardium) who have undergone echocardiography deemed to be technically suboptimal in evaluation of the effusion
  - Or
- In patients whose echocardiogram shows a complex pericardial effusion (loculated, containing solid material)
  - Or
- In patients with confirmed aortic dissection who have new or worsening symptoms

#### Additional Thoracic Aorta and Great Vessel Indications: \(^4-7\)

### EVALUATION OF THE THORACIC AORTA – ANEURYSM AND DISSECTION: \(^18-19\)

- In patients with suspected thoracic aortic aneurysm
  - Or
- In patients with confirmed thoracic aortic aneurysm with new or worsening signs/symptoms
  - Or
- For ongoing surveillance of stable patients with confirmed thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding six months
  - Or
- In patients with suspected aortic dissection
  - Or
- In patients with confirmed aortic dissection who have new or worsening symptoms
  - Or
- In patients with confirmed aortic dissection in whom surgical repair is anticipated (to assist in preoperative planning)
  - Or
COMMON DIAGNOSTIC INDICATIONS FOR CHEST MRA:

- For ongoing surveillance of stable patients with confirmed aortic dissection who have not undergone imaging of the thoracic aorta within the preceding year
  Or
- In patients with confirmed aortic dissection or thoracic aortic aneurysm who have undergone surgical repair within the preceding year and have not undergone imaging of the thoracic aorta within the preceding six months

HEMATOMA

ATHEROMATOUS DISEASE, INCLUDING PENETRATING ATHEROSCLEROTIC AORTIC ULCER

VASCULITIS

STENT GRAFT EVALUATION, INCLUDING DETECTION OF AN ENDOLEAK

- Pre-Procedure Assessment and Post-Procedure Follow-up

POST-OPERATIVE OR POST-INTERVENTIONAL VASCULAR PROCEDURE – FOR LUMINAL PATENCY VERSUS STENOSIS / OCCLUSION AS WELL AS POST-PROCEDURE COMPLICATIONS

- Potential complications include but are not limited to the following:
  - Infection, such as abscess
  - Peri-anastomotic leak
  - Pseudoaneurysm

CONGENITAL HEART DISEASE

CARDIAC MASSES AND TUMORS

Additional Pulmonary Artery and Vein Indications: 8-11

PULMONARY EMBOLISM 8-9

- Rarely requested and used only in selected cases, for example when intravenous iodinated contrast material for a CTA is contraindicated due to significant iodinated contrast allergy, and a diagnostic ventilation/perfusion (V/Q) study cannot be obtained.
- For clinically suspected pulmonary embolism or follow-up when recurrent thromboembolism is a concern in patients on adequate medical therapy
- Evaluation of candidates for pulmonary Thromboendarterectomy

PULMONARY ARTERIAL HYPERTENSION

PULMONARY ARTERIOVENOUS MALFORMATION (AVM) 10

PULMONARY SEQUESTRATION

EVALUATION OF CARDIAC VENOUS ANATOMY 11-13

- For localization of the pulmonary veins in patients with chronic or paroxysmal atrial fibrillation/flutter are candidates for radiofrequency ablation and have undergone appropriate electrophysiology evaluation.

REFERENCE/LITERATURE REVIEW:

<table>
<thead>
<tr>
<th>Reference/Literature Review</th>
</tr>
</thead>
</table>
Magnetic Resonance Imaging (MRI)
Breast
Also Referred to as MR Mammography (MRM)

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>77058</td>
<td>MRI of Breast, without and/or with contrast material(s); Unilateral</td>
</tr>
<tr>
<td>77059</td>
<td>MRI of Breast, without and/or with contrast material(s); Bilateral</td>
</tr>
</tbody>
</table>

IMAGING CONSIDERATIONS:

Technique:
- It is strongly recommended that Breast MRI examinations be performed with a dedicated breast coil.

Limitations:
- Breast MRI is not recommended as a screening technique in patients with average-risk for breast cancer.
- Breast MRI is not recommended to assess suspicious breast lesions in order to avoid a biopsy.
- Breast MRI should not be used to differentiate cysts from solid lesions, which is well evaluated with ultrasound.

Patient Compatibility Issues:
- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:
- This guideline does not supersede the enrollee’s health plan medical policy specific to breast MRI.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.

Additional Comments:
- A bilateral MRI study of the breast is correctly coded to CPT 77059. Requesting two unilateral studies (77058) to perform a bilateral exam is inappropriate. Billing 77058 two times for the same date of service or separately over subsequent days in order to describe a bilateral procedure fragments the service into its component parts and is not allowed.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassess-
### IMAGING CONSIDERATIONS:

- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

### COMMON DIAGNOSTIC INDICATIONS FOR BREAST MRI:

#### For Breast Carcinoma: Diagnostic Evaluation

- **Lesion Characterization, When Other Imaging Examinations, Such As Ultrasound And Mammography, And Physical Examination Are Inconclusive For The Presence Of Breast Cancer, And Biopsy Could Not Be Performed (E.g., Possible Distortion On Only One Mammographic View Without A Sonographic Correlate)**

- **Invasive Carcinoma And Ductal Carcinoma In Situ (DCIS) – To Determine The Extent Of Disease And The Presence Of Multifocality And Multicentricity**

- **Invasion Of Breast Cancer Deep To Fascia – MRI Evaluation Of Breast Prior To Surgical Treatment May Be Useful In Both Mastectomy And Breast Conservation Candidates To Define The Relationship Of The Tumor To The Fascia And Its Extension Into Pectoralis Major, Serratus Anterior, And/Or Intercostal Muscles**

- **Metastatic Cancer When The Primary Is Unknown And Suspected To Be Of Breast Origin – In Patients Presenting With Metastatic Disease And/Or Axillary Adenopathy And No Mammographic Or Physical Findings Of Primary Breast Carcinoma**

- **Neoadjuvant Chemotherapy – MR Mammography May Be Performed Before, During And After Chemotherapy, To Assess Response To Treatment And Extent Of Residual Disease, Prior To Surgery**

- **Recurrence Of Breast Cancer – In Women With A Prior History Of Breast Cancer And Suspicion Of Recurrence When Clinical, Mammographic, And/Or Sonographic Findings Are Inconclusive**

- **Post-Lumpectomy With Positive Margins – To Evaluate For Residual Disease In Patients Whose Pathology Specimens Demonstrate Close Or Positive Margins For Residual Disease**

- **Post-Operative Tissue Reconstruction – To Evaluate Suspected Cancer Recurrence In Patients With Tissue Transfer Flaps (Rectus, Latissimus Dorsi, And Gluteal)**

- **Differentiation Of Palpable Mass(ES) From Surgical Scar Tissue Following Breast Surgery, Breast Reconstruction Or Radiation Therapy**

- **At 6 Months Following A Previous Breast MRI With Bi-RADS Category 3 Findings. [Abnormal Finding Requiring Follow-Up]**

#### For Breast Carcinoma: Annual Screening

- **High-Risk Individuals With A Breast Cancer Genetic Mutation, Which Include The Following:**
  - BRCA1 and BRCA2 – including BRCA mutation or first degree relative of BRCA carrier
  - Li-Fraumeni Syndrome – including first degree relatives
  - Cowden Syndrome – including first degree relatives
  - Bannayan-Riley-Ruvalcaba Syndrome – including first degree relatives

- **Lifetime Risk ~ 20-25% Or Greater, As Defined By BRCAPRO Or Other Models That Are Largey Dependent On Family History**

- **History Of Lobular Carcinoma In Situ (LCIS) On Biopsy Or Ductal Carcinoma In Situ (DCIS) On Biopsy**

- **For An Individual Who Received Radiation To Chest Between The Ages 10-30 Years**
COMMON DIAGNOSTIC INDICATIONS FOR BREAST MRI:

For Breast Implant Rupture:  
(Not requiring breast carcinoma diagnosis)

EVALUATION OF SYMPTOMATIC PATIENTS WITH BREAST IMPLANTS, FOR DETECTION OF IMPLANT RUPTURE

REFERENCE/LITERATURE REVIEW:

CPT CODES:

78451……..Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)

78452…….. Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection

78453…….. Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)

78454…….. Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection

COMMONLY USED RADIOPHARMACEUTICALS

- Thallium-201 Chloride
- Technetium-99m Sestamibi
- Technetium-99m Tetrofosmin

USES OF MYOCARDIAL PERFUSION IMAGING (MPI):

- The primary use of MPI is in the diagnosis, exclusion or evaluation of obstructive Coronary Artery Disease (CAD)
- MPI is also used for risk stratification with established coronary artery disease.
- MPI may be used for assessment of myocardial viability in patients who have had myocardial infarction.

IMAGING CONSIDERATIONS:

- This guideline does not supersede the enrollee’s health plan medical policy specific to myocardial perfusion imaging
- A recent EKG is strongly recommended, preferably within 30 days of request for a Myocardial Perfusion Imaging Exam. The findings on the resting EKG may be important in determining the need for imaging, the selection of the appropriate imaging protocol and may also show evidence of ischemia at rest or interval myocardial infarction.
- Age, gender and the character of the chest pain provide useful predictors of CAD, as stratified in Table 1 below.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

Table 1*: Pre-Test Probability of Coronary Artery Disease by Age, Gender and Symptoms:

<table>
<thead>
<tr>
<th>Very Low &lt; 5%</th>
<th>Intermediate probability 10-90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Probability &lt; 10%</td>
<td>High Probability &gt; 90%</td>
</tr>
</tbody>
</table>

### IMAGING CONSIDERATIONS:

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Gender</th>
<th>Typical/Definite Angina Pectoris</th>
<th>Atypical/Probable Angina Pectoris</th>
<th>Non-Anginal Chest Pain</th>
<th>Asymptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>Men</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>40-49</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>50-59</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>60-69</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

- Myocardial Perfusion Imaging and Stress Echocardiography may provide useful information on Coronary Heart Disease. Comparison data on Sensitivity and Specificity are provided in Table 2 below. Due to regional variation in technical expertise and interpretive proficiency, the clinician should use the diagnostic imaging modality that has been proven most accurate in his/her practices.

#### Table 2**: Comparison of Non-Invasive Diagnostic Imaging


<table>
<thead>
<tr>
<th></th>
<th>Nuclear Imaging Sensitivity (%)</th>
<th>Stress Echo Sensitivity (%)</th>
<th>Nuclear Imaging Specificity (%)</th>
<th>Stress Echo Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise (7 studies)</td>
<td>83%</td>
<td>78%</td>
<td>83%</td>
<td>91%</td>
</tr>
<tr>
<td>Dobutamine (8 studies)</td>
<td>86%</td>
<td>80%</td>
<td>73%</td>
<td>86%</td>
</tr>
<tr>
<td>Adenosine (3 studies)</td>
<td>89%</td>
<td>63%</td>
<td>73%</td>
<td>86%</td>
</tr>
<tr>
<td>Dipyridamole (4 studies)</td>
<td>83%</td>
<td>68%</td>
<td>88%</td>
<td>89%</td>
</tr>
</tbody>
</table>

Several clinical indications listed for Myocardial Perfusion Imaging include standard methods of risk assessment, such as the SCORE (Systematic Coronary Risk Evaluation) or the Framingham risk score calculation. These risk calculation systems include consideration of the following factors:

- Age
- Sex
- Abnormal Lipid Profile
- Hypertension
- Diabetes Mellitus
- Cigarette Smoking

Other coronary risk factors such as family history of premature CAD, coronary artery calcification, C reactive protein levels, obesity etc. are not included in the standard methods of risk assessment but are thought to contribute to coronary artery disease risk.

- Selection of the optimal diagnostic work-up for evaluation or exclusion of coronary artery disease should be made within the context of available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.

- Occasionally it may be appropriate to do a second noninvasive test for diagnosis or exclusion of CAD when the initially selected test is technically suboptimal and the diagnosis of CAD cannot be established or excluded.

- In order to optimize image quality, imaging protocols may need to be modified in specific patient populations. Thus, patients who are obese may benefit from 2 day imaging protocols and/or prolonged image acquisition times. Similarly, imaging in the prone position may improve accuracy in patients who are obese and women with high likelihood of breast attenuation artifact. Patients whose baseline EKG demonstrates left bundle branch block, may be better suited to pharmacologic stress imaging than to exercise stress protocols.

- Rarely, absolute or relative contraindications to MPI will be encountered. MPI should not be used in pregnant or lactating women. Patients who are unable to remain motionless for several minutes or comprehend simple instructions are
### COMMON DIAGNOSTIC INDICATIONS FOR MYOCARDIAL PERFUSION IMAGING:

The following diagnostic indications for Myocardial Perfusion Imaging may be accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

#### SUSPECTED CORONARY ARTERY DISEASE IN SYMPTOMATIC PATIENTS

who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding sixty (60) days:

- Chest pain
  - With intermediate or high pretest probability of CAD (Table 1)
  - With low or very low pretest probability of CAD (Table 1) and high risk of CAD (SCORE)
- Atypical symptoms: syncope, shortness of breath (dyspnea), neck, jaw, arm, epigastric or back pain, or sweating (diaphoresis).
  - With moderate or high risk of CAD (SCORE)
- Other symptoms; palpitation, dizziness, lightheadedness, near syncope, nausea, vomiting, anxiety, weakness, fatigue etc
  - With high risk of CAD (SCORE)
- Patients with any cardiac symptom who have diseases/conditions with which coronary artery disease commonly coexists such as:
  - Diabetes mellitus
  - Abdominal aortic aneurysm
  - Established and symptomatic peripheral vascular disease
  - Prior history of cerebrovascular accident (CVA), transient ischemic attack (TIA) or carotid endarterectomy (CEA) or high grade carotid stenosis (>70%)
  - Chronic renal insufficiency or renal failure
- Patients who have undergone cardiac transplantation
- Patients in whom a decision has been made to treat with Interleukin 2.

#### SUSPECTED CORONARY ARTERY DISEASE IN ASYMPTOMATIC PATIENTS

- Patients with high-risk of CAD (SCORE) who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding three (3) years
- Patients with moderate or high risk of CAD (SCORE) who have a high risk occupation that would endanger others in the event of a myocardial infarction, for example: airline pilot, law-enforcement officer, firefighter, mass transit operator, bus driver) who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding two (2) years

---

**IMAGING CONSIDERATIONS:**

not suitable candidates for MPI. Image quality in morbidly obese patients (BMI >40) is usually suboptimal such that consideration should be given to other imaging modalities. If imaging studies using other radioactive tracers have been recently performed, adequate time must elapse to allow for clearance of activity from the heart and surrounding regions.

- For patients who are unable to walk on a treadmill for non cardiac reasons (orthopedic limitations, claudication, neurological conditions, advanced lung disease, etc) exercise stress testing is not an option. These patients will require pharmacological testing with echo or nuclear imaging.
- It is anticipated that the evaluation of patients with acute chest pain will occur in the emergency room or in an inpatient setting and MPI performed in these locations is not included in the AIM preauthorization program.
### COMMON DIAGNOSTIC INDICATIONS FOR MYOCARDIAL PERFUSION IMAGING:

- Patients with diseases/conditions with which coronary artery disease commonly coexist and who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding two (2) years:
  - Diabetes mellitus
  - Abdominal aortic aneurysm
  - Established and symptomatic peripheral vascular disease
  - Prior history of cerebrovascular accident (CVA), transient ischemic attack (TIA) or carotid endarterectomy (CEA) or high grade carotid stenosis (>70%)
  - Chronic renal insufficiency or renal failure
- Patients who have undergone cardiac transplantation and have had no evaluation for coronary artery disease within the preceding one (1) year

### ESTABLISHED CORONARY ARTERY DISEASE (DIAGNOSED BY PREVIOUS CARDIAC CATHETERIZATION, MPI, OR STRESS ECHO) IN PATIENTS WHO HAVE NO SYMPTOMS OR STABLE SYMPTOMS

- No evaluation of CAD (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding two (2) years

### ESTABLISHED CORONARY ARTERY DISEASE (DIAGNOSED BY PREVIOUS CARDIAC CATHETERIZATION, MPI, OR STRESS ECHO) IN PATIENTS WHO HAVE NEW OR WORSENING SYMPTOMS

*Note: if symptoms are typical of myocardial ischemia cardiac catheterization may be more appropriate than MPI*

### PATIENTS WITH NEW ONSET ARRHYTHMIAS (PATIENT CAN BE SYMPTOMATIC OR ASYMPTOMATIC)

- This guideline applies to patients with suspected or established CAD
- Patients with ventricular tachycardia
- Patients with atrial fibrillation or flutter and high or moderate risk of CAD (SCORE)
- Patients with atrial fibrillation or flutter and established CAD

### PATIENTS WITH NEW ONSET CONGESTIVE HEART FAILURE OR RECENTLY RECOGNIZED LEFT VENTRICULAR SYSTOLIC DYSFUNCTION (PATIENT CAN BE SYMPTOMATIC OR ASYMPTOMATIC)

- This guideline applies to patients with suspected or established CAD
- For patients in this category whose CAD risk (SCORE) is high, cardiac catheterization may be more appropriate than noninvasive evaluation
- Provided that CAD has not been excluded as the cause of LV dysfunction/CHF by any of the following tests: MPI, stress echo, coronary CTA or cardiac catheterization

### PATIENTS WITH ABNORMAL EXERCISE TREADMILL TEST (PERFORMED WITHOUT IMAGING)

- This guideline applies to patients with suspected or established CAD
- Abnormal findings on an exercise treadmill test include (chest pain, ST segment change, abnormal BP response or complex ventricular arrhythmias)

### PATIENTS WHO HAVE UNDERGONE RECENT (WITHIN THE PAST 60 DAYS) STRESS ECHOCARDIOGRAPHY

- When the stress echocardiogram is technically suboptimal, technically limited, inconclusive, indeterminate, or equivocal, such that myocardial ischemia cannot be adequately excluded.
  - It is not appropriate to perform MPI on patients who have had a recent normal or abnormal stress echocardiogram
  - A stress echocardiogram is deemed to be abnormal when there are echocardiographic abnormalities. Electrocardiographic abnormalities without echocardiographic evidence of ischemia are considered to be normal studies.
### COMMON DIAGNOSTIC INDICATIONS FOR MYOCARDIAL PERFUSION IMAGING:

#### PATIENTS WITH ABNORMAL FINDINGS ON CARDIAC CT / CORONARY CTA

**Symptomatic Patients:**
- With coronary artery calcium score > 400 Agatston units  
  *Or*  
- Intermediate severity coronary stenosis on coronary CTA

*Note: If symptoms are typical of myocardial ischemia cardiac catheterization may be more appropriate than MPI*

#### Asymptomatic patients who have not had MPI, stress echo or cardiac catheterization within the preceding two (2) years:
- With coronary artery calcium score > 400 Agatston units  
  *Or*  
- Intermediate severity coronary stenosis coronary CTA

#### PATIENTS WITH ABNORMAL FINDINGS ON CARDIAC CATHETERIZATION
- To determine flow limiting significance of intermediate coronary stenosis

### MYOCARDIAL VIABILITY EVALUATION

MPI may be used to evaluate myocardial viability in patients who
- Have established coronary artery disease  
  *And*  
- Have left ventricular systolic dysfunction  
  *And*  
- Are candidates for revascularization  
  *And*  
- Do not have evidence of viability using other imaging modalities (for example: Stress Echo, MRI, PET)

### PREOPERATIVE CARDIAC EVALUATION OF PATIENTS UNDERGOING NON-CARDIAC SURGERY
- This guideline applies to patients undergoing non-emergency surgery.  
- It is assumed that those who require emergency surgery will undergo inpatient preoperative evaluation.  
- Patients with **active cardiac conditions** such as unstable coronary syndromes (unstable angina), decompensated heart failure (NYHA function of class IV, worsening or new onset heart failure), significant arrhythmias (third degree AV block Mobitz II AV block, uncontrolled supraventricular arrhythmia, symptomatic ventricular arrhythmias, ventricular tachycardia), symptomatic bradycardia or severe stenotic valvular lesions. It is recommended that these conditions be evaluated and managed per ACC/AHA guidelines prior to considering elective surgery. That evaluation may include MPI.

#### Low-risk surgery** (endoscopic procedures, superficial procedures, cataract surgery, breast surgery, ambulatory surgery)
- Provided that there are no active cardiac conditions (as outlined above), MPI prior to low-risk surgery is considered not medically necessary

#### Intermediate risk surgery** (intraperitoneal and intrathoracic surgery, carotid endarterectomy, head and neck surgery, orthopedic surgery, prostate surgery, gastric bypass surgery) or **High-risk surgery** (aortic and other major vascular surgery, peripheral vascular surgery)
- In patients who are unable to walk on a treadmill  
  *And*  
- The patient has at least one of the following clinical risk factors:  
  - CAD including history of MI or Q waves on EKG, revascularization or angina  
  *Or*  
  - Compensated heart failure or prior history of heart failure (CHF)  
  *Or*  

---

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COMMON DIAGNOSTIC INDICATIONS FOR MYOCARDIAL PERFUSION IMAGING:

- Diabetes mellitus
- Chronic renal insufficiency or renal failure
- History of cerebrovascular disease (TIA, CVA or documented carotid stenosis requiring carotid endarterectomy)

UNABLE TO WALK ON A TREADMILL FOR REASONS OTHER THAN OBESITY

- Including but not limited to orthopedic impairment, claudication, neurological conditions, advanced lung disease etc.
- In these situations patients may not achieve an adequate exercise level to yield clinically useful information.
- Pharmacological stress testing should be performed and therefore echo or nuclear imaging is appropriate.

REFERENCE/LITERATURE REVIEW:

REFERENCE/LITERATURE REVIEW:

Nuclear Cardiology
Cardiac Blood Pool Imaging
Blood Pool Imaging includes MUGA (Multi-Gated Acquisition) & First Pass
Radionuclide Ventriculography

CPT CODES:

<table>
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<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>78472</td>
<td>Gated equilibrium; planar, single study, wall motion plus ejection fraction</td>
</tr>
<tr>
<td>78473</td>
<td>Gated equilibrium; planar, multiple studies, wall motion study plus ejection fraction</td>
</tr>
<tr>
<td>78481</td>
<td>First pass technique; single study, wall motion study plus ejection fraction</td>
</tr>
<tr>
<td>78483</td>
<td>First pass technique; multiple studies, wall motion study plus ejection fraction</td>
</tr>
<tr>
<td>78494</td>
<td>Gated equilibrium: SPECT, at rest, wall motion study plus ejection fraction</td>
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<tr>
<td>78496</td>
<td>This code is an add-on code to be used in conjunction with 78472. As such, this code does not require separate review</td>
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</table>

COMMONLY USED RADIOPHARMACEUTICALS:

- Technetium-99m

IMAGING CONSIDERATIONS:

- This guideline does not supersede the enrollee’s health plan medical policy specific to cardiac blood pool imaging.
- Primarily used to evaluate global and regional ventricular function and to determine ejection fraction(s)
- May be used in the evaluation of intracardiac shunting or diastolic function
- First-pass studies display initial transit of the radiotracer bolus passing through the cardiopulmonary and central systemic circulations. Right and/or left ventricular function may be evaluated.
- Equilibrium studies display gated data (MUGA) which is acquired over many cardiac cycles, using a blood pool radiotracer. Both right and left ventricles may be evaluated.
- First pass studies should be acquired on a high count-rate camera in order that images have sufficient temporal resolution. High count-rate cameras are not required for MUGA.
- Studies may be performed at rest and/or during exercise.
- MUGA studies are technically more difficult in patients with irregular heart rhythms. Imaging times may have to be prolonged to acquire adequate data.
- Some disease states and medications interfere with red blood cell labeling. These should be taken into account when selecting the optimal imaging modality.
- Selection of the optimal diagnostic imaging for cardiac evaluation should be made within the context of other available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac MRI, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
### COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC BLOOD POOL IMAGING:

The following diagnostic indications for Cardiac Blood Pool Imaging are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

## EVALUATION OF LEFT VENTRICULAR FUNCTION

Note: It is assumed that left ventricular function will be evaluated using a single imaging modality. Thus, if left ventricular function has been evaluated recently by echocardiography reevaluation using blood pool imaging is not necessary except in the situations outlined below:

- Initial evaluation of known or suspected heart failure (systolic or diastolic)
- Evaluation of patients with resting EKG abnormalities (LBBB, RBBB with left anterior or posterior hemiblock, RVH, Q waves suggestive of prior infarction)
- Reevaluation of patients with known heart failure (systolic or diastolic) in a patient with the change in clinical status
- Reevaluation of asymptomatic, clinically stable patients with left ventricular systolic dysfunction (Left Ventricular ejection fraction <55%) at yearly intervals.
- Baseline and serial reevaluation in patients undergoing, planning to undergo or who have undergone therapy with cardiotoxic agents (examples including but not limited to some chemotherapeutic agents for cancer, novantrone {mitoxantrone} for multiple sclerosis)
- Screening study for left ventricular dysfunction every two (2) years in clinically stable and first-degree relatives of patients with inherited cardiomyopathy
- Evaluation of suspected restrictive, infiltrative or genetic cardiomyopathy
- Evaluation on patients with diagnosed or suspected myocarditis
- Evaluation for dyssynchrony in a patient being considered for cardiac resynchronization therapy (CRT)
- Evaluation of a patient being treated with cardiac resynchronization therapy (CRT) with persistent or new symptoms with a view to device optimization
- Evaluation of patients being considered for implantation of AICD
- When left ventricular dysfunction is suggested by other testing (chest x-ray, elevated BNP, abnormal baseline scout imaging for stress echocardiography).
  - If left ventricular function has been evaluated using another modality, MUGA/First Pass is not necessary in this situation.
- Where a significant discrepancy (more than would be expected for the range of error of the methods) exists in the evaluation of left ventricular dysfunction by two other imaging modalities, MUGA/First Pass can be used as an arbiter

## EVALUATION OF RIGHT VENTRICULAR FUNCTION

- In patients suspected of having right ventricular dysfunction based on history and/or physical examination
- Reevaluation of patients with established right ventricular dysfunction in patients with a change in clinical status
### COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC BLOOD POOL IMAGING:

- Evaluation of right ventricular function in patients with pulmonary hypertension
  
  Or

- Evaluation of right ventricular function in patients with diagnoses known to cause right ventricular dysfunction including but not limited to coronary artery disease, valvular heart disease, left ventricular dysfunction, congenital heart disease, morbid obesity, sleep apnea syndrome, advanced lung disease, pulmonary thromboembolic disease, and right ventricular dysplasia
  
  Or

- Evaluation of right ventricular function in patients with myocardial infarction where right ventricular involvement is suspected
  
  Or

- Evaluation of right ventricular function in patients who are being evaluated for or have undergone cardiac or lung transplantation

### CORONARY ARTERY DISEASE (CAD) (APPLIES TO PATIENTS WITH ESTABLISHED CORONARY ARTERY DISEASE)

- Recent myocardial infarction (< 3 weeks) for initial assessment of LV function
  
  - This study is usually done prior to discharge
  
  - Not required if left ventricular function has been assessed using another imaging modality
  
  Or

- Prior myocardial infarction for reevaluation of ventricular function during recovery phase (up to six (6) months following myocardial infarction)
  
  Or

- Prior myocardial infarction for reevaluation of ventricular function after the recovery phase (more than six (6) months) in patients who develop new symptoms or signs suggestive of heart failure
  
  Or

- Prior myocardial infarction for reevaluation of LV function in patients being considered for AICD or cardiac resynchronization therapy (CRT)
  
  Or

- Patients who have undergone revascularization may reasonably undergo blood pool imaging for evaluation of post revascularization left ventricular function even if clinically stable.
  
  - Limited to one study within 12 months of revascularization (usually performed between 3 and 12 months following a revascularization procedure)

### CONGENITAL HEART DISEASE

- For detection and localization of shunts (Ventricular Septal Defect (VSD), Atrial Septal Defect (ASD), Patent Ductus Arteriosus (PDA), Anomalous Pulmonary Venous Drainage)
  
  - Echocardiography is generally considered to be a preferable imaging modality in this clinical situation

- For evaluation of RV and/or LV function in a patient with established complex congenital heart disease

### VALVULAR HEART DISEASE

- Established valvular heart disease in patients with new or worsening signs or symptoms
  
  - In patients with suspected valvular heart disease echocardiography is the appropriate initial imaging modality
  
  Or

- Patients with severe asymptomatic aortic regurgitation to assist in optimal timing of aortic valve replacement
  
  - Rest and stress studies are appropriate in this clinical situation

### REFERENCE/LITERATURE REVIEW:


REFERENCE/LITERATURE REVIEW:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006;13:415-26</td>
<td></td>
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<tr>
<td>5. Williams KA. Measurement of Ventricular Function with Scintigraphic</td>
<td>Techniques: Part 1 - Imaging Hardware, Radiopharmaceuticals, and</td>
</tr>
<tr>
<td>7. Vallejo E et al. Assessment of Left Ventricular Ejection Fraction with</td>
<td>Quantitative Gated SPECT: Accuracy and Correlation with First Pass</td>
</tr>
<tr>
<td>Cardiol 2003;10:424-28</td>
<td></td>
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Nuclear Cardiology
Infarct Imaging

CPT CODES:

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<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>78466</td>
<td>Planar, infarct avid; qualitative or quantitative</td>
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<tr>
<td>78468</td>
<td>Planar, infarct avid; with ejection fraction by first pass technique</td>
</tr>
<tr>
<td>78469</td>
<td>SPECT, infarct avid; with or without quantification</td>
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</tbody>
</table>

RADIOPHARMACEUTICALS:

- Technetium-99m Pyrophosphate

IMAGING CONSIDERATIONS:

- This guideline does not supersede the enrollee’s health plan medical policy specific to infarct imaging.
- Infarct imaging is typically optimal at 48-72 hours post-event.
- False positive findings have been attributed to the following conditions:
  - Amyloidosis
  - Cardiac valvular and pericardial calcification
  - Cardiomyopathy
  - Doxorubicin (Adriamycin) Treatment
  - Myocarditis and Pericarditis
  - Prior myocardial infarction, that remains persistently positive
  - Radiation Therapy
  - Ventricular aneurysm

Selection of the optimal diagnostic imaging for cardiac evaluation should be made within the context of other available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac MRI, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.

- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR INFARCT IMAGING:

The following diagnostic indications for Infarct Imaging are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

SUSPECTED ACUTE MYOCARDIAL INFARCTION, WHICH LIKELY OCCURRED WITHIN THE LAST 7 DAYS

- Including interrogation of the following:
  - Negative (past expected peak) cardiac enzymes
  - Abnormal baseline ECG, due to prior myocardial infarction
  - Left bundle branch block

DIFFERENTIATION OF SUBENDOCARDIAL (NON-Q-WAVE) INFARCTION VERSUS ISCHEMIA

POST-CARDIOVERSION

FOLLOWING SIGNIFICANT CHEST TRAUMA OR MAJOR SURGICAL PROCEDURE, WITH CHEST PAIN
<table>
<thead>
<tr>
<th>Reference/Literature Review</th>
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CPT CODES:

93350..................Echocardiography, transthoracic during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report;

93351..................Echocardiography, transthoracic during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report; including performance of continuous electrocardiographic monitoring with physician supervision

93320.................This code is an add-on code to be used in conjunction with 93350, 93351. As such, this code does not require separate review

93321.................This code is an add-on code to be used in conjunction with 93350, 93351. As such, this code does not require separate review

93325.................This code is an add-on code to be used in conjunction with 93350, 93351. As such, this code does not require separate review

93352.................This code is an add-on code to be used in conjunction with 93350, 93351. As such, this code does not require separate review

USES OF STRESS ECHOCARDIOGRAPHY (SE):

- The primary use of SE is in the diagnosis or exclusion of obstructive Coronary Artery Disease (CAD).
- SE is also used for risk stratification with established coronary artery disease.
- SE may be used for assessment of myocardial viability in patients who have had myocardial infarction.
- SE is occasionally used in the evaluation of valvular heart disease, and for the detection and management of occult pulmonary hypertension.

IMAGING CONSIDERATIONS:

- This guideline does not supersede the enrollee’s health plan medical policy specific to stress echocardiography.
- A recent EKG is strongly recommended, preferably within 7 days of request for Stress Echocardiogram. The findings on the resting EKG may help to determine the need for imaging and may also show evidence of ischemia at rest or interval myocardial infarction.
- Unlike MPI, stress echocardiography does not expose the patient to ionizing radiation
- Age, gender and the character of the chest pain provide useful predictors of CAD, as stratified in Table 1 below.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

Table 1*: Pre-Test Probability of Coronary Artery Disease by Age, Gender and Symptoms:

| Very Low < 5% | Intermediate probability 10-90% |
| Low Probability < 10% | High Probability > 90% |

### IMAGING CONSIDERATIONS:

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Gender</th>
<th>Typical/Definite Angina Pectoris</th>
<th>Atypical/Probable Angina Pectoris</th>
<th>Non-Anginal Chest Pain</th>
<th>Asymptomatic</th>
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</thead>
<tbody>
<tr>
<td>30-39</td>
<td>Men</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>40-49</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>50-59</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
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<td>Low</td>
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<tr>
<td></td>
<td>Women</td>
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<td>Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>60-69</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
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<td>Low</td>
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<tr>
<td></td>
<td>Women</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
</tbody>
</table>

- Stress Echocardiography and Myocardial Perfusion Imaging (MPI) may provide useful information on Coronary Heart Disease. Comparison data on Sensitivity and Specificity is provided in Table 2 below. Due to regional variation in technical expertise and interpretive proficiency, clinicians should use the diagnostic imaging modality that has been proven most accurate in their practices.

#### Table 2**: Comparison of Non-Invasive Diagnostic Imaging


<table>
<thead>
<tr>
<th></th>
<th>Nuclear Imaging</th>
<th>Stress Echo</th>
<th>Nuclear Imaging</th>
<th>Stress Echo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitivity (%)</td>
<td>Sensitivity (%)</td>
<td>Specificity (%)</td>
<td>Specificity (%)</td>
</tr>
<tr>
<td>Exercise (7 studies)</td>
<td>83%</td>
<td>78%</td>
<td>83%</td>
<td>91%</td>
</tr>
<tr>
<td>Dobutamine (8 studies)</td>
<td>86%</td>
<td>80%</td>
<td>73%</td>
<td>86%</td>
</tr>
<tr>
<td>Adenosine (3 studies)</td>
<td>89%</td>
<td>63%</td>
<td>73%</td>
<td>86%</td>
</tr>
<tr>
<td>Dipyridamole (4 studies)</td>
<td>83%</td>
<td>68%</td>
<td>88%</td>
<td>89%</td>
</tr>
</tbody>
</table>

Several clinical indications listed for SE include standard methods of risk assessment such as the SCORE (Systematic Coronary Risk Evaluation). These risk calculation systems include consideration of the following factors:

- Age
- Sex
- Abnormal Lipid Profile
- Hypertension
- Diabetes Mellitus
- Cigarette Smoking

Other coronary risk factors such as family history of premature CAD, coronary artery calcification, C reactive protein levels, obesity etc. are not included in the standard methods of risk assessment but are thought to contribute to coronary artery disease risk.

- Selection of the optimal diagnostic work-up for evaluation or exclusion of coronary artery disease should be made within the context of available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- Occasionally it may be appropriate to do a second noninvasive test for diagnosis or exclusion of CAD when the initially selected test is technically suboptimal and the diagnosis of CAD cannot be established or excluded.
- SE may be performed using either physical or pharmacologic stress. If physical stress is used, the choice rests between treadmill exercise test and bicycle exercise test. While it is possible to acquire images during exercise in patients undergoing bicycle exercise testing, image quality during treadmill exercise is suboptimal. In this situation, the “stress” images are actually acquired immediately following peak exercise. Thus, the laboratory must be set up in a manner that allows imaging to be completed within 45 to 60 seconds after peak exercise.
- Some patients may not be suitable candidates for SE. Image quality is frequently suboptimal in morbidly obese patients and in those with advanced lung disease. If image quality at rest is inadequate, the test should be canceled and
**COMMON DIAGNOSTIC INDICATIONS FOR STRESS ECHOCARDIOGRAPHY (SE):**

The following diagnostic indications for stress echocardiography may be accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

**IMAGING CONSIDERATIONS:**
- Consideration given to an alternative imaging modality.
- For patients who are unable to walk on a treadmill for non cardiac reasons (orthopedic limitations, claudication, neurological conditions, advanced lung disease, etc) exercise stress testing is not an option. These patients will require pharmacological testing with echo or nuclear imaging.
- It is anticipated that the evaluation of patients with acute chest pain will occur in the emergency room or in an inpatient setting and stress echo performed in these locations is not included in the AIM preauthorization program.

**COMMON DIAGNOSTIC INDICATIONS FOR STRESS ECHOCARDIOGRAPHY (SE):**

**SUSPECTED CORONARY ARTERY DISEASE IN ASYMPTOMATIC PATIENTS**
- Patients with high-risk of CAD (SCORE) who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding three (3) years
  - Or
- Patients with moderate or high risk of CAD (SCORE) who have a high risk occupation that would endanger others in the event of a myocardial infarction (for example: airline pilot, law-enforcement officer, firefighter, mass transit operator, bus driver) who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding two (2) years
  - Or
- Patients with diseases/conditions with which coronary artery disease commonly coexists and who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding two (2) years:
  - Diabetes mellitus
  - Abdominal aortic aneurysm
  - Established and symptomatic peripheral vascular disease
  - Prior history of cerebrovascular accident (CVA), transient ischemic attack (TIA) or carotid endarterectomy (CEA) or high grade carotid stenosis (>70%)
  - Or
  - Chronic renal insufficiency
- Patients who have undergone cardiac transplantation and have had no evaluation for coronary artery disease within the preceding one (1) year

**SUSPECTED CORONARY ARTERY DISEASE IN SYMPTOMATIC PATIENTS** who have not had evaluation of coronary artery disease (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding sixty (60) days:
- Chest pain
  - With intermediate or high pretest probability of CAD (Table 1)
  - Or
  - Atypical symptoms: syncope, shortness of breath (dyspnea), neck, jaw, arm, epigastric or back pain, sweating (diaphoresis).
    - With moderate or high risk of CAD (SCORE)
- Other symptoms; palpitation, dizziness, lightheadedness, near syncope, nausea, vomiting, anxiety, weakness, fatigue etc
  - With high risk of CAD (SCORE)
- Patients with any cardiac symptom who have diseases/conditions with which coronary artery disease commonly coexists such as:
  - Diabetes mellitus
### COMMON DIAGNOSTIC INDICATIONS FOR STRESS ECHOCARDIOGRAPHY (SE):

- Abdominal aortic aneurysm
- Established and symptomatic peripheral vascular disease
- Prior history of cerebrovascular accident (CVA), transient ischemic attack (TIA) or carotid endarterectomy (CEA) or high grade carotid stenosis (>70%)
- Chronic renal insufficiency or renal failure
- Patients who have undergone cardiac transplantation

### ESTABLISHED CORONARY ARTERY DISEASE (DIAGNOSED BY PREVIOUS CARDIAC CATHETERIZATION, MPI, OR STRESS ECHO) IN PATIENTS WHO HAVE NO SYMPTOMS OR STABLE SYMPTOMS)

- No evaluation of CAD (MPI, stress echo, coronary CTA or cardiac catheterization) within the preceding two (2) years

### ESTABLISHED CORONARY ARTERY DISEASE (DIAGNOSED BY PREVIOUS CARDIAC CATHETERIZATION, MPI, OR STRESS ECHO) IN PATIENTS WHO HAVE NEW OR WORSENING SYMPTOMS

**Note:** If symptoms are typical of myocardial ischemia cardiac catheterization may be more appropriate than MPI

### PATIENTS WITH NEW ONSET ARRHYTHMIAS (PATIENT CAN BE SYMPTOMATIC OR ASYMPTOMATIC)

- Patients with ventricular tachycardia
- Patients with atrial fibrillation or flutter and high or moderate risk of CAD (SCORE)
- Patients with atrial fibrillation or flutter and established CAD

### PATIENTS WITH NEW ONSET CONGESTIVE HEART FAILURE OR RECENTLY RECOGNIZED LEFT VENTRICULAR SYSTOLIC DYSFUNCTION (PATIENT CAN BE SYMPTOMATIC OR ASYMPTOMATIC)

- This guideline applies to patients with suspected or established CAD
- Provided that CAD has not been excluded as the cause of LV dysfunction/ CHF by any of the following tests: MPI, stress echo, coronary CTA or cardiac catheterization

### PATIENTS WITH ABNORMAL EXERCISE TREADMILL TEST (PERFORMED WITHOUT IMAGING)

- This guideline applies to patients with suspected or established CAD
- Abnormal findings on an exercise treadmill test include (chest pain, ST segment change, abnormal BP response or complex ventricular arrhythmias)

### PATIENTS WHO HAVE UNDERGONE RECENT (WITHIN THE PAST 60 DAYS) MYOCARDIAL PERFUSION IMAGING (MPI)

- When the MPI is technically suboptimal, technically limited, inconclusive, indeterminate, or equivocal, such that myocardial ischemia cannot be adequately excluded.
  - It is not appropriate to perform SE on patients who have had a recent normal or abnormal MPI
  - An MPI is deemed to be abnormal when there are abnormalities on the nuclear imaging portion of the test. Electrocardiographic abnormalities without evidence of ischemia on the nuclear imaging portion of the test are considered to be normal studies.

### PATIENTS WITH ABNORMAL FINDINGS ON CARDIAC CT / CORONARY CTA

**Symptomatic Patients:**
- With coronary artery calcium score > 400 Agatston units
- Intermediate severity coronary stenosis on coronary CTA

**Note:** If symptoms are typical of myocardial ischemia cardiac catheterization may be more appropriate than Stress Echo
COMMON DIAGNOSTIC INDICATIONS FOR STRESS ECHOCARDIOGRAPHY (SE):

**Myocardial Viability Evaluation**

Stress Echo may be used to evaluate myocardial viability in patients who

- Have established coronary artery disease
- Have left ventricular systolic dysfunction
- Are candidates for revascularization
- Do not have evidence of viability using other imaging modalities (for example: MPI, MRI, PET)

Note: Pharmacologic stress echocardiography with a drug such as dobutamine that increases myocardial contractility is the preferred form

PREOPERATIVE CARDIAC EVALUATION OF PATIENTS UNDERGOING NON-CARDIAC SURGERY

- This guideline applies to patients undergoing non-emergency surgery.
- It is assumed that those who require emergency surgery will undergo inpatient preoperative evaluation.

- Patients with **active cardiac conditions** such as unstable coronary syndromes (unstable angina), decompensated heart failure (NYHA function of class IV, worsening or new onset heart failure), significant arrhythmias (third degree AV block Mobitz II AV block, uncontrolled supraventricular arrhythmia, symptomatic ventricular arrhythmias, ventricular tachycardia), symptomatic bradycardia or severe stenotic valvular lesions. It is recommended that these conditions be evaluated and managed per ACC/AHA guidelines prior to considering elective surgery. That evaluation may include MPI.

**Low-risk surgery** (endoscopic procedures, superficial procedures, cataract surgery, breast surgery, ambulatory surgery)

- Provided that there are no active cardiac conditions (as outlined above) MPI prior to low-risk surgery is considered not medically necessary

**Intermediate risk surgery** (intraperitoneal and intrathoracic surgery, carotid endarterectomy, head and neck surgery, orthopedic surgery, prostate surgery, gastric bypass surgery) or **High-risk surgery** (aortic and other major vascular surgery, peripheral vascular surgery)

- In patients who are unable to walk on a treadmill
- The patient has at least one of the following clinical risk factors
  - CAD including history of MI or Q waves on EKG, revascularization or angina
  - Compensated heart failure or prior history of heart failure (CHF)
  - Diabetes mellitus
  - Chronic renal insufficiency or renal failure
  - History of cerebrovascular disease (TIA, CVA or documented carotid stenosis requiring carotid endarterectomy)

PATIENTS WITH ABNORMAL FINDINGS ON CARDIAC CATHETERIZATION

- To determine flow limiting significance of intermediate coronary stenosis
### COMMON DIAGNOSTIC INDICATIONS FOR STRESS ECHOCARDIOGRAPHY (SE):

#### VALVULAR HEART DISEASE
- **Mitral Valve Disease**
  - Patients who have symptoms out of proportion to the degree of mitral regurgitation documented on resting echocardiography
  - For timing of valve replacement or repair in patients with 3+ mitral regurgitation (or more) who are asymptomatic and do not meet other criteria for surgical intervention
  - For patients with apparently mild mitral stenosis on TTE whose symptoms suggest a higher degree of stenosis
- **Aortic Valve Disease**
  - Patients who have apparently severe aortic stenosis and left ventricular systolic dysfunction in whom calculation of the degree of stenosis may be affected by the low flow state
  - For timing of surgery in asymptomatic severe aortic regurgitation when LV size and function are normal

#### PULMONARY HYPERTENSION
- For evaluation or exclusion of exercise induced pulmonary hypertension
- For evaluation of right and/or left ventricular function during exercise in patients with established pulmonary hypertension

#### HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY
- For the evaluation of dynamic changes during exercise in patients with an established diagnosis of Hypertrophic Obstructive Cardiomyopathy

#### ABNORMAL EKG FINDINGS
Some patients have resting EKG findings which would render the interpretation of an exercise EKG test difficult or impossible. In these situations patients who, in the absence of the EKG abnormality, would not meet approval criteria for MPI, may be approved for MPI because exercise EKG testing without imaging would provide little clinically useful data. Patients with the following resting EKG abnormalities are included in this category:
- Left bundle branch block
  - Or
- Ventricular paced rhythm
  - Or
- Left ventricular hypertrophy with repolarization abnormality
  - Or
- Digoxin effect
  - Or
- 1 mm ST depression or more on a recent EKG (within the past 30 days)
  - Or
- Pre-excitation syndromes (E.G. WPW syndrome)

#### UNABLE TO WALK ON A TREADMILL FOR REASONS OTHER THAN OBESITY
- Including but not limited to orthopedic impairment, claudication, neurological conditions, advanced lung disease etc.
- In these situations patients may not achieve an adequate exercise level to yield clinically useful information
- Pharmacological stress testing should be performed and therefore echo or nuclear imaging is appropriate.
REFERENCE/LITERATURE REVIEW:

Transesophageal Echocardiography (TEE)

CPT CODES:

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<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>93312</td>
<td>TEE real-time with image documentation (2-D) (with or without M-mode recording)</td>
</tr>
<tr>
<td>93313</td>
<td>Placement of transesophageal probe only</td>
</tr>
<tr>
<td>93314</td>
<td>Image acquisition, interpretation and report only</td>
</tr>
<tr>
<td>93315</td>
<td>TEE for congenital cardiac anomalies</td>
</tr>
<tr>
<td>93316</td>
<td>Placement of transesophageal probe only</td>
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<tr>
<td>93317</td>
<td>Image acquisition, interpretation and report only</td>
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<td>This code is an add-on code to be used in conjunction with 93312, 93314, 93315, 93317. As such, this code does not require separate review</td>
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STANDARD ANATOMIC COVERAGE:
- Heart, proximal great vessels, pericardium

IMAGING CONSIDERATIONS:
- In general, it is assumed that TEE is appropriately used as an adjunct or subsequent test to transthoracic echocardiography (TTE) when suboptimal TTE images preclude obtaining a diagnostic study.
- This guideline does not supersede the enrollee’s health plan medical policy specific to transesophageal echocardiography
- There are some clinical situations for which TEE is a more appropriate initial imaging test than TTE. These situations are outlined below under Common Diagnostic Indications for TEE.
- Since TEE requires conscious sedation, it should only be performed at locations where cardiac monitoring and appropriate equipment for cardiopulmonary resuscitation are readily available.
- Patients with oropharyngeal or esophageal pathology which contraindicates intubation of the esophagus are not suitable candidates for TEE.
- Intraoperative TEE (93318) is beyond the scope of AIMs diagnostic imaging management program and will not be addressed in this document.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR TEE:

The following diagnostic indications for TEE are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

IN PATIENTS WHO HAVE, OR ARE LIKELY TO HAVE SUBOPTIMAL TRANSTHORACIC IMAGING
- When image quality is suboptimal such that the clinical question(s) prompting the TEE has/have not been adequately answered
  - Or
- When it is likely that transthoracic imaging will be suboptimal in the following situations:
COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:

- Previous transthoracic echocardiograms were of suboptimal quality
- In patients with severe abnormalities of thoracic contour (Pectus deformities, severe kyphoscoliosis)
- In patients who have recently had thoracic surgery where postoperative tenderness or the location of dressings or incisions would preclude imaging from the usual transthoracic locations
- Following severe chest trauma
- Following extensive burns to the thorax

IN PATIENTS WHOSE CLINICAL SITUATION SUGGESTS THAT TEE MAY BE PREFERABLE TO TRANSTHORACIC ECHOCARDIOGRAPHY AS AN INITIAL IMAGING TEST

- In evaluation of suspected acute aortic pathology
- To determine mechanism of valvular regurgitation and suitability for valve repair
  
  Or

- To diagnose/manage endocarditis with a moderate or high pretest probability (e.g. bacteremia, especially staph bacteremia or fungemia)
  
  Or

- To diagnose/manage endocarditis involving prosthetic heart valves
  
  Or

- In evaluation of persistent fever in a patient with an intracardiac device
  
  Or

- In evaluation of a patient with atrial fibrillation/flutter to facilitate clinical decision-making with regards to anticoagulation and/or cardioversion and/or radiofrequency ablation
  
  Or

- In evaluation of a patient who has undergone surgical correction of complex congenital heart disease for the exclusion of intracardiac thrombus

IN PATIENTS WHO HAVE UNDERGONE TECHNICALLY ADEQUATE TRANSTHORACIC ECHOCARDIOGRAPHY (TTE)

- In evaluation for cardiovascular source of embolic event in patients who have no history of atrial fibrillation or atrial flutter with normal EKG and normal TTE

REFERENCE/LITERATURE REVIEW:

**CPT CODES:**

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<tr>
<th>Code</th>
<th>Description</th>
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<td>93303</td>
<td>Transthoracic echocardiography or congenital cardiac anomalies; complete</td>
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<tr>
<td>93304</td>
<td>Transthoracic echocardiography or congenital cardiac anomalies; follow-up or</td>
</tr>
<tr>
<td>93306</td>
<td>Transthoracic echocardiography, transthoracic, real-time with image</td>
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<tr>
<td></td>
<td>documentation (2D), includes M-mode recording, when performed, complete,</td>
</tr>
<tr>
<td></td>
<td>with spectral Doppler echocardiography, and with color flow Doppler</td>
</tr>
<tr>
<td></td>
<td>echocardiography</td>
</tr>
<tr>
<td>93307</td>
<td>Transthoracic echocardiography; complete, without spectral Doppler</td>
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<tr>
<td></td>
<td>echocardiography, or color flow Doppler echocardiography.</td>
</tr>
<tr>
<td>93308</td>
<td>Transthoracic echocardiography; complete, without spectral Doppler</td>
</tr>
<tr>
<td></td>
<td>echocardiography, or color flow Doppler echocardiography follow-up or</td>
</tr>
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<td>limited study</td>
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</tr>
</tbody>
</table>

**STANDARD ANATOMIC COVERAGE:**

- Heart, proximal great vessels, pericardium

**IMAGING CONSIDERATIONS:**

**Advantages of transthoracic echocardiography:**
- No risk to the patient
- Minimal patient discomfort
- Widely available
- Extremely portable
- No exposure to ionizing radiation

**Disadvantages of transthoracic echocardiography:**
- Image quality suboptimal in some patients
- Less sensitive than transesophageal echocardiography in some clinical situations

**Ordering Issues:**
- This guideline does not supersede the enrollee’s health plan medical policy specific to transthoracic echocardiography
- Transthoracic echocardiography should only be acquired on equipment which has the capability to perform Doppler echocardiography (pulsed-wave and continuous wave with spectral display) and color flow velocity mapping.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
**COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:**

The following diagnostic indications for Transthoracic Echocardiography are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

### Valvular Heart Disease

| SUSPECTED VALVULAR HEART DISEASE | ESTABLISHED MITRAL OR TRICUSPID REGURGITATION
|---------------------------------|---------------------------------|
| • Evaluation of cardiac murmurs when the diagnosis of valvular heart disease has not been established. | • Changing signs or symptoms
|   – After the diagnosis of valvular heart disease has been established, follow the guidelines for the specific valvular lesion (eg, established aortic stenosis) | Or
| • Initial evaluation for mitral valve prolapse when signs or symptoms of mitral valve prolapse are present | Or
| • Initial evaluation for bicuspid aortic valve when there is a family history (established diagnosis in a first-degree relative) | Or

### ESTABLISHED AORTIC STENOSIS OR PULMONIC STENOSIS

| And | ESTABLISHED AORTIC OR PULMONIC REGURGITATION
|---------------------------------|---------------------------------|
| • Changing symptoms or signs | • Changing symptoms or signs
| Or | Or
| • Reevaluation of asymptomatic patients with **severe** stenosis annually | • Reevaluation of asymptomatic patients with **severe** regurgitation annually
| Or | Or
| • Reevaluation of asymptomatic patients with **moderate** stenosis every two (2) years | • Reevaluation of asymptomatic patients with mild or moderate regurgitation and ventricular dilation or dysfunction annually
| Or | Or
| • Assessment of changes in hemodynamic severity and left ventricular function in patients with known aortic stenosis during pregnancy | • Annual assessment of children age six (6) years or younger with pulmonic stenosis of any degree
| Or | Or
| • Annual assessment of children age six (6) years or younger with pulmonic stenosis of any degree | Or

### ESTABLISHED BICUSPID AORTIC VALVE

| And | ESTABLISHED MITRAL OR TRICUSPID STENOSIS
|---------------------------------|---------------------------------|
| • Changing signs or symptoms suggesting the development of aortic valve dysfunction | • Changing signs or symptoms
| Or | Or
| • Dilated aortic root (annual echocardiography is indicated) | • Reevaluation of asymptomatic patients with severe stenosis annually
| Or | Or
| • Reevaluation at three (3) yearly intervals to evaluate for aortic dilation | • Annual reevaluation of children age six (6) years or less with established mitral stenosis of any degree

### ESTABLISHED MITRAL OR TRICUSPID STENOSIS

| And | ESTABLISHED MITRAL OR TRICUSPID REGURGITATION
|---------------------------------|---------------------------------|
| • Changing signs or symptoms | • Changing signs or symptoms
| Or | Or
| • Reevaluation of asymptomatic patients with severe stenosis annually | Or
| Or | Or
| • Annual reevaluation of children age six (6) years or less with established mitral stenosis of any degree | Or

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# COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:

- Reevaluation in asymptomatic patients with **moderate or severe** regurgitation annually

## ESTABLISHED MITRAL VALVE PROLAPSE

- Changing signs or symptoms

## PROSTHETIC CARDIAC VALVES (MECHANICAL OR BIOPROSTHETIC) AND PATIENTS WHO HAVE UNDERGONE VALVE REPAIR

- Initial postoperative evaluation of valve function (baseline study)
- Annual reevaluation, of asymptomatic adults (age 19 years or older) who have undergone implantation of a bioprosthetic valve five (5) or more years ago and whose clinical examination reveals no new or worsening findings suggesting dysfunction of the prosthetic valve
- Annual reevaluation of asymptomatic non adult patients (less than or equal to 18 years old) whose clinical examination reveals no new or worsening findings suggesting dysfunction of the repaired or replaced valve
- Signs and/or symptoms suggesting dysfunction of a repaired or replaced valve

## EVALUATION OF PATIENTS WITH CONGENITAL HEART DISEASE

- Evaluation of patients in whom congenital heart disease is suspected based on signs and symptoms (including murmur, cyanosis, unexplained arterial desaturation, abnormal arterial pulses) abnormal EKG, abnormal chest x-ray
- Patients with chromosomal abnormalities or major extra cardiac abnormality associated with a high incidence of coexisting cardiac abnormality
- Patients with established congenital heart disease (repaired or unrepaired) in whom there is a change in clinical status
- Adult patients with a childhood history of congenital heart disease (with or without prior surgical repair) in whom the original diagnosis is uncertain or when the precise nature of the structural abnormalities or hemodynamics is unclear
- Bi-annual (every 2 years) echocardiography is appropriate in clinically stable patients age six (6) years or older with established complex congenital heart disease (with or without prior surgical repair) in whom surveillance for ventricular function, AV valvular regurgitation or pulmonary artery pressure is important in clinical decision-making.
  - This does not include patients with successfully repaired patent ductus arteriosus, small atrial or ventricular septal defects, bicuspid aortic valve or mitral valve prolapse
- Semiannual (every six months) echocardiography is appropriate in clinically stable patients age five (5) years or younger with established congenital heart disease (with or without prior surgical repair) in whom surveillance for ventricular function, AV valvular regurgitation or pulmonary artery pressure is important in clinical decision-making.
- Initial outpatient postoperative evaluation of patients who have undergone surgical or catheter-based procedures to correct congenital heart disease (within 60 days of the procedure).
- TTE is appropriate every three (3) years in the follow up of patients who have undergone catheter based closure of atrial or ventricular septal defects
- Non adult patients (less than or equal to 18 years old) who are undergoing staged surgical correction of congenital heart disease.
**COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:**

- Patients in whom a decision to perform surgical or catheter based repair of congenital heart disease has been made and in whom echocardiography will be used to assist with procedural planning.

**EVALUATION OF VENTRICULAR FUNCTION**

- Initial evaluation of hypertensive patients with suspected hypertensive heart disease
  - Or
- Annual evaluation of non adult patients (less than or equal to 18 years old) with an established diagnosis of hypertension
  - Or
- Initial evaluation of known or suspected heart failure (systolic or diastolic)
  - Or
- Evaluation of patients with resting EKG abnormalities (LBBB, RBBB with left anterior or posterior hemiblock, LVH, RVH, Q waves suggestive of prior infarction)
  - Or
- Reevaluation of asymptomatic and/or clinically stable patients with left ventricular systolic dysfunction (Left Ventricular ejection fraction <55%) at yearly intervals
  - Or
- Reevaluation of patients with known heart failure (systolic or diastolic) in a patient with the change in clinical status
  - Or
- Baseline and serial reevaluation in patients undergoing, planning to undergo or who have undergone therapy with cardiotoxic agents (examples including but not limited to some chemotherapeutic agents for cancer, novantrone (mitoxantrone) for multiple sclerosis
  - Or
- Screening study for left ventricular dysfunction every two (2) years in clinically stable first-degree relatives of patients with inherited cardiomyopathy
  - Or
- Evaluation of suspected restrictive or infiltrative cardiomyopathy
  - Or
- Initial evaluation of known or suspected hypertrophic obstructive cardiomyopathy (HOCM)
  - Or
- Reevaluation of known hypertrophic obstructive cardiomyopathy (HOCM) in a patient with a change in clinical status to guide or evaluate therapy
  - Or
- Annual reevaluation of asymptomatic patients with known hypertrophic obstructive cardiomyopathy (HOCM)
  - Or
- Evaluation for dyssynchrony in a patient being considered for cardiac resynchronization therapy (CRT)
  - Or
- Evaluation of a patient being treated with cardiac resynchronization therapy (CRT) with persistent or new symptoms with a view to device optimization
  - Or
- When left ventricular dysfunction is suggested by other testing (chest x-ray, elevated BNP) and LV function has not been evaluated by another modality since that testing was performed
  - Or
- Where a significant discrepancy (more than would be expected for the range of error of the methods) exists in the evaluation of left ventricular dysfunction by two other imaging modalities, echocardiography can be used as an arbiter
  - Or
- Pre and post cardiac transplant evaluation
  - Or
- Evaluation of known or suspected myocarditis
  - Or
### COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:

- Echocardiography to evaluate right ventricular function in patients with disease likely to affect right ventricular function including but not limited to chronic lung diseases and sleep apnea syndrome

### EVALUATION OF PATIENTS WITH CARDIAC ARRHYTHMIAS

- In patients who have sustained (lasting more than 30 seconds) or nonsustained (more than 3 beats but terminating within 30 seconds) ventricular tachycardia
- In patients who have sustained (lasting more than 30 seconds) or nonsustained (more than 3 beats but terminating within 30 seconds) supraventricular tachycardia (including but not limited to atrial fibrillation, atrial flutter, atrial tachycardia, AV node reentrant tachycardia etc)
  - It is not appropriate to perform echocardiography for evaluation of premature atrial or ventricular depolarizations

### EVALUATION OF INFECTIVE ENDOCARDITIS (NATIVE OR PROSTHETIC VALVES)

- Patients with suspected endocarditis (positive blood cultures and/or a new murmur on physical examination)
- Reevaluation of patients with established endocarditis who have any of the following
  - Virulent organism
    - Or
  - Severe hemodynamic lesion
    - Or
  - Aortic involvement
    - Or
  - Persistent bacteremia
    - Or
  - Clinical deterioration

### EVALUATION OF PATIENTS WITH KNOWN OR SUSPECTED CORONARY ARTERY DISEASE

- Patients with known coronary artery disease
  - And
- Recent (<3 weeks) myocardial infarction and hemodynamic instability or signs or symptoms suggesting a complication of myocardial infarction including but not limited to acute mitral regurgitation, hypoxemia, abnormal chest x-ray, acute ventricular septal rupture, free wall rupture/tamponade, shock, right ventricular involvement, heart failure, or thrombus
  - This study is usually requested on an inpatient
    - Or
- Recent myocardial infarction (<3 weeks) for initial assessment of LV function
  - This study is usually done prior to discharge
  - Not required if left ventricular function has been assessed using a different imaging modality
    - Or
- Prior myocardial infarction for reevaluation of ventricular function during recovery phase (up to six (6) months following myocardial infarction)
  - Or
- Prior myocardial infarction for reevaluation of ventricular function after the recovery phase (more than six (6) months) in patients who develop new symptoms or signs suggestive of heart failure
  - Or
- Prior myocardial infarction for reevaluation of LV function in patients being considered for AICD or cardiac resynchronization therapy (CRT)
  - Or
- Patients who have undergone revascularization may reasonably undergo echocardiography for evaluation of post revascularization left ventricular function even if clinically stable.
  - Limited to one study within 12 months of revascularization (usually performed between 3 and 12 months following a revascularization procedure)
  - Or
- Annual echocardiography is appropriate in non adult patients (less than or equal to 18 years old) with an established
COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:

- Diagnosis of, aberrant or anomalous coronary origins or coronary artery fistula if the findings on echocardiography will impact clinical decision making
  
  Or

- Echocardiography is appropriate in patients with an established diagnosis of Kawasaki disease at 6-8 weeks following diagnosis in patients who have had coronary artery involvement at the time of diagnosis. If this study shows no coronary artery abnormalities, no subsequent echocardiograms are necessary.

  Or

- Annual echocardiography is appropriate in patients with an established diagnosis of Kawasaki disease who have small or medium sized coronary artery aneurysms

  Or

- Semiannual (every six months) echocardiography is appropriate in patients with an established diagnosis of Kawasaki disease who have large or giant coronary artery aneurysms or coronary artery obstruction

- Patients with suspected coronary artery disease

  And

- Chest pain
  - Resting echocardiography may suggest a cause for the chest pain other than myocardial ischemia (mitral valve prolapse) and is therefore a reasonable imaging procedure in patients with chest pain
  - If coronary artery disease is a likely diagnosis and if a resting echocardiogram cannot be performed while the patient is experiencing the pain, a provocative test (exercise or pharmacological stress test with or without imaging as appropriate) is preferable
  - Resting echocardiography has no role in screening for coronary artery disease in asymptomatic patients

  Or

- Echocardiography is appropriate in the evaluation of patients with suspected aberrant or anomalous coronary origins or coronary artery fistula

  Or

- Echocardiography is appropriate in the evaluation of patients with suspected Kawasaki disease

EVALUATION OF SIGNS, SYMPTOMS OR ABNORMAL TESTING

- Echocardiography is appropriate in the evaluation of the following newly recognized symptoms (chest pain, dyspnea, lightheadedness, syncope, palpitations, reduced functional capacity, orthopnea, paroxysmal nocturnal dyspnea, transient ischemic attack (TIA) or cerebrovascular attack (CVA))

  Or

- Echocardiography is appropriate in the evaluation of the following newly recognized signs suggesting structural heart disease (murmur, cyanosis, ankle edema, ascites, elevation of jugular venous pressure, unexplained weight gain, tachycardia, tachypnea, audible third heart, lung crackles suggestive of pulmonary edema)

  Or

- Echocardiography is appropriate in the evaluation of patients who are hemodynamically unstable or hypotensive for unknown reasons

  Or

- Echocardiography is appropriate in further evaluation of abnormal results from other testing which suggests underlying cardiac disease (abnormal chest X ray suggesting cardiac chamber enlargement, valvular or congenital heart disease or congestive heart failure, abnormal EKG suggesting chamber hypertrophy, valvular or congenital heart disease (LBBB, RBBB with anterior or posterior hemiblock, left or right ventricular hypertrophy or Q waves suggestive of prior infarction) or abnormal laboratory results suggesting congestive heart failure such as elevated B-type natriuretic peptide (BNP)
  - When other cardiac testing raises concerns of underlying coronary artery disease, provocative testing is recommended over resting echocardiography

  Or

- Echocardiography is appropriate in the evaluation of respiratory failure of unknown cause

  Or
### COMMON DIAGNOSTIC INDICATIONS FOR TRANSTHORACIC ECHOCARDIOGRAPHY:

- Echocardiography is appropriate annually in the evaluation of patients with syndromes which place them at increased risk for the development of acquired myocardial or aortic diseases (for example, Marfan Syndrome, Ehlers-Danlos Syndrome, Turner Syndrome, etc).
- Echocardiography is appropriate in the evaluation of suspected acute rheumatic fever.

### EVALUATION OF PATIENTS WITH PULMONARY EMBOLUS

- In patients with known or suspected acute pulmonary embolus, echocardiography is useful in guiding initial decision making (thrombectomy, thrombolysis).
  - Echocardiography is not indicated in the initial evaluation of a patient with suspected pulmonary embolism in order to establish the diagnosis.
- In patients who have had a pulmonary embolus, echocardiography may be performed to evaluate right ventricular function. If right ventricular function is abnormal, repeated studies may be necessary.

### EVALUATION OF PATIENTS WITH PULMONARY HYPERTENSION

- Echocardiography is indicated for evaluation of suspected pulmonary hypertension.
- Echocardiography is indicated in follow-up of pulmonary arterial pressures in patients with pulmonary hypertension to evaluate response to treatment.
- Echocardiography may be performed at 2 yearly intervals in asymptomatic adults (age 19 years or older) with an established diagnosis of pulmonary hypertension.
- Echocardiography may be performed annually in asymptomatic non adult patients (less than or equal to 18 years old) with an established diagnosis of pulmonary hypertension.
- Echocardiography may be performed to evaluate signs or symptoms which may be attributable to worsened pulmonary hypertension.

### EVALUATION OF AORTIC DISEASE

- Echocardiography is indicated in the preoperative or postoperative evaluation of pathology of the ascending aorta (aneurysm/dissection) although transesophageal echocardiography (TEE) is often preferable in this situation.
  - Annual echocardiographic evaluation is usually sufficient in clinically stable patients but more frequent testing may be appropriate in some situations (e.g. in longitudinal follow-up of large or enlarging thoracic aneurysms, in follow-up of recently diagnosed thoracic aneurysms until stability is established).
- Echocardiography may be performed annually in patients with other disease entities which predispose them to diseases of the aorta including but not limited to Marfan syndrome, Ehlers-Danlos syndrome and Familial Aortic Dilation.

### EVALUATION OF PERICARDIAL DISEASES

- Echocardiography is indicated in the evaluation of pericardial conditions including but not limited to pericardial effusion, pericardial mass, constrictive pericarditis, effusive-constrictive conditions, patients post cardiac surgery or suspected pericardial tamponade.

### EVALUATION OF CARDIAC MASSES OR CARDIAC SOURCE OF EMBOLUS

- Echocardiography is indicated in the diagnosis or exclusion of a cardiac source of embolus in a patient who has had or appears to have had a systemic embolic event (although transesophageal echocardiography (TEE) is often preferable in this situation).
- Echocardiography is indicated in the pre and post treatment evaluation of cardiac masses (tumor or thrombus).
  - Annual echocardiographic evaluation is usually sufficient in clinically stable patients with cardiac masses (tumors or thrombus) but more frequent testing may be appropriate in some situations (e.g. in longitudinal follow-up of enlarging masses or in follow-up of recently diagnosed masses until stability is established).
REFERENCES/LITERATURE REVIEW:

<table>
<thead>
<tr>
<th></th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Newberger JW et al. Diagnosis, Treatment, and Long-Term Management of Kawasaki Disease A Statement for Health Professionals From the Committee on Rheumatic Fever, Endocarditis and Kawasaki Disease, Council on Cardiovascular Disease in the Young, American Heart Association Endorsed by the American Academy of Pediatrics. Circulation 2004;110:2747-2771</td>
</tr>
</tbody>
</table>
### Computerized Tomography (CT)
#### Cardiac (Structure)

**CPT CODES:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>75572</td>
<td>Computed tomography, heart, with contrast material, for evaluation of cardiac structure and morphology (including 3-D image postprocessing, assessment of cardiac function, and evaluation of venous structures if performed)</td>
</tr>
<tr>
<td>75573</td>
<td>Computed tomography, heart, with contrast material, for evaluation of cardiac structure and morphology in the setting of congenital heart disease (including 3-D postprocessing, assessment of left ventricular cardiac function, right ventricular structure and function and evaluation of venous structures, if performed)</td>
</tr>
</tbody>
</table>

**STANDARD ANATOMIC COVERAGE:**

- Heart and great vessels within the thorax

**IMAGING CONSIDERATIONS:**

**Advantages of Cardiac CT**
- Rapidly acquired exams, with excellent anatomic detail afforded by most multidetector CT scanners with 16 or more active detector rows.

**Disadvantages of Cardiac CT include:**
- Potential complications from use of intravascular iodinated contrast administration (see biosafety issues, below)
- Exposure to ionizing radiation
- Potential factors that may limit the image quality during acquisition of Cardiac CT such as:
  1. uncontrolled atrial or ventricular arrhythmias
  2. inability to image at a desired heart rate, which may occur despite beta blocker administration
  3. inability of the patient to comply with the requirements of scanning (patient motion during image acquisition, inability to comply with breath hold requirements, inability to lie supine, claustrophobia)
  4. not a suitable imaging modality for morbidly obese patients (BMI > 40)
  5. because of the radiation exposure issues careful consideration should be given to other imaging modalities in pregnant women and children

**Biosafety Issues:**
- Ordering and imaging providers are responsible for considering safety issues prior to the cardiac CT exam. One of the most significant considerations is the requirement for intravascular iodinated contrast material, which may have an adverse effect on patients with a history of documented allergic contrast reactions or atopy, as well as on individuals with renal impairment, who are at greater risk for contrast-induced nephropathy. In addition, radiation safety issues including cumulative exposure to ionizing radiation should be considered.

**Ordering Issues:**
- This guideline does not supersede the enrollee's health plan medical policy specific to cardiac CT for evaluation of cardiac structure.
- This guideline does not apply to coronary CT angiography (CPT 75574)
- This guideline does not apply to Cardiac CT for quantitation of coronary artery calcification (CPT 75571)
- Selection of the optimal diagnostic work-up for cardiac evaluation should be made within the context of other available studies (which include transthoracic and transesophageal echocardiography and cardiac MRI), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- There are uncommon circumstances when both Cardiac CT and Cardiac MRI should be ordered for the same clinical presentation. The specific rationale must be delineated at the time of request.
### Imaging Considerations:
- In general, follow-up Cardiac CT exams should be performed only when there is a clinical change, with new signs or symptoms, or specific finding(s) requiring imaging surveillance.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

### Common Diagnostic Indications for Cardiac CT:
The following diagnostic indications for Cardiac CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

#### Congenital Heart Disease
- For evaluation of suspected or established congenital heart disease in patients whose echocardiogram is technically limited or nondiagnostic
  - Or
- For further evaluation of complex congenital heart disease in patients who have undergone echocardiography
  - Or
- For evaluation of complex congenital heart disease in patients who are less than one year post surgical correction
  - Or
- For evaluation of complex congenital heart disease in patients who have new or worsening symptoms and/or a change in physical examination
  - Or
- To assist in surgical planning for patients with complex congenital heart disease
  - Or
- For surveillance in asymptomatic patients with complex congenital heart disease in patients who have not had cardiac MRI or cardiac CT within the preceding year
  - Cardiac MRI or transesophageal echocardiography may be preferable to cardiac CT in order to avoid radiation exposure

#### Intra-Cardiac and Para-Cardiac Masses and Tumors
- In patients with a suspected cardiac or para-cardiac mass (thrombus, tumor, etc.) suggested by transthoracic echocardiography, transesophageal echocardiography, blood pool imaging or contrast ventriculography who have not undergone cardiac CT or cardiac MRI within the preceding 60 days
  - Or
- In patients with established cardiac or para-cardiac mass (thrombus, tumor, etc.) who are clinically unstable
  - Or
- In patients with established cardiac or para-cardiac mass (thrombus, tumor, etc.) who are clinically stable and have not undergone cardiac CT or cardiac MRI within the preceding year
  - Or
- In patients with established cardiac or para-cardiac mass (thrombus, tumor, etc.) who have undergone treatment (chemotherapy, radiation therapy, thrombolysis, anticoagulation or surgery) within the preceding year and have not had cardiac CT or cardiac MRI within the preceding 60 days

#### Cardiac Aneurysm and Pseudoaneurysm

#### Evaluation of Pericardial Conditions (Pericardial Effusion, Constrictive Pericarditis, or Congenital Pericardial Diseases)
- In patients with suspected pericardial constriction
  - Or
- In patients with suspected congenital pericardial disease
  - Or
COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC CT:

- In patients with suspected pericardial effusion who have undergone echocardiography deemed to be technically suboptimal in evaluation of the effusion
  
  Or

- In patients whose echocardiogram shows a complex pericardial effusion (loculated, containing solid material)

EVALUATION OF CARDIAC VENOUS ANATOMY

- For localization of the pulmonary veins in patients with chronic or paroxysmal atrial fibrillation/flutter who are being considered for first radiofrequency ablation.
  
  Or

- For reevaluation of the pulmonary veins on one occasion following radiofrequency ablation
  
  Or

- For re-evaluation of the pulmonary venous anatomy prior to repeat radiofrequency ablation provided that the patient has not had evaluation of the pulmonary veins following the previous radiofrequency ablation
  
  Or

- Coronary venous localization prior to implantation of a biventricular pacemaker

EVALUATION OF THE THORACIC AORTA – ANEURYSM AND DISSECTION:

- In patients with suspected thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding 60 days
  
  Or

- In patients with confirmed thoracic aortic aneurysm with new or worsening signs/symptoms
  
  Or

- For ongoing surveillance of stable patients with confirmed thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding six months
  
  Or

- In patients with suspected aortic dissection
  
  Or

- In patients with confirmed aortic dissection who have new or worsening symptoms
  
  Or

- In patients with confirmed aortic dissection in whom surgical repair is anticipated (to assist in preoperative planning)
  
  Or

- For ongoing surveillance of stable patients with confirmed aortic dissection who have not undergone imaging of the thoracic aorta within the preceding year
  
  Or

- In patients with confirmed aortic dissection or thoracic aortic aneurysm who have undergone surgical repair within the preceding year and have not undergone imaging of the thoracic aorta within the preceding six months
  
  Or

- In patients who have sustained blunt chest trauma, penetrating aortic trauma or iatrogenic trauma as a result of aortic instrumentation.

REFERENCE/LITERATURE REVIEW:


2. Model Local Coverage Determination (LCD) Work Group for Cardiac Computed Tomography (CCT) and Computed Tomography Coronary Angiography (CTCA), comprising of the American College of Cardiology (ACC), Carrier Advisory Committee (CAC), American College of Radiology (ACR), American Society of Nuclear Cardiology (ASNC), North American Society for Cardiac Imaging (NASCI) Society of Cardiac Angiography and Intervention (SCAI) and Society of Cardiovascular CT (SCCT).


### REFERENCES/LITERATURE REVIEW:


Computerized Tomographic Angiography
Coronary Arteries (CCTA)

CPT CODES:

75574…… Computed tomographic angiography, heart, coronary arteries and bypass grafts (where present), with contrast material, including 3-D image postprocessing (including evaluation of cardiac structure and morphology, assessment of cardiac function, and evaluation of venous structures, if performed)

STANDARD ANATOMIC COVERAGE:

- Cardiac and Coronary Artery Imaging: Coverage may vary, depending on the specific clinical indication as well as prior history of coronary artery bypass graft placement.

IMAGING CONSIDERATIONS:

Advantages of CTA:
- Advantages of Coronary Artery CTA
  - Rapidly acquired exams, with excellent anatomic detail afforded by most multidetector CT scanners with 16 or more active detector rows.
  - CTA has a very high negative predictive value (93 to 100%)

Disadvantages of CTA:
- Disadvantages of Coronary Artery CTA include:
  - Exposure to ionizing radiation (2-3 times higher than the average radiation dose administered to patients undergoing cardiac catheterization)
  - Potential complications from use of intravascular iodinated contrast administration (see biosafety issues, below)
  - Potential factors that may limit the image quality during a Cardiac CT/Coronary Artery CTA exam, such as:
    1. Uncontrolled atrial or ventricular arrhythmias
    2. Extensive coronary artery calcification which may produce artifact
    3. Coronary stent evaluation for possible restenosis, as the stent material itself as well as the quality of the scan and scanner may produce artifacts, limiting the exam
    4. Inability to image at a desired heart rate, which may occur despite beta blocker administration
    5. Inability of the patient to comply with the requirements of scanning (patient motion during image acquisition, inability to comply with breath hold requirements, inability to lie supine, claustrophobia)
    6. Not a suitable imaging modality for morbidly obese patients (BMI > 40)
    7. Because of the radiation exposure issues careful consideration should be given to other imaging modalities in pregnant women and children
    8. CCTA images the coronary arteries directly. Therefore the information provided is anatomical. The presence of coronary stenosis on CCTA (particularly if deemed to be of intermediate severity) does not establish that the lesion has flow limiting significance. Thus, following abnormal CCTA, functional testing may be required to assist in clinical decision-making.

Biosafety Issues:
- Ordering and imaging providers are responsible for considering safety issues prior to the CCTA exam. One of the most significant considerations is the requirement for intravascular iodinated contrast material, which may have an adverse effect on patients with a history of documented allergic contrast reactions or atopy, as well as on individuals with renal impairment, who are at greater risk for contrast-induced nephropathy. In addition, radiation safety issues including cumulative exposure to ionizing radiation should be considered.
IMAGING CONSIDERATIONS:

Ordering Issues:
- This guideline does not supersede the enrollee’s health plan medical policy specific to cardiac CCTA.
- CCTA exams are not covered by most healthcare insurers as a screening study, in the absence of signs, symptoms or known disease.
- Selection of the optimal diagnostic work-up for cardiac evaluation should be made within the context of other available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac MRI, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- In general, follow-up CCTA exams should be performed only when there is a clinical change, with new signs or symptoms, or specific finding(s) requiring imaging surveillance.
- This guideline does not apply to Cardiac CT for quantitation of coronary artery calcification (CPT 75571).
- This guideline does not apply to Cardiac CT for evaluation of cardiac structure (CPT 75572-75573).
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

Several clinical indications listed for CCTA include standard methods of risk assessment, such as the SCORE (Systematic Coronary Risk Evaluation) or the Framingham risk score calculation. These risk calculation systems include consideration of the following factors:

- Age
- Sex
- Abnormal Lipid Profile
- Hypertension
- Diabetes Mellitus
- Cigarette Smoking

COMMON DIAGNOSTIC INDICATIONS FOR CCTA:

The following diagnostic indications for CCTA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

CONGENITAL CORONARY ARTERY ANOMALIES
- For evaluation of suspected congenital anomalies of the coronary arteries

CONGESTIVE HEART FAILURE/CARDIOMYOPATHY
- For exclusion of coronary artery disease in patients with low or moderate Coronary Heart Disease Risk (using standard methods of risk assessment, such as the SCORE risk calculation) in whom coronary artery disease has not been excluded as the etiology of the cardiomyopathy.
  - Patients with high Coronary Heart Disease Risk should undergo cardiac catheterization.
  - Or
- For coronary vein mapping in patients with cardiomyopathy for whom cardiac resynchronization therapy (CRT) is planned.

EVALUATION OF PATIENTS WITH SUSPECTED CORONARY ARTERY DISEASE INCLUDING THOSE WITH PRIOR ABNORMAL CARDIAC TESTING (MPI OR STRESS ECHO)
- Patients with abnormal MPI or stress echo within the preceding 60 days suspected to be false positive on the basis of low Coronary Heart Disease Risk (using standard methods of risk assessment such as the SCORE risk calculation).
  - In the absence of a contraindication (excluding renal impairment and iodinated contrast agent hypersensitivity) patients with moderate or high Coronary Heart Disease Risk should be referred for coronary arteriography.
  - Or
- Patients with equivocal MPI or stress echo within the preceding 60 days who have low or moderate Coronary Heart Disease Risk (using standard methods of risk assessment such as the SCORE risk calculation).
  - In the absence of a contraindication (excluding renal impairment and iodinated contrast agent hypersensitivity)
COMMON DIAGNOSTIC INDICATIONS FOR CCTA:

- Patients with high Coronary Heart Disease Risk should be referred for coronary arteriography.
- The resulting information from the CCTA should facilitate management decisions and not merely add a new layer of testing.
- Patients at low or intermediate coronary heart disease risk (using standard methods of risk assessment, such as the SCORE risk calculation) being evaluated for non-coronary artery cardiac surgery (including valvular and ascending aortic surgery) to avoid an invasive angiogram, where all the necessary preoperative information can be obtained using cardiac CT
- For evaluation of suspected congenital anomalies of the coronary arteries

EVALUATION OF PATIENTS WITH ESTABLISHED CORONARY ARTERY DISEASE:

- Noninvasive coronary arterial mapping (including internal mammary artery) in patients with established coronary artery disease undergoing repeat surgical revascularization

REFERENCE/LITERATURE REVIEW:

2. Model Local Coverage Determination (LCD) Work Group for Cardiac Computed Tomography (CCT) and Computed Tomography Coronary Angiography (CTCA), comprising of the American College of Cardiology (ACC), Carrier Advisory Committee (CAC), American College of Radiology (ACR), American Society of Nuclear Cardiology (ASNC), North American Society for Cardiac Imaging (NASCI) Society of Cardiac Angiography and Intervention (SCAI) and Society of Cardiovascular CT (SCCT).
Cardiac Computerized Tomography (CT) for Quantitative Evaluation of Coronary Calcification

CPT CODES:
75571……..Computed tomography, heart, without contrast material, with quantitative evaluation of coronary artery calcium

STANDARD ANATOMIC COVERAGE:
● Coronary Artery Imaging

IMAGING CONSIDERATIONS:

Advantages of Cardiac CT for quantitative evaluation of coronary artery calcification.
- Rapidly acquired exams.
- Coronary artery calcification has been shown to correlate with the presence of atheromatous coronary artery disease

Disadvantages of Cardiac CT for quantitative evaluation of coronary artery calcification.
- Exposure to ionizing radiation
- No role in the evaluation of patients with symptoms potentially due to coronary artery disease
- Not clear that risk stratification data provided by quantitative evaluation of coronary artery calcification impacts patient outcomes

Biosafety Issues:
● Ordering and imaging providers are responsible for considering safety issues prior to performing quantitative evaluation of coronary artery calcification

Ordering Issues:
● This guideline does not supersede the enrollee’s health plan medical policy specific to cardiac CT for quantitative evaluation of coronary artery calcification
● Cardiac CT for quantitative evaluation of coronary artery calcification is not covered by most healthcare insurers as a screening study
● Selection of the optimal diagnostic work-up for cardiac evaluation should be made within the context of other available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac MRI, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- This guideline pertains to cardiac CT for quantitative evaluation of coronary artery calcification using either Electron Beam CT (EBCT) or Multi-Detector CT (MDCT)
- This guideline does not apply to coronary CT angiography (CPT 75574)
- This guideline does not apply to cardiac CT for evaluation of cardiac structure and function (CPT 75572-75573)
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC CT FOR QUANTITATIVE EVALUATION OF CORONARY ARTERY CALCIFICATION:
● The use of Cardiac CT for quantitative evaluation of coronary artery calcification has not been conclusively shown to impact patient outcomes and is therefore considered to be not medically necessary in all clinical situations.
<table>
<thead>
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<th>REFERENCES/LITERATURE REVIEW:</th>
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Magnetic Resonance Imaging (MRI)

Cardiac

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>75557</td>
<td>Cardiac MRI for morphology and function, without contrast material</td>
</tr>
<tr>
<td>75559</td>
<td>Cardiac MRI for morphology and function, with contrast material</td>
</tr>
<tr>
<td>75561</td>
<td>Cardiac MRI for morphology and function, followed by contrast material</td>
</tr>
<tr>
<td>75563</td>
<td>Cardiac MRI for morphology and function, followed by contrast material with</td>
</tr>
<tr>
<td></td>
<td>stress imaging</td>
</tr>
<tr>
<td>75565</td>
<td>This code is an add-on code to be used in conjunction with 75557, 75559, 75561</td>
</tr>
<tr>
<td></td>
<td>and 75563. As such, this code does not require separate review</td>
</tr>
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</table>

CODING CONSIDERATIONS:

Only one procedure in the series 75557-75563 is appropriately reported per session. This code series is not to be used to report cardiac MRA (see unlisted code 76598)

IMAGING CONSIDERATIONS:

Patient Compatibility Issues:
- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Gating Issues:
  - As with other cardiac imaging modalities, the acquisition of images is frequently gated to the electrocardiogram.
  - Thus, in patients with irregular heart rhythms, image quality may be suboptimal.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging

Biosafety Issues:
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers

Ordering Issues:
- This guideline does not supersede the enrollee’s health plan medical policy specific to cardiac MRI
- Selection of the optimal diagnostic work-up for cardiac evaluation should be made within the context of other available studies (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac MRI, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
### IMAGING CONSIDERATIONS:

- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

### COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC MRI:

The following diagnostic indications for Cardiac MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

#### CORONARY ARTERY DISEASE

**Patients who have had a myocardial infarction**
- To assess viability of the infarcted myocardium utilizing delayed hyperenhancement (contrast studies) when other studies (myocardial perfusion imaging or stress echocardiography) have yielded equivocal or indeterminate results
  - Or
- To assess LV function post myocardial infarction when there is discordant information from other studies or when other studies are technically suboptimal
  - Or
- To assess mitral valve regurgitation post-myocardial infarction when echocardiography is technically suboptimal.
  - Or
- To assess ventricular septal defects post-myocardial infarction when echocardiography is technically suboptimal.
  - Or
- To delineate pericardial effusions associated with acute myocardial infarction when echocardiography is technically suboptimal.

**Patients with suspected coronary artery disease**
- For evaluation of patients with suspected congenital coronary anomalies

#### MYOCARDITIS

- For the evaluation of patients with suspected myocarditis
  - Or
- For follow-up evaluation LV function of patients with an established diagnosis of myocarditis
  - And
- Technically suboptimal transthoracic echocardiogram

#### CARDIOMYOPATHY

- To assess LV function in patients with cardiomyopathy when there is discordant information from other studies or when other studies are technically suboptimal
  - Or
- Evaluation of patients with chronic and progressive diseases of the myocardium which result in cardiomyopathy including but not limited to the following:
  - Infiltrative Cardiomyopathy – Sarcoidosis; Amyloidosis; Hemochromatosis
  - Hypertrophic Obstructive Cardiomyopathy (HOCM)
  - Non-compaction Cardiomyopathy
  - Or
- Evaluation of patients with suspected arrhythmogenic right ventricular dysplasia
  - Or
- For coronary vein mapping in patients with cardiomyopathy for whom cardiac resynchronization therapy (CRT) is planned

#### CARDIAC ANEURYSM OR PSEUDOANEURYSM
### COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC MRI:

#### CONGENITAL HEART DISEASE
- For evaluation of suspected congenital heart disease in patients whose echocardiogram is technically limited or nondiagnostic
  
  Or
- For further evaluation of complex congenital heart disease in patients who have undergone echocardiography
  
  Or
- For evaluation of complex congenital heart disease in patients who are less than one year post surgical correction
  
  Or
- For evaluation of complex congenital heart disease in patients who have new or worsening symptoms and/or a change in physical examination
  
  Or
- To assist in surgical planning for patients with complex congenital heart disease
  
  Or
- For evaluation of complex congenital heart disease in patients who are less than one year post surgical correction
  
  Or
- To assist in surgical planning for patients with complex congenital heart disease
  
  Or
- For surveillance in asymptomatic patients with complex congenital heart disease in patients who have not had cardiac CT or cardiac MRI within the preceding year
  
  Or
- For evaluation of suspected congenital anomalies of the coronary arteries

#### VALVULAR HEART DISEASE
- Following inconclusive echocardiography or when echocardiography is not feasible
  
  Or
- When moderate or severe valvular disease diagnosed using other imaging modalities requires further definition and that information is likely to affect subsequent management of the patient
  - To assess valvular lesions and measure regurgitant volume, regurgitant fraction, ejection fraction and ventricular volumes
  - To help determine the timing for valvular surgery

#### INTRA-CARDIAC AND PARA-CARDIAC MASSES AND TUMORS
- In patients with a suspected cardiac or para-cardiac mass (thrombus, tumor, etc.) suggested by transthoracic echocardiography, transesophageal echocardiography, blood pool imaging or contrast ventriculography who have not undergone cardiac MRI or cardiac CT within the preceding 60 days
  
  Or
- In patients with established cardiac or para-cardiac mass (thrombus, tumor, etc.) who are clinically unstable
  
  Or
- In patients with established cardiac or para-cardiac mass (thrombus, tumor, etc.) who are clinically stable and have not undergone cardiac MRI or cardiac CT within the preceding year
  
  Or
- In patients with established cardiac or para-cardiac mass (thrombus, tumor, etc.) who have undergone treatment (chemotherapy, radiation therapy, thrombolysis, anticoagulation or surgery) within the preceding year and have not had cardiac MRI or cardiac CT within the preceding 60 days

#### EVALUATION OF CARDIAC VENOUS ANATOMY
- For localization of the pulmonary veins in patients with chronic or paroxysmal atrial fibrillation/flutter who are being considered for first radiofrequency ablation.
  
  Or
- For reevaluation of the pulmonary veins on one occasion following radiofrequency ablation
  
  Or
- For re-evaluation of the pulmonary venous anatomy prior to repeat radiofrequency ablation provided that the patient has not had evaluation of the pulmonary veins following the previous radiofrequency ablation
  
  Or
- Coronary venous localization prior to implantation of a biventricular pacemaker
### COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC MRI:

#### EVALUATION OF PERICARDIAL CONDITIONS (PERICARDIAL EFFUSION, CONSTRUCTIVE PERICARDITIS, OR CONGENITAL PERICARDIAL DISEASES)
- In patients with suspected pericardial constriction
  - Or
- In patients with suspected congenital pericardial disease
  - Or
- In patients with suspected pericardial effusion (including hemopericardium) who have undergone echocardiography deemed to be technically suboptimal in evaluation of the effusion
  - Or
- In patients whose echocardiogram shows a complex pericardial effusion (loculated, containing solid material)

#### EVALUATION OF THE THORACIC AORTA - ANEURYSM AND DISSECTION:
- In patients with confirmed thoracic aortic aneurysm with new or worsening signs/symptoms
  - Or
- For ongoing surveillance of stable patients with confirmed thoracic aortic aneurysm who have not undergone imaging of the thoracic aorta within the preceding six months
  - Or
- In patients with suspected aortic dissection
  - Or
- In patients with confirmed aortic dissection who have new or worsening symptoms
  - Or
- In patients with confirmed aortic dissection in whom surgical repair is anticipated (to assist in preoperative planning)
  - Or
- For ongoing surveillance of stable patients with confirmed aortic dissection who have not undergone imaging of the thoracic aorta within the preceding year
  - Or
- In patients with confirmed aortic dissection or thoracic aortic aneurysm who have undergone surgical repair within the preceding year and have not undergone imaging of the thoracic aorta within the preceding six months
  - Or
- In patients who have sustained blunt chest trauma, penetrating aortic trauma or iatrogenic trauma as a result of aortic instrumentation.

### REFERENCE/LITERATURE REVIEW:

REFERENCE/LITERATURE REVIEW:


Positron Emission Tomography (PET) Myocardial Imaging

CPT CODES:
- 78491…………PET myocardial perfusion, single study
- 78492…………PET myocardial perfusion, multiple studies
- 78459…………PET myocardial, metabolic evaluation

COMMONLY USED RADIOPHARMACEUTICALS
- Ammonia (13NH3)
- Rubidium Chloride (82 RbCl)
- 2-(18F) FLURO-2DEOXY-D-GLUCOSE (FDG)

IMAGING CONSIDERATIONS:
- This guideline does not supersede the enrollee’s health plan medical policy specific to myocardial PET imaging.
- Perfusion PET imaging, using Ammonia or Rubidium isotopes, is used to differentiate areas of myocardium with normal coronary blood flow from those with abnormal coronary blood flow.
- Rest and or stress Perfusion PET imaging can be performed.
- Metabolic evaluation (to determine myocardial viability) is performed using PET Flurodeoxyglucose (FDG) imaging. Metabolic PET imaging has been shown to be useful in selection of patients who are likely to benefit from revascularization.
- Perfusion PET imaging and Metabolic PET imaging may occasionally be appropriate in the evaluation of myocardial pathologic processes other than coronary artery disease.
- Isotopes used in PET imaging require special handling arrangements because of their short half-lives.
- While Rubidium may be produced in a commercially available on-site generator Ammonia requires cyclotron production.
- Selection of the optimal diagnostic imaging for cardiac evaluation should be made within the context of other available modalities (which include treadmill stress test, stress myocardial perfusion imaging, stress echocardiography, cardiac MRI, cardiac PET imaging and invasive cardiac/coronary angiography), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

REQUIREMENTS FOR MYOCARDIAL PET IMAGING:
- Perfusion PET imaging is generally (exceptions noted below) to be considered only when a patient has undergone recent nuclear stress testing or stress echocardiography with equivocal results.
- In morbidly obese patients (BMI > 40) Perfusion PET imaging can be considered as the initial test (because of a higher likelihood of technically suboptimal image quality on nuclear stress testing and stress echocardiography in this patient subgroup).
- In keeping with CMS guidelines, Perfusion PET myocardial imaging may be considered as an alternative to nuclear stress testing or stress echocardiography in symptomatic (or asymptomatic intermediate/high risk) patients greater than 65 years old.
- Perfusion PET myocardial imaging is not appropriate for screening for coronary artery disease in asymptomatic low risk patients regardless of age or body habitus.
- PET metabolic imaging is used in patients with established coronary artery disease and left ventricular systolic dysfunc-
### REQUIREMENTS FOR MYOCARDIAL PET IMAGING:
- PET metabolic imaging of the myocardium provides clinically useful information only when the myocardium is deemed to be nonviable using other imaging modalities (perfusion imaging using thallium/technetium isotopes or echocardiography) or when such imaging modalities are inconclusive regarding the viability status of the myocardium.

### COMMON DIAGNOSTIC INDICATIONS FOR CARDIAC PET:

The following diagnostic indications for Cardiac PET are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

#### PERFUSION PET IMAGING – FOR PATIENTS WHO ARE AT LEAST 65 YRS OLD OR HAVE BMI >40:
- Evaluation of symptoms consistent with myocardial ischemia to diagnose or exclude coronary artery disease
  - Or
- Established coronary artery disease with recurrent atypical symptoms
  - Or
- Evaluation of regional myocardial blood flow in patients with multiple vessel coronary artery disease with a view to identifying a “culprit” lesion for revascularization
  - Or
- Evaluation of asymptomatic patients who by virtue of risk factor status are at moderate or high risk of coronary artery disease.

#### PERFUSION PET IMAGING – FOR PATIENTS WHO ARE < 65 YRS OLD AND HAVE BMI <40:
- Further evaluation of patients who have had an equivocal nuclear stress test (MPI) or stress echo within the past 60 days

#### METABOLIC PET IMAGING FOR EVALUATION OF MYOCARDIAL VIABILITY – WHEN ALL FOUR OF THE FOLLOWING CONDITIONS ARE MET:
- The patient has established coronary artery disease
  - And
- Left ventricular systolic dysfunction
  - And
- Viability status is not defined by other testing
  - And
- Revascularization is being considered

#### METABOLIC PET IMAGING
- May be considered in the evaluation of some myopathic processes excluding coronary artery disease (for example: sarcoidosis)

### REFERENCE/LITERATURE REVIEW:

4. National Coverage Determination for Myocardial Viability (220.6.8), Publication Number 100-3, Implementation Date 04/18/2005
6. National Coverage Determination for PET for Perfusion of the Heart (220.6.1), Publication Number 100-3, Implementation Date 04/18/2005
7. ACC/AHA/ASNC Guidelines for the Clinical Use of Cardiac Radionuclide Imaging. www.acc.org
Computed Tomography (CT)
Abdomen

CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74150</td>
<td>CT Abdomen; without contrast</td>
</tr>
<tr>
<td>74160</td>
<td>CT Abdomen; with contrast</td>
</tr>
<tr>
<td>74170</td>
<td>CT Abdomen; without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Diaphragmatic Dome to Iliac Crests
- CT of the abdomen generally includes imaging of the following anatomic structures:
  - Liver and Biliary Tract, including the Gallbladder
  - Pancreas
  - Gastrointestinal tract
  - Spleen
  - Kidneys
  - Adrenal Glands
  - Abdominal Aorta
  - Inferior Vena Cava
  - Abdominal Lymph Nodes
  - Other Retroperitoneal Structures
- Scan coverage may vary, depending on the specific clinical indication

IMAGING CONSIDERATIONS:

- Radiation dosimetry: For abdominal CT exams, the typical effective radiation dose is approximately 10 milliSieverts (mSv). This dosage correlates with an estimated 500 Chest X-Ray equivalents or approximately 4.5 years of natural background radiation.
- When ordering an abdominal CT exam, consideration should be given to the benefits as well as the risks from radiation exposure and ramifications of false positive studies (both financial and psychological), which may require further work-up with other imaging modalities or follow-up surveillance with CT.
- Many health plans do not currently provide benefit coverage for screening exams (in patients without signs and symptoms of disease) that use advanced imaging.
- Depending on the presenting signs and symptoms, other diagnostic studies, including Ultrasound, Barium Examinations and Endoscopy, may be useful to help focus on the most appropriate advanced imaging exam (such as CT, CTA, MRI, MRA, MRCP, PET and Radionuclide Imaging).
- Contrast-enhanced CT may be contraindicated in certain circumstances, such as a documented severe allergic reaction to intravenous contrast material and renal insufficiency.
- For most gallbladder and hepatobiliary conditions, ascites evaluation and certain renal abnormalities (such as detection of hydronephrosis and differentiation of cystic, complex and solid lesions), initial imaging should be considered using Ultrasound.
- Verification of cystic lesions in abdominal viscera can usually be well-documented with Ultrasound.
- Ultrasound studies may be limited in obese patients.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CT:

The following diagnostic indications for Abdominal CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

This section contains:

- General Abdominal CT Indications
- Additional Hepatobiliary Indications
- Additional Pancreatic Indications
- Additional Gastrointestinal Indications
- Additional Genitourinary Indications
- Additional Splenic Indications
- Additional Vascular Indications

**General Abdominal CT Indications:**

**ABDOMINAL PAIN – UNEXPLAINED BY CLINICAL FINDINGS, INCLUDING PHYSICAL EXAMINATION AND OTHER IMAGING STUDIES**

- Choice of the best diagnostic imaging exam to evaluate abdominal pain is dependent on the location of the pain as well as other factors (such as severity of pain; associated symptoms; laboratory findings; age – pediatric versus adult patient).

- The following studies represent alternative imaging for abdominopelvic pain, in specific clinical scenarios:
  - Ultrasound:
    1. For right upper quadrant pain, in all age groups – Abdominal Ultrasound is often the initial study of choice for evaluation of the Gallbladder and Biliary Tract
    2. For abdominal symptoms in the pediatric population – Abdominal Ultrasound frequently provides diagnostic information, without incurring radiation exposure from CT
    3. For pelvic symptoms in females – Pelvic Ultrasound (trans-abdominal and trans-vaginal scans) usually provides excellent anatomic depiction of the uterus, adnexal structures and cul-de-sac
  - Plain Abdominal Radiographs: For initial evaluation of the bowel gas pattern, abnormal abdominal calcifications, pneumoperitoneum and other abnormalities
  - Barium Examination or Endoscopy: For symptoms related to the gastrointestinal tract, such as epigastric pain secondary to peptic ulcer disease

- In many other circumstances, abdominal CT may be indicated for evaluation of unexplained abdominal pain.

**ABNORMAL FINDINGS ON OTHER IMAGING EXAMS THAT REQUIRE FURTHER EVALUATION**

- For example, abdominal radiographs demonstrating abnormal calcifications suspicious for urinary tract calculus disease

**ASCITES**

**CONGENITAL ANOMALY**

**FEVER OF UNKNOWN ORIGIN**

**HEMATOMA / HEMORRHAGE**

**HERNIA**

- For diagnosis of a hernia with suspected complications or presurgical planning including but not limited to the following types of hernia:
  - Femoral
  - Incisional
  - Internal
  - Inguinal
  - Spigelian (through semilunar line, lateral to rectus abdominis muscle)
  - Ventral

**DIFFUSE, UNEXPLAINED LOWER EXTREMITY EDEMA**

- Advanced imaging may be used to exclude an occult pelvic tumor or lesion causing mass effect, not identified by pelvic ultrasound, as the cause of vascular compression and resultant lower extremity edema
### COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CT:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LYMPHADENOPATHY</strong></td>
<td>● For initial detection and follow-up</td>
</tr>
<tr>
<td><strong>PALPABLE ABDOMINAL MASS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>POST-OPERATIVE EVALUATION FOR COMPLICATIONS</strong></td>
<td>● For suspected or known operative complications, particularly during the initial 6-8 weeks following open or laparoscopic abdomino-pelvic surgery</td>
</tr>
<tr>
<td><strong>PRE-OPERATIVE PLANNING FOR BARIATRIC SURGERY</strong></td>
<td></td>
</tr>
<tr>
<td><strong>RETROPERITONEAL ABNORMALITY – FIBROSIS, INFLAMMATION AND NEOPLASM</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TRAUMA</strong></td>
<td>● Following significant blunt or penetrating injury to the Abdomen and Pelvis</td>
</tr>
</tbody>
</table>
| **TUMOR EVALUATION: PRIMARY ABDOMINAL OR PELVIC NEOPLASM** | ● Diagnosis  
● Initial staging  
● Periodic follow-up  

*Note: For colorectal cancer surveillance, the American Society of Clinical Oncology (ASCO) recommends the following 2005 practice guideline regarding use of CT:*

"Panel recommends annual computed tomography (CT) of the chest and abdomen for 3 years after primary therapy for patients who are at higher risk of recurrence and who could be candidates for curative-intent surgery; pelvic CT scan for rectal cancer surveillance, especially for patients with several poor prognostic factors, including those who have not been treated with radiation."

| **TUMOR EVALUATION: METASTATIC DISEASE** | ● For diagnosis  
● Initial staging  
● Periodic follow-up after treatment  
May involve the following anatomic structures: ¹  
  - Adrenal Glands  
  - Biliary Tract  
  - Kidneys  
  - Liver  
  - Lymph Nodes  
  - Other abdominal and retroperitoneal structures  
  - Pancreas  
  - Spleen  
  - Stomach, Small Intestines and Colo-rectum |

| **UNEXPLAINED WEIGHT LOSS – SIGNIFICANT WEIGHT LOSS EXCEEDING 10% OF DESIRABLE BODY WEIGHT, OVER SHORT TIME INTERVAL (SIX MONTHS OR LESS), AFTER INITIAL EVALUATION FOR OTHER CAUSES** | |

#### Additional Hepatobiliary Indications:

| ELEVATED LIVER TRANSAMINASES: | ● Including alanine transaminase (ALT) and aspartate transaminase (AST)  
● Following an abnormal or inconclusive Abdominal Ultrasound  
● In patients on medications known to cause liver transaminase elevation, such as statins for hyperlipidemia, acetaminophen, non-steroidal anti-inflammatory drugs, Dilantin, protease inhibitors and sulfonamides. These medications should be stopped, whenever possible, and liver chemistries repeated, before performing advanced imaging.  
● Other causes for elevated liver transaminases include excessive alcohol intake, cirrhosis, hepatitis, hepatic steatosis as well as other hepatic and non-hepatic disorders. Consider additional diagnostic labs such as hepatitis panel and serum alpha fetoprotein, as appropriate. ² |
**COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CT:**

**CIRRHOSIS AND EVALUATION FOR HEPATOCELLULAR CARCINOMA**

**FOCAL LIVER LESION CHARACTERIZATION**
- Complex or solid, including but not limited to:
  - Focal Nodular Hyperplasia
  - Hemangioma
  - Hepatic Adenoma
  - Other focal pathologic abnormalities in the liver

**JAUNDICE**
- With abnormal liver function tests (transaminases) and unexplained icterus, following an Abdominal Ultrasound
- CT imaging used to evaluate for diffuse or multifocal parenchymal liver disease as well as biliary obstruction

**HEPATOMEGALY**
- For clinically suspected or worsening hepatic enlargement

**Additional Pancreatic Indications:**

**ACUTE PANCREATITIS, WITH SUSPECTED COMPLICATIONS INCLUDING PANCREATIC NECROSIS, ABSCESS, PSEUDOCYST(S) AND/OR PERI-PANCREATIC EFFUSIONS:**
- Note that patients with mild acute, uncomplicated pancreatitis usually do not require cross-sectional imaging, aside from Ultrasound identification of gallstones and/or biliary ductal calculi, as a potential cause.

**PANCREATIC PSEUDOCYST**
- With prior history of pancreatitis or pancreatic trauma

**PANCREATIC MASS**

**Additional Gastrointestinal Indications:**

**APPENDICITIS**

**APPENDICEAL OR PERI-APPENDICEAL MASS – UNEXPLAINED ON PHYSICAL EXAM AND OTHER IMAGING STUDIES**

**BOWEL OBSTRUCTION**

**ENTERITIS AND/OR COLITIS**

**DIVERTICULITIS**

**INFLAMMATORY BOWEL DISEASE (IBD)**
- Crohn’s Disease
- Ulcerative Colitis
- For follow-up of known IBD, with new signs/symptoms suggesting exacerbation

**ISCHEMIC BOWEL**

**Additional Genitourinary Indications:**

**ADRENAL LESION**
- For characterization of an indeterminate adrenal mass identified on prior imaging – such as a benign adenoma versus a metastatic deposit
  - Or
- When there is biochemical evidence of an adrenal endocrine abnormality

**INFECTIOUS OR INFLAMMATORY PROCESS**
- Including but not limited to the following:
  - Abscess
  - Diffuse Inflammation / Phlegmon
### COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CT:

- Fistula
- Pyelonephritis persistent or worsening symptoms after three days of antibiotics
- Recurrent cystitis, male with at least two episodes, female with failed antibiotic therapy

### HEMATURIA

**HYDRONEPHROSIS**
- Evaluation for possible obstructing ureteral or urinary bladder lesion
- When ultrasound is non-diagnostic or abnormal and unexplained, requiring further evaluation

### RENAL LESION
- Characterization of indeterminate lesion, particularly a mass, demonstrated on prior imaging

### RENAL NEOPLASM
- For diagnosis, initial staging and pre-operative evaluation, re-staging and treatment monitoring

### URINARY TRACT CALCULUS DISEASE AND/OR UNILATERAL FLANK PAIN

### UNDESCENDED (CRYPTORCHIDISM) TESTICLE

**Additional Splenic Indications:**

### INDETERMINATE SPLENIC LESION ON PRIOR IMAGING, SUCH AS ULTRASOUND

### SPLENIC PARENCHYMAL, SUBCAPSULAR OR PERI-SPLENIC HEMATOMA

### SPLENOMEGALY
- For clinically suspected or worsening splenic enlargement

**Additional Vascular Abnormalities:**

### AORTIC DISSECTION
- May evaluate with either CT or CTA
  - Usually results from subdiaphragmatic extension of a Thoracic Aortic Dissection

### ENDOVASCULAR STENT GRAFT PLACEMENT FOR ABDOMINAL AORTIC ANEURYSM

- May evaluate with either CT or CTA
- Primary concerns are for monitoring the aneurysm size, identifying stent migration and detecting endoleaks.
- Prior to and as surveillance following placement of stent graft
- Society of Interventional Radiology - Post-procedure recommended follow-up in asymptomatic patients:
  1. Initial baseline CTA is recommended in less than 1 month post-stent graft placement
  2. If there are no problems related to the stent graft, then scans are obtained at 6 month intervals, for 2 years
  3. Thereafter, an annual follow-up CTA may be performed
- If symptoms/problems related to the stent graft occur, then more frequent imaging may be needed

### THROMBOSIS IN THE SYSTEMIC AND PORTAL VENA CIRCULATIONS
- May follow initial evaluation with Doppler Ultrasound
REFERENCE/LITERATURE REVIEW:

Magnetic Resonance Imaging (MRI)
Abdomen

**CPT CODES:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74181</td>
<td>MRI of Abdomen, without contrast</td>
</tr>
<tr>
<td>74182</td>
<td>MRI of Abdomen, with contrast</td>
</tr>
<tr>
<td>74183</td>
<td>MRI of Abdomen, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

**STANDARD ANATOMIC COVERAGE:**

- Scan coverage depends on the specific clinical indication for the abdominal MRI. General landmarks extend from the diaphragmatic dome to the iliac crests.
- Anatomic structures may include the liver, pancreas, spleen, adrenal glands, kidneys and remainder of the abdomen.
- Magnetic Resonance Cholangiopancreatography (MRCP) is used to evaluate the biliary and pancreatic ductal systems non-invasively and is covered under CPT code 74181, Abdominal MRI without contrast.

**IMAGING CONSIDERATIONS:**

- Abdominal MRI studies are usually targeted for further evaluation of indeterminate or questionable findings, identified on more standard imaging exams such as Ultrasound and CT.
- For evaluation of vascular abnormalities such as renal artery stenosis and celiac/superior mesenteric artery stenosis (in chronic mesenteric ischemia), Doppler Ultrasound, MRA or CTA should be considered as the preferred imaging modalities.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.
- When Magnetic Resonance Cholangiopancreatography (MRCP) is requested in addition to a MRI of the abdomen, only one MRI abdomen code should be allowed. Additional sequences obtained for MRCP are considered part of the primary procedure.

**Patient Compatibility Issues:**

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging

**Biosafety Issues:**

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

**Ordering Issues:**

- This guideline does not supersede the enrollee’s health plan medical policy specific to abdominal MRI.
IMAGING CONSIDERATIONS:

- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL MRI:

The following diagnostic indications for Abdominal MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

INDETERMINATE ABDOMINAL MASS

- For further evaluation and characterization of indeterminate lesions arising in the solid abdominal viscera and surrounding anatomic structures, including but not limited to the following anatomic sites:
  - Liver – Characterization of focal hepatic lesions, both benign (e.g., cavernous hemangioma; focal nodular hyperplasia) and malignant (e.g., hepatocellular carcinoma; liver metastases) in etiology
  - Pancreas
  - Spleen
  - Kidney – Evaluation of an indeterminate renal mass
  - Adrenal – Characterization of an adrenal mass, including differentiation of adrenal adenoma from metastasis
  - Other Abdominal and Retroperitoneal anatomic structures
  - Assess vascular invasion or compression by pelvic or renal tumor

TUMOR EVALUATION: PRIMARY NEOPLASM AND METASTATIC DISEASE

- MRI staging and follow-up evaluation for biopsy-proven malignancies of the following structures:
  - Liver
  - Pancreas
  - Spleen
  - Kidney
  - Adrenal
  - Lymph Nodes
  - Other Abdominal and Retroperitoneal Neoplasms
  - Assess vascular invasion or compression by pelvic or renal tumor
- Disseminated intra-abdominal tumor
  - Uterus, Cervix, Vagina or Vulva
  - Rectum
  - Testicles
  - Ovaries
  - Urinary Bladder
  - Prostate
  - Musculoskeletal Tumor

LYMPHADENOPATHY

- When Abdominal CT is non-diagnostic
- May be useful for differentiating enlarged lymph nodes from vascular structures (with flow void on MRI), as follow-up from an unenhanced abdominal CT exam

DIFFUSE LIVER DISEASE

- Following an inconclusive or abnormal Abdominal Ultrasound or CT
COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL MRI:

- Including the following hepatic disorders:
  - Cirrhosis
  - Chronic Hepatitis
  - Hemochromatosis

INFECTIOUS OR INFLAMMATORY PROCESS

- CT is usually the initial imaging modality of choice for infectious and inflammatory conditions
- Including but are not limited to the following:
  - Abscess
  - Diffuse Inflammation / Phlegmon

CONGENITAL ANOMALY

IN PATIENTS WITH APPROPRIATE AIM GUIDELINE INDICATIONS FOR ABDOMINAL CT, WHEN CT IS EXPECTED TO BE LIMITED, DUE TO CONTRAINDICATIONS (SUCH AS A HISTORY OF ALLERGIC REACTION TO IODINATED RADIOGRAPHIC CONTRAST MATERIAL)

FOR CLARIFICATION OF QUESTIONABLE OR ABNORMAL FINDINGS ON OTHER ABDOMINAL IMAGING STUDIES

MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY (MRCP) DIAGNOSTIC INDICATIONS:

- Covered by CPT Code 74181 – MRI of Abdomen, without contrast
- MRCP is performed using heavily T2-weighted images to display hyperintense signal from static or slowly-moving fluid-filled structures
- Advantages of MRCP, when compared with ERCP, include: non-invasive imaging technique; no ionizing radiation; no anesthesia required; often better anatomic visualization proximal to a ductal obstruction; may detect extra-ductal abnormalities not evident by ERCP
- Disadvantages of MRCP, when compared with ERCP, include: limited spatial resolution and therefore, less sensitive exam for detection of more subtle abnormalities; only provides diagnostic information, compared with ERCP which has both diagnostic and therapeutic capabilities; as a consequence, MRCP may result in a delay for needed therapeutic interventions performed with ERCP (such as sphincterotomy, stone extraction, stent placement); susceptibility artifact on MRI may occur (for example, from metallic foreign bodies/surgical clips in the right upper abdominal quadrant) and result in image degradation
- Significant upper abdominal ascites and large cystic/fluid-filled structures may impede visualization of the pancreatic and biliary ductal systems with MRCP.

COMMON INDICATIONS:

IN PATIENTS WITH SUSPECTED BILIARY AND/OR PANCREATIC DUCTAL ABNORMALITIES, FOLLOWING INCOMPLETE OR FAILED ERCP, OR WHEN ERCP CANNOT BE SAFELY PERFORMED (for example, a significant allergy to iodinated contrast material which would complicate performance of an ERCP)

WHEN ERCP IS PRECLUDED BY ANATOMIC CONSIDERATIONS, SUCH AS A BILIARY-ENTERIC SURGICAL ANASTOMOSIS (for example, from previous choledochojejunostomy and partial gastrectomy with Billroth II anastomosis)

TO EVALUATE PATIENTS WITH BILIARY TRACT DILATATION, BIOCHEMICAL EVIDENCE OF BILIARY OBSTRUCTION AND/OR UNEXPLAINED RUQ PAIN, INCLUDING DETECTION OF CHOLEDOCHOLITHIASIS, BENIGN STRicture, MASS LESION (BENIGN OR MALIGNANT), FISTULA AND OTHER PATHOLOGIC PROCESSES

STATUS POST CHOLECYSTECTOMY AND HIGH CLINICAL SUSPICION FOR CHOLEDOCHOLITHIASIS

FOLLOWING PANCREATIC DUCTAL TRAUMA, WHEN ERCP IS CONTRAINDICATED, TO ASSESS DUCTAL INTEGRITY AND PSEUDOCYST FORMATION
## COMMON INDICATIONS:

**IN RECURRENT ACUTE PANCREATITIS OF UNKNOWN ETIOLOGY, TO IDENTIFY POSSIBLE CAUSES SUCH AS CONGENITALLY ABERRANT DUCTAL ANATOMY (for example, Choledochal Cyst, Pancreas Divisum and Annular Pancreas)**

**PRIMARY SCLEROSING CHOLANGITIS**

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### REFERENCE/LITERATURE REVIEW:

CT Angiography (CTA) and MR Angiography (MRA)

Abdomen

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74175</td>
<td>Computed tomographic angiography, abdomen, with contrast material(s), including noncontrast images, if performed, and image postprocessing</td>
</tr>
<tr>
<td>74185</td>
<td>Magnetic resonance angiography, abdomen; without or with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Anatomic coverage for CPT codes 74175 (CTA) and 74184 (MRA) includes the major arterial and/or venous structures in the abdomen, from the diaphragmatic dome through the iliac crests.

IMAGING CONSIDERATIONS:

- For CTA of the abdominal aorta and iliofemoral vasculature with lower extremity runoff, use CPT code 75635.
- For MRA of the abdominal aorta and iliofemoral vasculature, with lower extremity runoff, use the following CPT codes:
  - CPT 74185 MRA Abdomen x 1
  - CPT 73725 MRA Lower Extremities x 2
- Doppler Ultrasound examination is an excellent means to identify a wide range of vascular abnormalities, both arterial and venous in origin. This well-established modality should be considered in the initial evaluation of many vascular disorders listed below.
- MRA should also be considered in patients with a history of either previous contrast reaction to intravascular administration of iodinated radiographic contrast material or atopy.
- CTA should be considered, unless contraindicated, in patients who cannot undergo MRA, due to either an inability to tolerate MRA examination (for example, secondary to claustrophobia) or biosafety issues. Among the generally recognized contraindications to MRI exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers

COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CTA/MRA:

<table>
<thead>
<tr>
<th>Indication</th>
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<tbody>
<tr>
<td><strong>ANEURYSM</strong> 1,2</td>
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<tr>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
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<tr>
<td><strong>PSEUDOANEURYSM</strong></td>
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<tr>
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<tr>
<td><strong>DISSECTION</strong> 3</td>
</tr>
<tr>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
</tr>
<tr>
<td><strong>ARTERIOVENOUS MALFORMATION (AVM) OR FISTULA (AVF)</strong></td>
</tr>
</tbody>
</table>
## COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CTA/MRA:

### STENOSIS OR OCCLUSION OF THE ABDOMINAL AORTA OR BRANCH VESSELS

- Due to:
  - Atherosclerosis
  - Thromboembolism
  - Other causes

### MESENTERIC ISCHEMIA

- May have an acute or chronic and progressive (Intestinal or Abdominal Angina) presentation

### VENOUS THROMBOSIS OR OCCLUSION

- Consider initial evaluation with Doppler Ultrasound
  - Portal and Mesenteric Venous Systems
  - Systemic Venous System:
    1. IVC Thrombosis or Extrinsic Compression/Occlusion, for example by tumor
    2. Hepatic Vein Thrombosis (Budd-Chiari Syndrome)
    3. Renal Vein Thrombosis
    4. Other major abdominal vessels

### VASCULAR EVALUATION OF LOWER EXTREMITY CLAUDICATION

- CPT Coding for Abdominal Aortic and Run-Off evaluation, which involves image post-processing for three-dimensional reconstructions, should follow:
  1. For CTA: 75635 - CTA of Abdominal Aorta and Bilateral Iliofemoral Lower Extremity Run-Off without contrast, followed by re-imaging with contrast
  2. For MRA: 74185 - Abdominal MRA and 73725 - Bilateral Lower Extremity MRAs

- Either CTA or MRA is indicated in a patient with classic presenting symptoms of claudication from peripheral arterial disease, such as diminished/absent peripheral pulses and cramping pain in the legs (particularly in the thighs and calves) when walking, which disappears at rest. Other clinical findings which support non-invasive assessment with CTA or MRA include lower extremity cutaneous ulcers and gangrene.

- In the absence of classic peripheral symptoms of claudication, then obtain a vascular surgical consultation and perform lower extremity non-invasive arterial evaluation, which may include the following: segmental systolic pressure measurements, segmental limb plethysmography, continuous wave Doppler and duplex ultrasonography. Ankle brachial indices (ABI) of < 0.9 may undergo advanced imaging. Rest pain or severe occlusive disease typically occurs with ABI < 0.5.

### RENAL ARTERY STENOSIS

- For suspected Renovascular Hypertension from Renal Artery Stenosis, required clinical information includes at least 2-3 serial blood pressure measurements and a list of current anti-hypertensive medications. Renal Artery CTA or MRA may be performed in the following clinical scenarios:
  - Refractory hypertension, in patients on therapeutic doses of 3 or more anti-hypertensive medications. Note that for hypertension easily managed on 1-2 anti-hypertensive medications, imaging may not be required.
  - Hypertension with renal failure or progressive renal insufficiency
  - Accelerated or malignant hypertension
  - Abrupt onset of hypertension
  - Hypertension developing in patients younger than 35 years of age
  - Deteriorating renal function on angiotensin converting enzyme inhibition
  - Abdominal bruit, suspected to originate in the renal artery
  - Generalized arteriosclerotic occlusive disease with hypertension
  - Unilateral small renal size (> 1.5 cm difference in renal size on Ultrasound)
  - Following an abnormal renal Doppler Ultrasound suggestive of renal artery stenosis
  - Recurrent, unexplained episodes of “flash” pulmonary edema

Note: Doppler Ultrasound examination of the renal arteries has been shown in the peer-reviewed literature to be efficacious and cost-efficient in detecting renal artery stenosis. However, it is less sensitive than MRA for detection of renovascular hypertension.
## COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL CTA/MRA:

<table>
<thead>
<tr>
<th>PORTAL HYPERTENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-OPERATIVE EVALUATION PRIOR TO LIVER RESECTION OR LIVER TRANSPLANTATION</td>
</tr>
<tr>
<td>PRIOR TO RESECTION OF PELVIC NEOPLASM</td>
</tr>
<tr>
<td>SURGICAL PLANNING FOR A KIDNEY DONOR</td>
</tr>
<tr>
<td>SURGICAL PLANNING FOR RENAL TUMOR RESECTION</td>
</tr>
<tr>
<td>VASCULITIS</td>
</tr>
<tr>
<td>TRAUMATIC VASCULAR INJURY</td>
</tr>
<tr>
<td>SUSPECTED LEAK FOLLOWING ABDOMINAL AORTIC SURGERY</td>
</tr>
</tbody>
</table>

### ENDOVASCULAR STENT GRAFT PLACEMENT FOR ABDOMINAL AORTIC ANEURYSM REPAIR 13-15

- Stent grafts must be documented as MR-compatible prior to MRA
- Primary concerns are for monitoring the aneurysm size, identifying stent migration and detecting endoleaks.
- Post-procedure follow-up in asymptomatic patients: 13
  - Initial baseline CTA is recommended in less than 1 month post-stent graft placement
  - If there are no problems related to the stent graft, then scans are obtained at 6 month intervals, for 2 years
  - Thereafter, an annual follow-up CTA may be performed
- If symptoms/problems related to the stent graft occur, then more frequent imaging may be needed.

### VASCULAR ANATOMIC DELINEATION FOR OTHER SURGICAL AND INTERVENTIONAL PROCEDURES

- Including but not limited to the following clinical scenarios:
  - For surgical porto-systemic shunt placement or TIPS (transjugular intrahepatic porto-systemic shunt) 16
  - For hepatic chemo-embolization procedure
  - For vascular delineation prior to operative resection of an abdominal neoplasm 17-18
  - For pre- and post-procedure evaluation of bypass grafts, stents and vascular anastomoses

### VASCULAR INVASION OR COMPRESSION BY AN ABDOMINAL TUMOR

### UNEXPLAINED BLOOD LOSS IN THE ABDOMEN

## REFERENCE/LITERATURE REVIEW:


CT Angiography (CTA)  
Abdominal Aorta and Bilateral Iliofemoral Lower Extremity Run-Off

**CPT CODES:**

75635..............Computed tomographic angiography, abdominal aorta and bilateral iliofemoral lower extremity runoff, with contrast material(s), including noncontrast images, if performed, and image postprocessing.

**STANDARD ANATOMIC COVERAGE:**

- CPT code 75635 (CTA) includes imaging of the abdominal aorta and bilateral iliofemoral vasculature, in addition to lower extremity run-off to the level of the popliteal regions at the knees and often extending through the calf vasculature to the ankle and foot regions.

**IMAGING CONSIDERATIONS:**

- Doppler Ultrasound examination is an excellent means to identify a wide range of vascular abnormalities, both arterial and venous in origin. This well-established modality should be considered in the initial evaluation of many vascular disorders listed below.
- CTA should be considered, unless contraindicated, in patients who cannot undergo MRA, due to either an inability to tolerate MRA examination (for example, secondary to claustrophobia) or biosafety issues. Among the generally recognized contraindications to MRI exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- CT Angiography utilizes the data obtained from standard CT imaging. A request for a CT exam, in addition to a CTA of the same anatomic area during the same imaging session, is inappropriate.
- Additional, separate requests for a CTA of the pelvis and/or the lower extremities, along with CPT code 75635, are inappropriate.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**COMMON DIAGNOSTIC INDICATIONS FOR CTA OF THE ABDOMINAL AORTA AND BILATERAL IlioFEMORAL ARTERIES WITH LOWER EXTREMITY RUN-OFF:**

The following diagnostic indications for CTA of the Abdominal Aorta and Bilateral Iliofemoral Arteries with Lower Extremity Run-Off are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

<table>
<thead>
<tr>
<th>Indication</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>ANEURYSM</strong> 1-2</td>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
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<tr>
<td><strong>PSEUDOANEURYSM</strong></td>
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<tr>
<td><strong>DISSECTION</strong> 3</td>
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| **STENOSIS OR OCCLUSION OF THE ABDOMINAL AORTA OR BRANCH VESSELS** 4 | Due to:  
  - Atherosclerosis |
COMMON DIAGNOSTIC INDICATIONS FOR CTA OF THE ABDOMINAL AORTA AND BILATERAL ILIOFEMORAL ARTERIES WITH LOWER EXTREMITY RUN-OFF:

- Thromboembolism
- Other causes

VAScular EVALUATION oF LOWER EXTREMITY CLAUDICATION

- Either CTA or MRA is indicated in a patient with classic presenting symptoms of claudication from peripheral arterial disease, such as diminished/absent peripheral pulses and cramping pain in the legs (particularly in the thighs and calves) when walking, which disappears at rest. Other clinical findings which support non-invasive assessment with CTA or MRA include lower extremity cutaneous ulcers and gangrene.
- In the absence of classic peripheral symptoms of claudication, then obtain a vascular surgical consultation and perform lower extremity non-invasive arterial evaluation, which may include the following: segmental systolic pressure measurements, segmental limb plethysmography, Continuous wave Doppler and duplex ultrasonography. Ankle brachial indices (ABI) of < 0.9 may undergo advanced imaging. Rest pain or severe occlusive disease typically occurs with ABI < 0.5.

CRITICAL ISCHEMIA oF LOWER EXTREMITIES

- For example, in diabetic vascular disease with ischemic ulcers or gangrene

SURGICAL PLANNING FOR A KIDNEY DONOR

PRE- AND POST-OPERATIVE OR INTERVENTIONAL VASCULAR PROCEDURE – FOR LUMINAL PATENCY VERSUS RE-STENOSIS (DUE TO ATHEROSCLEROSIS, THROMBOEMBOLISM, INTIMAL HYPERPLASIA OR OTHER CAUSE) AS WELL AS POST-PROCEDURAL COMPLICATIONS (SUCH AS PSEUDOANEURYSMS RELATED TO SURGICAL BYPASS GRAFTS OR VASCULAR STENTS)

REFERENCE/LITERATURE REVIEW:

Computed Tomography (CT)  
Pelvis

<table>
<thead>
<tr>
<th>CPT CODES:</th>
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<tbody>
<tr>
<td>72192...........CT of Pelvis, without contrast</td>
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<tr>
<td>72193...........CT of Pelvis, with contrast</td>
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<td>72194...........CT of Pelvis without contrast, followed by re-imaging with contrast</td>
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<table>
<thead>
<tr>
<th>STANDARD ANATOMIC COVERAGE:</th>
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<tbody>
<tr>
<td>● Iliac Crests to Ischial Tuberosities</td>
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<tr>
<td>● Pelvic CT may include imaging of the following anatomic structures:</td>
</tr>
<tr>
<td>– Urinary Bladder</td>
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<tr>
<td>– Lower Retroperitoneum</td>
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<td>● Coverage may vary, depending on the specific clinical indication for the exam</td>
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<tr>
<th>IMAGING CONSIDERATIONS:</th>
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<tbody>
<tr>
<td>● Radiation Dosimetry: For Pelvic CT scans performed without contrast, the typical effective radiation dose is 10 mSv. This dosage correlates with an estimated 500 Chest X-Ray equivalents or approximately 4.5 years of natural background radiation.</td>
</tr>
<tr>
<td>● When ordering a Pelvic CT exam, consideration should be given to the benefits as well as the risks from radiation exposure and ramifications of false positive studies (both financial and psychological), which may require further work-up with other imaging modalities or follow-up surveillance with CT.</td>
</tr>
<tr>
<td>● Most health plans do not currently provide benefit coverage for screening exams that use advanced imaging.</td>
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<tr>
<td>● Depending on the patient’s presenting signs and symptoms, pelvic imaging should be directed to the most appropriate modality for clinical work-up. Techniques available for diagnostic evaluation of the pelvis include the following:</td>
</tr>
<tr>
<td>– Pelvic ultrasound (trans-abdominal and trans-vaginal) as the initial imaging modality for most gynecologic abnormalities</td>
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<td>– Transabdominal pelvic sonography is also used for urinary bladder assessment, such as post-void residual urine volume</td>
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<td>– Endoscopy and barium examinations are well-established procedures for intestinal evaluation</td>
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<td>– Cystoscopy is often used for lower urinary tract assessment</td>
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<tr>
<td>– Pelvic CT</td>
</tr>
<tr>
<td>– Pelvic MRI</td>
</tr>
<tr>
<td>● Consider using Ultrasound for indications such as differentiation of cystic, complex and solid lesions and initial ascites evaluation.</td>
</tr>
<tr>
<td>● Verification of cystic lesions in the pelvis is usually well-established with Ultrasound.</td>
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<td>● Ultrasound studies may be limited in obese patients.</td>
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<td>● Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.</td>
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# COMMON DIAGNOSTIC INDICATIONS FOR PELVIC CT:

The following diagnostic indications for Pelvic CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.  
This section contains:

- General Pelvic CT Indications
- Additional Intestinal Indications
- Additional Genitourinary Indications
- Additional Vascular Indications
- Additional Osseous Indications

## General Pelvic CT Indications:

### ABNORMAL FINDINGS ON OTHER IMAGING EXAMS THAT REQUIRE FURTHER EVALUATION

- For example, pelvic radiographs demonstrating abnormal calcifications suspicious for urinary tract calculus disease

### ASCITES

- Following preliminary evaluation on a Pelvic Ultrasound

### CONGENITAL ANOMALY

### FEVER OF UNKNOWN ORIGIN

### HEMATOMA / HEMORRHAGE

### HERNIA

- For diagnosis of a hernia with suspected complications or presurgical planning including but not limited to the following types of hernia:
  - Femoral
  - Incisional
  - Inguinal
  - Spigelian (through semilunar line, lateral to rectus abdominis muscle)
  - Ventral

### INFECTIOUS OR INFLAMMATORY PROCESS

- Including but not limited to the following:
  - Abscess
  - Diffuse Inflammation / Phlegmon
  - Fistula

### DIFFUSE, UNEXPLAINED LOWER EXTREMITY EDEMA

- Advanced imaging may be used to exclude an occult pelvic tumor or lesion causing mass effect, not identified by pelvic ultrasound, as the cause of vascular compression and resultant lower extremity edema

### LYMPHADENOPATHY

- For initial detection and follow-up

### PALPABLE PELVIC MASS

- When undiagnosed by ultrasound in female patients

### PELVIC PAIN – UNEXPLAINED BY CLINICAL FINDINGS, PHYSICAL EXAMINATION AND OTHER IMAGING STUDIES

- Choice of the best diagnostic imaging exam to evaluate pelvic pain is dependent on the location of the pain as well as other factors (such as severity of pain; associated symptoms; laboratory findings; and age - pediatric versus adult patient).
- The following studies represent alternative imaging, in specific clinical scenarios
  - Ultrasound:
    1. For pelvic symptoms in the pediatric population – Ultrasound frequently provides diagnostic information, without incurring radiation exposure from CT
    2. For pelvic symptoms in females with non-specific lower pelvic pain– Pelvic Ultrasound (trans-abdominal and
### COMMON DIAGNOSTIC INDICATIONS FOR PELVIC CT:

- trans-vaginal scans) usually provides excellent anatomic depiction of the uterus, adnexal structures and cul-de-sac
  - Barium examination or Endoscopy: For symptoms related to the intestinal tract, such as pelvic pain secondary to inflammatory bowel disease
- In other circumstances, pelvic CT may be indicated for evaluation of unexplained pelvic pain.

### POST-OPERATIVE EVALUATION FOR COMPLICATIONS

- For suspected or known operative complications, particularly during the initial 6-8 weeks following open or laparoscopic abdomino-pelvic surgery

### PRE-OPERATIVE PLANNING FOR BARIATRIC SURGERY

### TUMOR EVALUATION: PRIMARY NEOPLASM OR METASTATIC DISEASE

- For initial staging and periodic follow-up
- May involve:
  - Colo-rectum
  - Gynecologic structures: Uterus, Cervix or Ovaries
  - Lymph Nodes
  - Prostate Gland
  - Small Intestines
  - Testicles
  - Urinary Bladder
  - Other pelvic and lower retroperitoneal structures

### TRAUMA – SIGNIFICANT PELVIC INJURY

### UNEXPLAINED WEIGHT LOSS – SIGNIFICANT WEIGHT LOSS EXCEEDING 10% OF DESIRABLE BODY WEIGHT, OVER SHORT TIME INTERVAL (SIX MONTHS OR LESS) AFTER INITIAL EVALUATION FOR OTHER CAUSES

- Additional Intestinal Indications:
  - APPENDICITIS
  - APPENDECEAL OR PERI-APPENDECEAL MASS – UNEXPLAINED ON PHYSICAL EXAM AND OTHER IMAGING STUDIES
  - BOWEL OBSTRUCTION
  - ENTERITIS AND/OR COLITIS
  - DIVERTICULITIS
  - INFLAMMATORY BOWEL DISEASE (IBD)
  - Crohn’s Disease
  - Ulcerative Colitis
  - For follow-up of known IBD, with new signs/symptoms suggesting exacerbation
  - ISCHEMIC BOWEL

- Additional Genitourinary Indications:
  - HYDRONEPHROSIS
  - Evaluation for possible obstructing ureteral or urinary bladder lesion
  - When ultrasound is non-diagnostic or abnormal and unexplained, requiring further evaluation
  - HEMATURIA
  - URINARY TRACT CALCULUS DISEASE AND/OR UNILATERAL FLANK PAIN
### COMMON DIAGNOSTIC INDICATIONS FOR PELVIC CT:

**UNDESCENDED (CRYPTORCHIDISM) TESTICLE**

**Additional Vascular Abnormalities:**

**ANEURYSM OF LOWER ABDOMINAL AORTA, ILIAC ARTERIES OR BRANCH VESSELS**
- Initial diagnosis, particularly in obese patients
- Follow-up imaging with Ultrasound in non-surgical and non-obese patients, who are asymptomatic and have aneurysms < 5 cm in diameter
- Suspected complication of an aneurysm, such as rupture or infection

**AORTO-ILIAC DISSECTION**
- May evaluate with either CT or CTA

**ENDOVASCULAR REPAIR OF ABDOMINAL AORTIC ANEURYSM**
- May evaluate with CT or CTA
- Primary concerns are in monitoring aneurysm size, identifying stent migration and detecting endoleaks.
- Prior to and surveillance following placement of Stent Graft
- Society of Interventional Radiology: Post-procedure recommended follow-up in asymptomatic patients:
  - Initial baseline CTA is recommended in less than 1 month post-stent graft placement
  - If there are no problems related to the stent graft, then scans are obtained at 6 month intervals for 2 years
  - Thereafter, an annual follow-up CTA may be performed
- If symptoms/problems related to the stent graft occur, then more frequent imaging may be needed

**ARTERIOVENOUS MALFORMATION (AVM)**
- CTA or MRA are the modalities of choice for evaluating these vascular lesions

**THROMBOSIS IN THE SYSTEMIC AND PORTAL VENOUS CIRCULATIONS**
- May follow initial evaluation with Doppler Ultrasound

**Additional Osseous Indications:**

**STRESS / INSUFFICIENCY FRACTURE IN THE PELVIS**
- Radiographs are a required first step, before other imaging is performed

**ACUTE PELVIC TRAUMA, FOR FRACTURE EVALUATION**
- Radiographs should be performed prior to CT in most circumstances

**HIP OSTEONECROSIS**
- When the patient is unable to undergo hip MRI or Radionuclide Bone Scintigraphy, which are more sensitive modalities than hip CT, in individuals with normal hip films or inconclusive radiographic evidence of hip osteonecrosis
- In known hip osteonecrosis and femoral head collapse by radiography, CT may help in the pre-operative planning, to define the location and extent of disease in patients with painful hips

**OSSEOUS TUMOR EVALUATION IN THE PELVIS**
- Radionuclide Bone Scintigraphy is a frequently used imaging modality for detection of skeletal metastases from most primary tumors and usually precedes request for CT.
- When an abnormality is detected on bone scanning, radiographs of the anatomic area are usually performed to document whether finding(s) may be secondary to a benign process, such as osteoarthritis or fracture.

**CHRONIC HIP PAIN, WITH NEGATIVE X-RAY AND SUSPECTED OSTEOID OSTEOMA**
- Requires negative or inconclusive hip radiographs prior to CT imaging

**SACROILIITIS**
- Following sacroiliac joint radiographs

**SUSPICION OF PELVIC OSTEOMYELITIS OR SEPTIC ARTHRITIS**
- When the patient is unable to undergo Hip MRI or Radionuclide Bone Scintigraphy
REFERENCE/LITERATURE REVIEW:

5. Jung SE. Lee JM, Rha SE, et al. CT and MR Imaging of Ovarian Tumors with Emphasis on Differential Diagnosis
Magnetic Resonance Imaging (MRI)
Pelvis

CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>72195</td>
<td>MRI of Pelvis, without contrast</td>
</tr>
<tr>
<td>72196</td>
<td>MRI of Pelvis, with contrast</td>
</tr>
<tr>
<td>72197</td>
<td>MRI of Pelvis, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Iliac Crests to Ischial Tuberosities
- Pelvic MRI may include imaging of the following anatomic structures:
  - Urinary Bladder
  - Lower Retroperitoneum
  - Iliofemoral Lymph Nodes
  - Sacrum and Iliac Bones
  - Sacroiliac (SI) Joints
  - Prostate Gland and Seminal Vesicles in Males
  - Uterus, Cervix, Vagina and Ovaries in Females
- Coverage may vary, depending on the specific clinical indication for the exam

IMAGING CONSIDERATIONS:

- Depending on the patient’s presenting signs and symptoms, pelvic imaging should be directed to the most appropriate modality for clinical work-up
- Diagnostic evaluation of the pelvis may be performed with:
  - Pelvic ultrasound (trans-abdominal and trans-vaginal), which is the initial imaging modality for most gynecologic abnormalities
  - Transabdominal pelvic sonography is also used for urinary bladder assessment, such as post-void residual urine volume
  - Endoscopy and barium examinations are well established procedures for intestinal evaluation
  - Cystoscopy is often used for lower urinary tract assessment
  - Pelvic CT
  - Pelvic MRI
- Verification of cystic lesions in the pelvis is usually well-established with Ultrasound.
- Ultrasound studies may be limited in obese patients.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Authorization requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed.

Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.
**IMAGING CONSIDERATIONS:**

**Biosafety Issues:**
- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

**Ordering Issues:**
- This guideline does not supersede the enrollee’s health plan medical policy specific to pelvic MRI.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**COMMON DIAGNOSTIC INDICATIONS FOR PELVIC MRI:**

*The following diagnostic indications for Pelvic MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

**ADENOMYOSIS OF THE UTERUS**

**ADNEXAL MASS(ES)**
- Usually performed to further evaluate problematic cases which are initially detected on pelvic ultrasound. Some uses of Pelvic MRI in adnexal lesion evaluation include: differentiation of an ovarian mass from an exophytic or pedunculated fibroid; more confident identification of an ovarian dermoid/teratoma, following an ultrasound or other imaging exam; and demonstration of findings to suggest malignancy in some adnexal masses.
- Includes assessment of suspected hemorrhagic cystic lesions and tumors

**CONGENITAL ANOMALY**

**ENDOMETRIOSIS**
- Following pelvic ultrasound

**INFECTIOUS OR INFLAMMATORY PROCESS OF THE SOFT TISSUES**
- CT is usually the imaging modality of choice for infectious and inflammatory conditions
- Including but not limited to the following:
  - Abscess
  - Diffuse Inflammation

**OSTEOMYELITIS OR SEPTIC ARTHRITIS**

**BILATERAL HIP OSTEONECROSIS (AVASCULAR NECROSIS; ASEPTIC NECROSIS)**
- MRI is the modality of choice for evaluation of osteonecrosis, particularly when there is clinical suspicion with hip pain and negative or inconclusive hip radiographs

**LYMPHADENOPATHY**
- When Pelvic CT is non-diagnostic
- May be useful for differentiating enlarged lymph nodes from vascular structures (with flow void on MRI), as follow-up from an unenhanced pelvic CT exam
**COMMON DIAGNOSTIC INDICATIONS FOR PELVIC MRI:**

**OBSTETRICAL ABNORMALITIES PELVIMETRY OR OBSTETRICAL COMPLICATIONS**

**TUMOR EVALUATION: PRIMARY NEOPLASM AND METASTATIC DISEASE**

- MRI staging and follow-up evaluation for biopsy-proven malignancies of the following structures: \(^1,^3-^4,^7-^11\)
  - Liver
  - Pancreas
  - Spleen
  - Kidney \(^2\)
  - Adrenal \(^2\)
  - Lymph Nodes
  - Other Abdominal and Retroperitoneal Neoplasms
  - Assess vascular invasion or compression by pelvic or renal tumor

- Disseminated intra-abdominal tumor
  - Uterus, Cervix, Vagina or Vulva
  - Rectum
  - Testicles
  - Ovaries
  - Urinary Bladder
  - Prostate
  - Musculoskeletal Tumor

**UTERINE ARTERY EMBOLIZATION PROCEDURES \(^12\)**

- Often performed for treatment of persistent bleeding from uterine fibroids

**PELVIC FLOOR DISORDERS ASSOCIATED WITH URINARY OR BOWEL INCONTINENCE**

**PELVIC VENOUS THROMBOSIS EVALUATION**

**SACROILIAC JOINT IMAGING FOR SACROILIITIS**

**SACRAL INSUFFICIENCY FRACTURE**

**SIGNIFICANT PELVIC INJURY**

- Following pelvic or sacral radiographs

**UNDESCENDED (CRYPTORCHIDISM) TESTICLE**

**IN PATIENTS WITH APPROPRIATE AIM GUIDELINE INDICATIONS FOR PELVIC CT, WHEN CT IS EXPECTED TO BE LIMITED, DUE TO CONTRAINDICATIONS (SUCH AS A HISTORY OF ALLERGIC REACTION TO IODINATED RADIOGRAPHIC CONTRAST MATERIAL)**

**FOR CLARIFICATION OF QUESTIONABLE OR ABNORMAL FINDINGS ON OTHER PELVIC IMAGING STUDIES**

**REFERENCE/LITERATURE REVIEW:**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
</table>
CT Angiography (CTA) and MR Angiography (MRA)

Pelvis

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72191</td>
<td>Computed tomographic angiography, pelvis, with contrast material(s), including noncontrast images, if performed, and image postprocessing</td>
</tr>
<tr>
<td>72198</td>
<td>Magnetic resonance angiography, pelvis; without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Iliac Crests to Ischial Tuberosities
- Scan coverage may vary, depending on the specific clinical indication for the exam.

IMAGING CONSIDERATIONS:

- Doppler Ultrasound examination is an excellent means to identify a wide range of vascular abnormalities, both arterial and venous in origin. This well-established modality should be considered in the initial evaluation of many vascular disorders listed below.
- MRA should also be considered in patients with a history of either previous contrast reaction to intravascular administration of iodinated radiographic contrast material or atopy.
- CTA should be considered, unless contraindicated, in patients who cannot undergo MRA, due to either an inability to tolerate MRA examination (for example, secondary to claustrophobia) or biosafety issues. Among the generally recognized contraindications to MRI exam performance are indwelling pacemakers or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- CT Angiography utilizes the data obtained from standard CT imaging. A request for a CT exam in addition to a CT Angiography of the same anatomic area during the same imaging session is inappropriate.
- Requests for Pelvic CTA or MRA in addition to a request for a MRA or CTA abdominal aorta and bilateral iliofemoral lower extremity runoff study are not allowed.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR PELVIC CTA/MRA:

The following diagnostic indications for Pelvic CTA and MRA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aneurysm</td>
</tr>
<tr>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
</tr>
<tr>
<td>Pseudoaneurysm</td>
</tr>
<tr>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
</tr>
<tr>
<td>Dissection</td>
</tr>
<tr>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
</tr>
<tr>
<td>Intramural Hematoma</td>
</tr>
<tr>
<td>Of the Abdominal Aorta and/or Branch Vessel</td>
</tr>
</tbody>
</table>
### COMMON DIAGNOSTIC INDICATIONS FOR PELVIC CTA/MRA:

#### ARTERIOVENOUS MALFORMATION (AVM) OR FISTULA (AVF)

**STENOSIS OR OCCLUSION OF THE LOWER ABDOMINAL AORTA, ILIAC ARTERIES OR OTHER BRANCH VESSELS IN THE PELVIS**

- Due to:
  - Atherosclerosis
  - Thromboembolism
  - Other Causes

#### MESENTERIC ISCHEMIA

- May have an acute or chronic and progressive (intestinal or abdominal angina) presentation

#### VENOUS THROMBOSIS OR OCCLUSION

- Consider initial evaluation with Doppler Ultrasound
  - Systemic Venous System, including Lower IVC and/or Ilio-femoral Luminal Thrombosis
  - Mesenteric Venous System in Pelvis

#### TRAUMATIC VASCULAR INJURY

#### SURGICAL PLANNING FOR A KIDNEY DONOR

#### SUSPECTED LEAK FOLLOWING ABDOMINAL AORTIC SURGERY

#### ENDOVASCULAR STENT GRAFT PLACEMENT FOR ABDOMINAL AORTIC ANEURYSM REPAIR

- Stent grafts must be documented as MR-compatible prior to MRA
- Primary concerns are in monitoring aneurysm size, identifying stent migration and detecting endoleaks.
- Prior to and surveillance following placement of a Stent Graft
- Society of Interventional Radiology: Post-procedure recommended follow-up in asymptomatic patients:
  - Initial baseline CTA is recommended in less than 1 month post-stent graft placement
  - If there are no problems related to the stent graft, then scans are obtained at 6 month intervals for 2 years
  - Thereafter, an annual follow-up CTA may be performed
- If symptoms/problems related to the stent graft occur, then more frequent imaging may be needed

#### VASCULAR ANATOMIC DELINEATION FOR OTHER SURGICAL AND INTERVENTIONAL PROCEDURES:

- For vascular delineation prior to operative resection of a pelvic neoplasm
- For pre- and post-procedure evaluation of bypass grafts, stents and vascular anastomoses

#### VASCULAR INVASION OR COMPRESSION BY A PELVIC TUMOR

#### VASCULITIS

#### UNEXPLAINED BLOOD LOSS IN THE PELVIS

### REFERENCE/LITERATURE REVIEW:

Computed Tomography (CT)
Abdomen & Pelvis Combination

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74150</td>
<td>CT of Abdomen, without contrast</td>
</tr>
<tr>
<td>74160</td>
<td>CT of Abdomen, with contrast</td>
</tr>
<tr>
<td>74170</td>
<td>CT of Abdomen, without contrast, followed by re-imaging with contrast</td>
</tr>
<tr>
<td>72192</td>
<td>CT of Pelvis, without contrast</td>
</tr>
<tr>
<td>72193</td>
<td>CT of Pelvis, with contrast</td>
</tr>
<tr>
<td>72194</td>
<td>CT of Pelvis without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Diaphragmatic Dome through Pubic Symphysis
- Scan coverage may vary, depending on the specific clinical indication

IMAGING CONSIDERATIONS:

- Radiation dosimetry: For abdominal and pelvic CT combinations, the typical effective radiation dose is approximately 10 milliSieverts (mSv) for each individual component, or 20 mSv for the combination study. For both exams, this dosage correlates with an estimated 1,000 Chest X-Ray equivalents or approximately 9 years of natural background radiation.
- When ordering abdominal and pelvic CT exams, consideration should be given to the benefits as well as the risks from radiation exposure and ramifications of false positive studies (both financial and psychological), which may require further work-up with other imaging modalities or follow-up surveillance with CT.
- Many health plans do not currently provide benefit coverage for screening exams (in patients without signs and symptoms of disease) that use advanced imaging.
- Contrast-enhanced CT may be contraindicated in certain circumstances, such as a documented severe allergic reaction to intravenous contrast material and renal insufficiency.
- Depending on the presenting signs and symptoms, other diagnostic studies including Ultrasound, Barium Examinations and Endoscopy may be useful.
- For most gallbladder and hepatobiliary conditions, certain renal abnormalities (for example, detection of hydronephrosis and differentiation of cystic, complex and solid lesions) and ascites evaluation, initial imaging should be considered using Ultrasound.
- Verification of cystic lesions in the abdominal and pelvis is usually well-established with Ultrasound.
- Ultrasound studies may be limited in obese patients.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL & PELVIC COMBINATION CT:

The following diagnostic indications for Combined Abdominal and Pelvic CT Exams are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

This section contains:
- General Abdominal and Pelvic CT Indications
- Additional Gastrointestinal Indications
- Additional Pancreatic Indications
- Additional Genitourinary Indications

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General Abdominal and Pelvic CT Indications:

ABDOMINAL / PELVIC PAIN – unexplained by clinical findings, physical examination and other imaging studies
- Choice of the best diagnostic imaging exam to evaluate abdominal pain is dependent on the location of the pain as well as other factors (such as severity of pain; associated symptoms; laboratory findings; and age - pediatric versus adult patient).
- The following studies represent alternative imaging of abdomino-pelvic pain, in specific clinical scenarios
  - Ultrasound:
    1. For right upper quadrant pain, in all age groups – Abdominal Ultrasound is often the initial study of choice
    2. For abdominal symptoms in the pediatric population – Abdominal Ultrasound frequently provides diagnostic information, without incurring radiation exposure from CT
    3. For pelvic symptoms in females – Pelvic Ultrasound (trans-abdominal and trans-vaginal scans) usually provides excellent anatomic depiction of the uterus, adnexal structures and cul-de-sac
  - Plain Abdominal Radiographs: For initial evaluation of the bowel gas pattern, abnormal abdominal calcifications, pneumoperitoneum and other abnormalities
  - Upper or Lower Endoscopy: For symptoms related to the gastrointestinal tract, such as epigastric pain secondary to peptic ulcer disease

ABNORMAL FINDINGS ON OTHER IMAGING EXAMS THAT REQUIRE FURTHER EVALUATION
- For example, pelvic radiographs demonstrating abnormal calcifications suspicious for urinary tract calculus disease

ASCITES
- Following preliminary evaluation on an Abdominal Ultrasound

CONGENITAL ANOMALY

FEVER OF UNKNOWN ORIGIN

HEMATOMA / HEMORRHAGE

HERNIA
- For diagnosis of a hernia with suspected complications or presurgical planning including but not limited to the following types of hernia:
  - Femoral
  - Incisional
  - Internal
  - Inguinal
  - Spigelian (through semilunar line, lateral to rectus abdominis muscle)
  - Ventral

INFECTIOUS OR INFLAMMATORY PROCESS
- Including but not limited to the following:
  - Abscess
  - Diffuse Inflammation / Phlegmon
  - Fistula

DIFFUSE, UNEXPLAINED LOWER EXTREMITY EDEMA
- Advanced imaging may be used to exclude an occult pelvic tumor or lesion causing mass effect, not identified by pelvic ultrasound, as the cause of vascular compression and resultant lower extremity edema

LYMPHADENOPATHY
- For initial detection and follow-up
### COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL & PELVIC COMBINATION CT:

<table>
<thead>
<tr>
<th><strong>PALPABLE ABDOMINAL / PELVIC MASS</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>● When undiagnosed by ultrasound in female patients</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>POST-OPERATIVE EVALUATION FOR COMPLICATIONS</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>● For suspected or known operative complications, particularly during the initial 6-8 weeks following open or laparoscopic abdomino-pelvic surgery</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PRE-OPERATIVE PLANNING FOR BARIATRIC SURGERY</strong></th>
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<tbody>
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<table>
<thead>
<tr>
<th><strong>TRAUMA</strong></th>
<th></th>
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<tbody>
<tr>
<td>● Following significant blunt or penetrating injury to the Abdomen and Pelvis</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>TUMOR EVALUATION: PRIMARY NEOPLASM</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>● For diagnosis</td>
<td></td>
</tr>
<tr>
<td>● Initial staging</td>
<td></td>
</tr>
<tr>
<td>● Periodic follow up</td>
<td></td>
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</tbody>
</table>

*Note: For colorectal cancer surveillance, the American Society of Clinical Oncology (ASCO) recommends the following 2005 practice guideline regarding use of CT:*

“Panel recommends annual computed tomography (CT) of the chest and abdomen for 3 years after primary therapy for patients who are at higher risk of recurrence and who could be candidates for curative-intent surgery; pelvic CT scan for rectal cancer surveillance, especially for patients with several poor prognostic factors, including those who have not been treated with radiation.”

<table>
<thead>
<tr>
<th><strong>TUMOR EVALUATION: METASTATIC DISEASE</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>● For diagnosis</td>
<td></td>
</tr>
<tr>
<td>● Initial staging</td>
<td></td>
</tr>
<tr>
<td>● Periodic follow up</td>
<td></td>
</tr>
</tbody>
</table>

May involve the following anatomic areas: 2-4

- Adrenal Glands
- Biliary Tract
- Liver
- Lymph Nodes
- Other abdomino-pelvic and retroperitoneal structures
- Pancreas
- Spleen
- Stomach, Small Intestines or Colo-Rectum
- Urinary Bladder

<table>
<thead>
<tr>
<th><strong>UNEXPLAINED WEIGHT LOSS – SIGNIFICANT WEIGHT LOSS EXCEEDING 10% OF DESIRABLE BODY WEIGHT, OVER SHORT TIME INTERVAL (SIX MONTHS OR LESS), AFTER INITIAL EVALUATION FOR OTHER CAUSES</strong></th>
<th></th>
</tr>
</thead>
</table>

*Additional Gastrointestinal Indications:*

<table>
<thead>
<tr>
<th><strong>APPENDICITIS</strong> 8</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>APPENDICEAL OR PERI-APPENDICEAL MASS – UNEXPLAINED ON PHYSICAL EXAM AND OTHER IMAGING STUDIES</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>DIVERTICULITIS</strong> 9-10</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>INFLAMMATORY BOWEL DISEASE (IBD)</strong></th>
<th></th>
</tr>
</thead>
</table>

- Crohn’s Disease12
- Ulcerative Colitis

● For follow-up of known IBD, with new signs/symptoms suggesting exacerbation
### COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL & PELVIC COMBINATION CT:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOWEL OBSTRUCTION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ISCHEMIC BOWEL</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ENTERITIS AND/OR COLITIS</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Additional Pancreatic Indications:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACUTE PANCREATITIS, WITH SUSPECTED COMPLICATIONS INCLUDING PANCREATIC NECROSIS, ABSCESSES, PSEUDOCYST(S) AND/OR PERI-PANCREATIC EFFUSIONS</strong></td>
<td>- Note that patients with mild acute, uncomplicated pancreatitis usually do not require cross-sectional imaging, aside from Ultrasound identification of gallstones and/or biliary ductal calculi, as a potential cause.</td>
</tr>
<tr>
<td><strong>PANCREATIC PSEUDOCYST</strong></td>
<td>With prior history of pancreatitis or pancreatic trauma</td>
</tr>
<tr>
<td><strong>PANCREATIC MASS</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Additional Genitourinary Tract Indications:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>URINARY TRACT CALCULUS DISEASE AND/OR UNILATERAL FLANK PAIN</strong></td>
<td></td>
</tr>
<tr>
<td><strong>HYDRONEPHROSIS</strong></td>
<td>Evaluation for possible obstructing ureteral or urinary bladder lesion</td>
</tr>
<tr>
<td></td>
<td>When ultrasound is non-diagnostic or abnormal and unexplained, requiring further evaluation</td>
</tr>
<tr>
<td><strong>HEMATURIA</strong></td>
<td></td>
</tr>
<tr>
<td><strong>RENAL NEOPLASM</strong></td>
<td>For diagnosis, initial staging and pre-operative evaluation, re-staging and treatment monitoring</td>
</tr>
<tr>
<td><strong>UNDESCENDED (CRYPTORCHIDISM) TESTICLE</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Additional Vascular Abnormalities:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANEURYSM OF ABDOMINAL AORTA OR BRANCH VESSEL</strong></td>
<td>- Initial diagnosis, particularly in obese patients</td>
</tr>
<tr>
<td></td>
<td>- Follow-up imaging may be performed with ultrasound in non-surgical and non-obese patients, who are asymptomatic and have aneurysms &lt; 5 cm in diameter</td>
</tr>
<tr>
<td></td>
<td>- Pre-operative assessment or prior to percutaneous endovascular stent graft placement</td>
</tr>
<tr>
<td></td>
<td>- Post-operative surveillance</td>
</tr>
<tr>
<td></td>
<td>- Suspected complication of an aneurysm, such as aneurysmal rupture or infection – requiring urgent imaging</td>
</tr>
<tr>
<td><strong>AORTIC DISSECTION</strong></td>
<td>May evaluate with either CT or CTA</td>
</tr>
<tr>
<td></td>
<td>Usually results from subdiaphragmatic extension of a Thoracic Aortic Dissection</td>
</tr>
</tbody>
</table>

#### Endovascular Stent Graft Placement for Abdominal Aortic Aneurysm

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENDOVASCULAR STENT GRAFT PLACEMENT FOR ABDOMINAL AORTIC ANEURYSM</strong></td>
<td>- May evaluate with CT or CTA</td>
</tr>
<tr>
<td></td>
<td>- Primary concerns are in monitoring aneurysm size, identifying stent migration and detecting endoleaks.</td>
</tr>
<tr>
<td></td>
<td>- Prior to and surveillance following placement of Stent Graft</td>
</tr>
<tr>
<td><strong>Society of Interventional Radiology: Post-procedure recommended follow-up in asymptomatic patients:</strong></td>
<td>- Initial baseline CTA is recommended in less than 1 month post-stent graft placement</td>
</tr>
<tr>
<td></td>
<td>- If there are no problems related to the stent graft, then scans are obtained at 6 month intervals for 2 years</td>
</tr>
<tr>
<td></td>
<td>- Thereafter, an annual follow-up CTA may be performed</td>
</tr>
<tr>
<td></td>
<td>- If symptoms/problems related to the stent graft occur, then more frequent imaging may be needed</td>
</tr>
<tr>
<td><strong>ARTERIOVENOUS MALFORMATION (AVM)</strong></td>
<td>CTA or MRA are the modalities of choice for evaluating these vascular lesions</td>
</tr>
</tbody>
</table>

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145

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COMMON DIAGNOSTIC INDICATIONS FOR ABDOMINAL & PELVIC COMBINATION CT:

THROMBOSIS IN THE SYSTEMIC AND PORTAL VENOUS CIRCULATIONS

- May follow initial evaluation with Doppler Ultrasound

REFERENCE/LITERATURE REVIEW:

Computerized Tomography (CT)
CT Colonography
(Virtual Colonoscopy)

CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74263</td>
<td>Screening CT Colonography including image post processing</td>
</tr>
<tr>
<td>74261</td>
<td>Diagnostic CT Colonography without contrast</td>
</tr>
<tr>
<td>74262</td>
<td>Diagnostic CT Colonography with contrast including non-contrast images if performed</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Use of helical CT and reconstruction algorithms to provide endoluminal visualization of the colon, as well as anatomic depiction throughout much of the abdomen and pelvis. Both 2D and 3D reconstructions are routinely used for colonic evaluation. Colonic preparation is required, similar to standard fiberoptic colonoscopy. Another similarity to fiberoptic colonoscopy is the requirement for air insufflation to distend the colon.

IMAGING CONSIDERATIONS:

- The CPT codes for CT of the abdomen (74150-74170) and CT of the Pelvis (72192 – 72194) should not be used when a CT Colonography exam is requested.
- When ordering CT studies, consideration should be given to the benefits as well as the risks from radiation exposure and ramifications of false positive studies (both financial and psychological), which may require further work-up with other imaging modalities or follow-up surveillance with CT.
- Depending on the presenting signs and symptoms, other studies such as fiberoptic colonoscopy and barium examination may be helpful for evaluation of the colon.
- CT Colonography requires cleansing bowel preparation and air insufflation for colonic distention, similar to fiberoptic colonoscopy.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR DIAGNOSTIC CT COLONOGRAPHY:

The following diagnostic indication for Diagnostic CT Colonography is accompanied by pre-test considerations and supporting clinical data

Indications for Diagnostic CT Colonography (74261, 74262):

FAILED OR INCOMPLETE FIBEROPTIC COLONOSCOPY OF THE ENTIRE COLON, DUE TO INABILITY TO PASS THE COLONOSCOPE PROXIMALLY. FAILURE TO ADVANCE THE COLONOSCOPE MAY BE SECONDARY TO:

- Obstructing neoplasm
- Spasm
- Redundant colon
- Altered anatomy or scarring from previous surgery
- Stricture
- Extrinsic compression

COAGULOPATHY

LIFETIME OR LONG-TERM ANTICOAGULATION, WITH INCREASED PATIENT RISK IF DISCONTINUED
COMMON DIAGNOSTIC INDICATIONS FOR DIAGNOSTIC CT COLONOGRAPHY:

COMPLICATIONS FROM PRIOR FIBEROPTIC COLONOSCOPY

DIVERTICULITIS, WITH INCREASED RISK OF PERFORATION

INCREASED SEDATION RISK
• For example, COPD or previous adverse reaction to anesthesia

KNOWN COLONIC OBSTRUCTION, WHEN STANDARD FIBEROPTIC COLONOSCOPY IS CONTRAINDICATED

Indications for Screening CT Colonography (74263):

AS AN ALTERNATIVE TO EITHER CONVENTIONAL (OPTICAL) COLONOSCOPY OR DOUBLE CONTRAST BARIUM ENEMA FOR COLORECTAL CANCER SCREENING, IN INDIVIDUALS BEGINNING AT THE AGE OF 50 YEARS AND AT A FREQUENCY OF EVERY 5 YEARS.

REFERENCE/LITERATURE REVIEW:

**Computed Tomography (CT)**  
**Cervical Spine**

**CPT CODES:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72125</td>
<td>CT of Cervical Spine, without contrast</td>
</tr>
<tr>
<td>72126</td>
<td>CT of Cervical Spine, with contrast</td>
</tr>
<tr>
<td>72127</td>
<td>CT of Cervical Spine, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

**STANDARD ANATOMIC COVERAGE:**

- Entire cervical spine (C1-C7), from the craniocervical junction through the T1 vertebra.
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions.

**IMAGING CONSIDERATIONS:**

- MRI is the modality of choice for most cervical spine imaging indications, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia).
- CT is the preferred technique for certain clinical scenarios such as suspected fracture, follow-up of known fracture, osseous tumor evaluation and congenital vertebral defects in the pediatric population, as well as procedures such as cervical spine CT Myelography.
- Do not use CT Cervical Spine for imaging of the soft tissues of the neck. See CPT codes 70490-70492 CT soft tissue neck for this service.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**COMMON DIAGNOSTIC INDICATIONS FOR CERVICAL SPINE CT:**

The following diagnostic indications for Cervical Spine CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

- MRI is the preferred modality for most cervical spine imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; osseous tumor assessment; developmental vertebral abnormalities) and CT myelography.

**FRACTURE EVALUATION**

- **1-2**
  - SIGNIFICANT ACUTE TRAUMA TO THE CERVICAL SPINE REGION
  - LESS SEVERE CERVICAL SPINE TRAUMA AND NEW NEUROLOGIC FINDING(S) OR PROGRESSIVELY WORSENING NECK PAIN

**ABNORMAL CERVICAL SPINE RADIOGRAPHS**

**POST-MYELOGRAM CT**

**WHEN THE PATIENT’S CONDITION MEETS THE CERVICAL SPINE MRI GUIDELINES, BUT THERE IS EITHER A CONTRAINDICATION TO MRI OR THE PATIENT CANNOT TOLERATE MRI EXAMINATION (FOR EXAMPLE, DUE TO CLAUSTROPHOBIA).**

For most other indications, MRI is the preferred modality for advanced cervical spine imaging, unless contraindicated.
<table>
<thead>
<tr>
<th>COMMON DIAGNOSTIC INDICATIONS FOR CERVICAL SPINE CT:</th>
</tr>
</thead>
<tbody>
<tr>
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<td>• In the Pediatric population, as well as in patients with documented rheumatologic disease afflicting the joints, pain in the cervical spine region may not require completion of the 3-4 week course of conservative treatment</td>
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<td>• Neck pain not meeting the above criteria but associated with &quot;red flag&quot; symptoms such as unexplained weight loss, history of malignant disease, fever, abnormal serum electrophoresis suggestive of multiple myeloma, history of drug abuse or tuberculosis</td>
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<td><strong>SIGNS AND SYMPTOMS OF SPINAL CORD AND/OR NERVE ROOT COMPRESSION (FOR EXAMPLE, DUE TO CERVICAL SPINE STENOSIS OR DISC HERNIATION)</strong></td>
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<td><strong>DEMELYELATING DISORDERS, SUCH AS MULTIPLE SCLEROSIS, WHEN MRI IS CONTRAINDICATED</strong></td>
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<tr>
<td><strong>MYELOPATHY</strong></td>
</tr>
<tr>
<td><strong>SPINAL CORD INFARCT</strong></td>
</tr>
<tr>
<td><strong>POST-MYELOGRAM CT OR CT FOLLOWING OTHER INTERVENTIONAL PROCEDURE</strong></td>
</tr>
<tr>
<td><strong>PREOPERATIVE EVALUATION AND PLANNING</strong></td>
</tr>
<tr>
<td><strong>POST-OPERATIVE EVALUATION, WITH NEW NEUROLOGIC FINDINGS OR WITH PERSISTENT OR RECURRENT PAIN</strong></td>
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<td><strong>INFECTIOUS OR INFLAMMATORY PROCESS</strong></td>
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<td><strong>TUMOR EVALUATION</strong></td>
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<td><strong>ARNOLD CHIARI MALFORMATION</strong></td>
</tr>
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<td><strong>CONGENITAL SPINE ANOMALIES</strong></td>
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<td>• Cervical spine dysraphism and other congenital anomalies involving the cervical spine and/or spinal cord</td>
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<td>• Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies</td>
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</tbody>
</table>
COMMON DIAGNOSTIC INDICATIONS FOR CERVICAL SPINE CT:

SYRINGOHYDROMYELIA (SYRINX)

SEVERE SCOLIOSIS, FOR THE FOLLOWING PATIENT POPULATIONS:  
- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; or
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); or
- With scoliosis related to other pathologic processes such as neurofibromatosis; or
- For pre-operative evaluation of severe scoliosis

Note: For Pediatric patients, who may require imaging of significant portions of the spine or the entire spine, MRI should be considered to minimize radiation exposure

REFERENCE/LITERATURE REVIEW:

# Magnetic Resonance Imaging (MRI) 
## Cervical Spine

### CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72141</td>
<td>MRI of Cervical Spine, without contrast</td>
</tr>
<tr>
<td>72142</td>
<td>MRI of Cervical Spine, with contrast</td>
</tr>
<tr>
<td>72156</td>
<td>MRI of Cervical Spine, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

### STANDARD ANATOMIC COVERAGE:

- Entire cervical spine (C1-C7), from the craniocervical junction through the T1 vertebra.
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions.

### IMAGING CONSIDERATIONS:

- For most cervical spine abnormalities, MRI is the examination of choice.
- CT of the cervical spine is often reserved for suspected fracture, follow-up of a known fracture, osseous tumor evaluation, congenital vertebral defects and procedures such as cervical spine CT Myelography.
- In most other clinical situations, MRI is the preferred modality for cervical spine imaging, unless contraindicated [due to pacemaker, implantable cardioverter-defibrillator (ICD), and other non-compatible devices unsafe for use in an MRI scanner] or not tolerated by the patient (usually secondary to claustrophobia).
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Authorization requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.

**Patient Compatibility Issues:**

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

**Biosafety Issues:**

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

**Ordering Issues:**

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the cervical spine.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to
IMAGING CONSIDERATIONS:

- high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR CERVICAL SPINE MRI:

The following diagnostic indications for Cervical Spine MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

- Unless contraindicated, MRI is the preferred modality for most cervical spine imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; osseous tumor assessment; developmental vertebral abnormalities) and CT myelography.

PERSISTENT PAIN / RADICULOPATHY

- In Adults, persistent symptoms despite ≥ 3-4 weeks of conservative therapy and failed or inadequate response to treatment, which may include the following:
  - Medications, such as NSAIDs and muscle relaxants
  - Steroids
  - Physical therapy/exercises
  - Activity modification
- In the Pediatric population, as well as in patients with documented rheumatologic disease afflicting the joints, pain in the cervical spine region may not require completion of the 3-4 week course of conservative treatment
- Neck pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, abnormal serum electrophoresis suggestive of multiple myeloma, history of drug abuse or tuberculosis

NECK OR SHOULDER PAIN AND NEW NEUROLOGIC FINDINGS RELATED TO THE CERVICAL SPINE OR DOCUMENTED NEUROLOGIC DEFICIT ON PHYSICAL EXAM (FOR EXAMPLE: REFLEX ABNORMALITY; MUSCLE WEAKNESS; OBJECTIVE SENSORY ABNORMALITY IN THE CERVICAL DERMATOME DISTRIBUTION)

SIGNs AND SYMPTOMS OF SPINAL CORD AND/OR NERVE ROOT COMPRESSION (FOR EXAMPLE, DUE TO CERVICAL SPINE STENOSIS OR DISC HERNIATION)

- Including but not limited to the following signs and symptoms:
  - Hyperactive Reflexes
  - Muscle Weakness
  - Sensory Loss
  - Spasticity

MYELOPATHY

SPINAL CORD INFARCT

DEMYELINATING DISORDERS, SUCH AS MULTIPLE SCLEROSIS

INFECTIOUS OR INFLAMMATORY PROCESS

- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis

TUMOR EVALUATION

- Including but not limited to the following:
  - Primary or Metastatic Neoplasm involving the Vertebrae
  - Tumor Spread within the Spinal Canal
  - Spinal Cord Neoplasm
COMMON DIAGNOSTIC INDICATIONS FOR CERVICAL SPINE MRI:

FRACTURE EVALUATION

SIGNIFICANT ACUTE TRAUMA TO THE CERVICAL SPINE REGION

LESS SEVERE CERVICAL SPINE TRAUMA AND NEW NEUROLOGIC FINDING(S) OR PROGRESSIVELY WORSENING NECK PAIN

ABNORMAL CERVICAL SPINE RADIOGRAPHS

PREOPERATIVE EVALUATION AND PLANNING

POST-OPERATIVE EVALUATION, WITH NEW NEUROLOGIC FINDINGS OR WITH PERSISTENT OR RECURRENT PAIN

ARNOLD CHIARI MALFORMATION

SYRINGOHYDROMYELIA (SYRINX)

SEVERE SCOLIOSIS, FOR THE FOLLOWING PATIENT POPULATIONS:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; or
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); or
- With scoliosis related to other pathologic processes such as neurofibromatosis; or
- For pre-operative evaluation of severe scoliosis

CONGENITAL SPINE ANOMALIES

- Cervical spine dysraphism and other congenital anomalies involving the cervical spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

REFERENCE/LITERATURE REVIEW:

Computed Tomography (CT)
Thoracic Spine

**CPT CODES:**
- 72128..............CT of Thoracic Spine, without contrast
- 72129..............CT of Thoracic Spine, with contrast
- 72130..............CT of Thoracic Spine, without contrast, followed by re-imaging with contrast

**STANDARD ANATOMIC COVERAGE:**
- Entire thoracic spine (T1-T12), from the cervicothoracic region through the thoracolumbar junction
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

**IMAGING CONSIDERATIONS:**
- Advanced diagnostic imaging of the thoracic spine is indicated in selected clinical scenarios and is performed significantly less often than in the lumbar and cervical regions.
- MRI is the modality of choice for most thoracic spine imaging indications, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia).
- CT is the preferred technique for certain clinical scenarios such as suspected fracture, osseous tumor evaluation, congenital vertebral defects and interventional procedures such as CT Myelography.
- Authorization request for re-imaging, due to technically limited exams, is the responsibility of the imaging provider.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers

**COMMON DIAGNOSTIC INDICATIONS FOR THORACIC SPINE CT:**
The following diagnostic indications for Thoracic Spine CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

MRI is the preferred modality for most thoracic spine imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; occasional osseous tumor assessment; developmental vertebral abnormalities) and CT myelography.

**FRACTURE EVALUATION**

<table>
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<th>SIGNIFICANT ACUTE TRAUMA TO THE THORACIC SPINE REGION</th>
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| LESS SEVERE THORACIC SPINE TRAUMA AND NEW NEUROLOGIC FINDING(S) OR PROGRESSIVELY WORSENING BACK PAIN |

| ABNORMAL THORACIC SPINE RADIOGRAPHS |

| POST-MYELOGRAM CT OR CT FOLLOWING OTHER THORACIC INTERVENTIONAL PROCEDURE |

| WHEN THE PATIENT’S CONDITION MEETS THE THORACIC SPINE MRI GUIDELINES, BUT THERE IS EITHER A CONTRAINDICATION TO MRI OR THE PATIENT CANNOT TOLERATE MRI EXAMINATION (FOR EXAMPLE, DUE TO CLAUSTROPHOBIA). |

For most other indications, MRI is the preferred modality for advanced thoracic spine imaging, unless contraindicated.
### COMMON DIAGNOSTIC INDICATIONS FOR THORACIC SPINE CT:

#### PERSISTENT PAIN / RADICULOPATHY
- In Adults, persistent symptoms despite ≥4-6 weeks of conservative therapy and failed or inadequate response to treatment, which may include the following:
  - Medications, such as NSAIDs and muscle relaxants
  - Steroids
  - Physical therapy/exercises
  - Activity modification
- In the Pediatric population, as well as in patients with documented rheumatologic disease afflicting the joints, pain in the thoracic spine region may not require completion of the 4-6 week course of conservative treatment.
- Upper Back pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, abnormal serum electrophoresis suggestive of multiple myeloma, history of drug abuse or tuberculosis

#### SIGNS AND SYMPTOMS OF SPINAL CORD AND/OR NERVE ROOT COMPRESSION (FOR EXAMPLE, DUE TO THORACIC SPINAL STENOSIS OR DISC HERNIATION)
- Including but not limited to the following signs and symptoms:
  - Hyperactive Reflexes
  - Muscle Weakness
  - Sensory Loss
  - Spasticity

#### BACK PAIN AND NEW NEUROLOGIC FINDINGS RELATED TO THE THORACIC SPINE OR DOCUMENTED NEUROLOGIC DEFICIT ON PHYSICAL EXAM (FOR EXAMPLE: REFLEX ABNORMALITY; MUSCLE WEAKNESS; OBJECTIVE SENSORY ABNORMALITY IN THE THORACIC DERMATOME DISTRIBUTION)

#### DEMYELINATING DISORDERS, SUCH AS MULTIPLE SCLEROSIS, WHEN MRI IS CONTRAINDICATED

#### MYELOPATHY

#### SPINAL CORD INFARCT

#### PREOPERATIVE EVALUATION AND PLANNING

#### POST-OPERATIVE EVALUATION, WITH NEW NEUROLOGIC FINDINGS OR WITH PERSISTENT OR RECURRENT PAIN

#### INFECTIOUS OR INFLAMMATORY PROCESS
- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis

#### TUMOR EVALUATION
- Including but not limited to the following:
  - Primary or Metastatic Neoplasm involving the Vertebrae
  - Tumor Spread within the Spinal Canal
  - Spinal Cord Neoplasm

#### CONGENITAL SPINE ANOMALIES
- Thoracic spine dysraphism and other congenital anomalies involving the thoracic spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

#### SYRINGOHYDROMYELIA (SYRINX)

#### SEVERE SCOLIOSIS, INCLUDING THE FOLLOWING PATIENT POPULATIONS:
- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congeni-
### COMMON DIAGNOSTIC INDICATIONS FOR THORACIC SPINE CT:

- Tal scoliosis; or
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); or
- With scoliosis related to other pathologic processes such as neurofibromatosis; or
- For pre-operative evaluation of severe scoliosis

*Note: For Pediatric patients, who may require imaging of significant portions of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

### REFERENCE/LITERATURE REVIEW:

Magnetic Resonance Imaging (MRI)  
Thoracic Spine

CPT CODES:

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>72146</td>
<td>MRI of Thoracic Spine, without contrast</td>
</tr>
<tr>
<td>72147</td>
<td>MRI of Thoracic Spine, with contrast</td>
</tr>
<tr>
<td>72157</td>
<td>MRI of Thoracic Spine, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Entire thoracic spine (T1-T12), from the cervicothoracic region through the thoracolumbar junction.
- Imaging planes generally include sagittal and axial/oblique axial (parallel with the disc spaces) views.

IMAGING CONSIDERATIONS:

- Advanced imaging of the thoracic spine is indicated in selected clinical scenarios and is performed significantly less often than in the cervical and lumbar regions.
- CT is the preferred technique for certain indications, including fracture detection, follow-up of a known fracture, osseous tumor assessment, congenital vertebral defects and for interventional procedures, such as CT Myelography.
- In most other clinical situations, MRI is the modality of choice for thoracic spine imaging, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia).
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.

Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the thoracic spine.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- CT may be used after MRI if diagnosis still in doubt or when MRI cannot be done.
IMAGING CONSIDERATIONS:

- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR THORACIC SPINE MRI:

The following diagnostic indications for Thoracic Spine MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

- Unless contraindicated, MRI is the preferred modality for most thoracic spine imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; occasional osseous tumor assessment; developmental vertebral abnormalities) and CT myelography.

PERSISTENT PAIN / RADICULOPATHY

- In Adults, persistent symptoms despite ≥ 4-6 weeks of conservative therapy and failed or inadequate response to treatment, which may include the following:
  - Medications, such as NSAIDs and muscle relaxants
  - Steroids
  - Physical therapy/exercises
  - Activity modification
- In the Pediatric population, as well as in patients with documented rheumatologic disease afflicting the joints, pain in the thoracic spine region may not require completion of the 4-6 week course of conservative treatment.
- Upper Back pain not meeting the above criteria but associated with ‘red flag’ symptoms such as unexplained weight loss, history of malignant disease, fever, abnormal serum electrophoresis suggestive of multiple myeloma, history of drug abuse or tuberculosis

NEW NEUROLOGIC FINDINGS RELATED TO THE THORACIC SPINE OR PROGRESSIVE NEUROLOGIC DEFICIT, PARTICULARLY UNDER TREATMENT

- For example, progressive weakness or objective sensory abnormality in thoracic dermatome distribution

SIGNS AND SYMPTOMS OF SPINAL CORD AND/OR NERVE ROOT COMPRESSION (FOR EXAMPLE, DUE TO THORACIC SPINE STENOSIS OR DISC HERNIATION)

- Including but not limited to the following signs and symptoms:
  - Hyperactive Reflexes
  - Muscle Weakness
  - Sensory Loss
  - Spasticity

BACK PAIN AND NEW NEUROLOGIC FINDINGS RELATED TO THE THORACIC SPINE OR DOCUMENTED NEUROLOGIC DEFICIT ON PHYSICAL EXAM (FOR EXAMPLE: REFLEX ABNORMALITY; MUSCLE WEAKNESS; OBJECTIVE SENSORY ABNORMALITY IN THE THORACIC DERMATOME DISTRIBUTION)

DEMYELINATING DISORDERS, SUCH AS MULTIPLE SCLEROSIS

MYELOPATHY

SPINAL CORD INFARCT

INFECTIOUS OR INFLAMMATORY PROCESS

- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis
### COMMON DIAGNOSTIC INDICATIONS FOR THORACIC SPINE MRI:

#### TUMOR EVALUATION

- Including but not limited to the following:
  - Primary or Metastatic Neoplasm involving the Vertebrae
  - Tumor Spread within the Spinal Canal
  - Spinal Cord Neoplasm

#### FRACTURE EVALUATION

#### POST-TRAUMATIC NEUROLOGIC DEFICIT AND POSSIBLE SPINAL CORD INJURY

#### PREOPERATIVE EVALUATION AND PLANNING

#### POST-OPERATIVE EVALUATION, WITH NEW NEUROLOGIC FINDINGS OR WITH PERSISTENT OR RECURRENT PAIN

#### ABNORMAL THORACIC SPINE RADIOGRAPHS

### SEVERE SCOLIOSIS, FOR THE FOLLOWING PATIENT POPULATIONS:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; or
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); or
- With scoliosis related to other pathologic processes such as neurofibromatosis; or
- For pre-operative evaluation of severe scoliosis

#### CONGENITAL SPINE ANOMALIES

- Thoracic spine dysraphism and other congenital anomalies involving the thoracic spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

### SYRINGOHYDROMYELIA (SYRINX)

#### REFERENCE/LITERATURE REVIEW:

Computed Tomography (CT)
Lumbar Spine

**CPT CODES:**

72131.................CT of Lumbar Spine, without contrast
72132.................CT of Lumbar Spine, with contrast
72133.................CT of Lumbar Spine, without contrast, followed by re-imaging with contrast

**STANDARD ANATOMIC COVERAGE:**

- Entire lumbar spine (L1-L5), from the thoracolumbar region through the lumbosacral junction.
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

**IMAGING CONSIDERATIONS:**

- CT of the lumbar spine is often reserved for suspected fracture, follow-up of a known fracture, skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates, congenital vertebral defects, osseous tumor evaluation, and procedures such as Lumbar CT Myelography.
- For most other lumbar spine abnormalities, MRI is the modality of choice, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia).
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**COMMON DIAGNOSTIC INDICATIONS FOR LUMBAR SPINE CT:**

The following diagnostic indications for Lumbar Spine CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

MRI is the preferred modality for most lumbar spine advanced imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates; osseous tumor assessment; developmental vertebral abnormalities) as well as Lumbar CT Myelography.

**FRACTURE EVALUATION**

**SIGNIFICANT ACUTE TRAUMA TO THE LUMBAR SPINE REGION**

**LESS SEVERE LUMBAR SPINE TRAUMA AND NEW NEUROLOGIC FINDING(S) OR PROGRESSIVELY WORSENING LOWER BACK PAIN**

**ABNORMAL LUMBAR SPINE RADIOGRAPHS**

**SPONDYLOLYSIS AND SPONDYLOLISTHESIS**

- Following non-diagnostic or abnormal lumbar spine radiographs (including oblique views), in an operative candidate

**CT FOLLOWING MYELOGRAPHY OR OTHER LUMBAR INTERVENTIONAL PROCEDURE**

**WHEN THE PATIENT’S CONDITION MEETS THE LUMBAR SPINE MRI GUIDELINES, BUT THERE IS EITHER A CONTRAINDICATION TO MRI OR THE PATIENT CANNOT TOLERATE MRI EXAMINATION (FOR EXAMPLE, DUE TO CLAUSTROPHOBIA).**

For most other indications, MRI is the preferred modality for advanced lumbar spine imaging, unless contraindicated.
### COMMON DIAGNOSTIC INDICATIONS FOR LUMBAR SPINE CT:

#### PERSISTENT PAIN / RADICULOPATHY
- In Adults, persistent symptoms despite ≥ 4-6 weeks of conservative therapy and failed or inadequate response to treatment, which may include the following:
  - Medications, such as NSAIDs and muscle relaxants
  - Steroids
  - Physical therapy/exercises
  - Activity modification
- In the Pediatric population, as well as in patients with documented rheumatologic disease afflicting the joints, pain in the lumbar spine region may not require completion of the 4-6 week course of conservative treatment
- Lower Back pain not meeting the above criteria but associated with "red flag" symptoms such as unexplained weight loss, history of malignant disease, fever, abnormal serum electrophoresis suggestive of multiple myeloma, history of drug abuse or tuberculosis

#### SIGNS AND SYMPTOMS OF SPINAL CORD AND/OR NERVE ROOT COMPRESSION (FOR EXAMPLE, DUE TO LUMBAR SPINAL STENOSIS OR DISC HERNIATION)
- Including but not limited to the following signs and symptoms:
  - Hyperactive Reflexes
  - Muscle Weakness
  - Sensory Loss
  - Spasticity

#### LOWER BACK OR LEG PAIN AND NEW NEUROLOGIC FINDINGS RELATED TO THE LUMBAR SPINE OR DOCUMENTED NEUROLOGIC DEFICIT ON PHYSICAL EXAM (FOR EXAMPLE: REFLEX ABNORMALITY; MUSCLE WEAKNESS; OBJECTIVE SENSORY ABNORMALITY IN THE LUMBAR DERMATOME DISTRIBUTION)

#### DEMYELINATING DISORDERS, SUCH AS MULTIPLE SCLEROSIS, WHEN MRI IS CONTRAINDICATED AND THERE ARE SYMPTOMS REFERABLE TO THE LOWER LUMBAR REGION

#### MYELOPATHY INVOLVING THE LOWER SPINAL CORD

#### SPINAL CORD INFARCT

#### CAUDA EQUINA SYNDROME

#### INFECTIOUS OR INFLAMMATORY PROCESS
- Including but not limited to the following:
  - Abscess
  - Arachnoiditis
  - Discitis
  - Osteomyelitis

#### TUMOR EVALUATION
- Including but not limited to the following:
  - Primary or Metastatic Neoplasm involving the Vertebrae
  - Tumor Spread within the Spinal Canal
  - Spinal Cord Neoplasm

#### CONGENITAL SPINE ANOMALIES
- Lumbar spine dysraphism and other congenital anomalies involving the lumbar spine and/or lower spinal cord (Conus Medullaris), filum terminale or nerve roots
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

#### SYRINGOHYDROMYELIA (SYRINX)
COMMON DIAGNOSTIC INDICATIONS FOR LUMBAR SPINE CT:

SEVERE SCOLIOSIS, INCLUDING THE FOLLOWING PATIENT POPULATIONS:

- With high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; or
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); or
- With scoliosis related to other pathologic processes, such as neurofibromatosis; or
- For pre-operative evaluation of severe scoliosis

Note: For Pediatric patients, who may require imaging of significant portions of the spine or the entire spine, MRI should be considered to minimize radiation exposure

PREOPERATIVE EVALUATION AND PLANNING

POST-OPERATIVE EVALUATION, WITH NEW NEUROLOGIC FINDINGS OR WITH PERSISTENT OR RECURRENT LOWER BACK PAIN

- Including but not limited to the following:
  - Differentiation of recurrent disc herniation from scarring
  - Evaluation for post-surgical complications, such as epidural hematoma/abscess

REFERENCE/LITERATURE REVIEW:

# Magnetic Resonance Imaging (MRI)

## Lumbar Spine

### CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72148</td>
<td>MRI of Lumbar Spine, without contrast</td>
</tr>
<tr>
<td>72149</td>
<td>MRI of Lumbar Spine, with contrast</td>
</tr>
<tr>
<td>72158</td>
<td>MRI of Lumbar Spine, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

### STANDARD ANATOMIC COVERAGE:

- Entire lumbar spine (L1-L5), from the thoracolumbar region through the lumbosacral junction.
- Imaging planes generally include sagittal and axial/oblique axial (parallel with disc spaces) views.

### IMAGING CONSIDERATIONS:

- For most other lumbar spine abnormalities, MRI is the modality of choice, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia).
- Lumbar spine CT is often reserved for suspected fracture, follow-up of a known fracture, skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates, congenital vertebral defects, osseous tumor evaluation, and procedures such as Lumbar CT Myelography.
- For the majority of patients with acute low back pain, symptoms and/or physical exam findings will improve or resolve during a trial of conservative treatment and diagnostic imaging is not necessary.\(^1\)
- Definitive diagnosis is not achieved in as many as 85% of patients with low back pain.\(^1\)
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.

**Patient Compatibility Issues:**

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

**Biosafety Issues:**

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

**Ordering Issues:**

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the lumbar spine.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or
IMAGING CONSIDERATIONS:

- Duplicate testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR LUMBAR SPINE MRI:

- Unless contraindicated, MRI is the preferred modality for most lumbar spine advanced imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; skeletal abnormalities including spondylolisthesis in operative candidates; osseous tumor assessment; and developmental vertebral abnormalities) as well as CT Myelography.

PERSISTENT PAIN / RADICULOPATHY

- In Adults, persistent symptoms despite ≥ 4-6 weeks of conservative therapy and failed or inadequate response to treatment, which may include the following:
  - Medications, such as NSAIDs and muscle relaxants
  - Steroids
  - Physical therapy/exercises
  - Activity modification
- In the Pediatric population, as well as in patients with documented rheumatologic disease afflicting the joints, pain in the lumbar spine region may not require completion of the 4-6 week course of conservative treatment
- Lower Back pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, abnormal serum electrophoresis suggestive of multiple myeloma, history of drug abuse or tuberculosis

SIGNS AND SYMPTOMS OF SPINAL CORD AND/OR NERVE ROOT COMPRESSION (FOR EXAMPLE, DUE TO LUMBAR SPINAL STENOSIS OR DISC HERNIATION)

- Including but not limited to the following signs and symptoms:
  - Hyperactive Reflexes
  - Muscle Weakness
  - Sensory Loss
  - Spasticity

LOWER BACK OR LEG PAIN AND NEW NEUROLOGIC FINDINGS RELATED TO THE LUMBAR SPINE OR DOCUMENTED NEUROLOGIC DEFICIT ON PHYSICAL EXAM (FOR EXAMPLE: REFLEX ABNORMALITY; MUSCLE WEAKNESS; OBJECTIVE SENSORY ABNORMALITY IN THE LUMBAR DERMATOME DISTRIBUTION)

DEMYELINATING DISORDERS, SUCH AS MULTIPLE SCLEROSIS

MYELOPATHY INVOLVING THE LOWER SPINAL CORD

SPINAL CORD INFARCT

CAUDA EQUINA SYNDROME

INFEKTIOUS OR INFLAMMATORY PROCESS

- Including but not limited to the following:
  - Abscess
  - Arachnoiditis
  - Discitis
  - Osteomyelitis
### COMMON DIAGNOSTIC INDICATIONS FOR LUMBAR SPINE MRI:

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TUMOR EVALUATION</strong></td>
<td>● Including but not limited to the following:</td>
</tr>
<tr>
<td></td>
<td>– Primary or Metastatic Neoplasm involving the Vertebrae</td>
</tr>
<tr>
<td></td>
<td>– Tumor Spread within the Spinal Canal</td>
</tr>
<tr>
<td></td>
<td>– Spinal Cord Neoplasm</td>
</tr>
<tr>
<td><strong>FRACTURE EVALUATION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PREOPERATIVE EVALUATION AND PLANNING</strong></td>
<td></td>
</tr>
<tr>
<td><strong>POST-TRAUMATIC NEUROLOGIC DEFICIT AND POSSIBLE SPINAL CORD INJURY</strong></td>
<td></td>
</tr>
<tr>
<td><strong>POST-OPERATIVE EVALUATION, WITH NEW NEUROLOGIC FINDINGS OR WITH PERSISTENT OR RECURRENT LOWER BACK PAIN</strong></td>
<td>● Including but not limited to the following:</td>
</tr>
<tr>
<td></td>
<td>– Differentiation of recurrent disc herniation from scarring</td>
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<tr>
<td></td>
<td>– Evaluation for post-surgical complications</td>
</tr>
<tr>
<td><strong>ABNORMAL LUMBAR SPINE RADIOGRAPHS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SPONDYLOLYSIS AND SPONDYLOLISTHESIS</strong></td>
<td>● Following non-diagnostic or abnormal lumbar spine radiographs (including oblique views), in an operative candidate</td>
</tr>
</tbody>
</table>
| **SEVERE SCOLIOSIS, FOR THE FOLLOWING PATIENT POPULATIONS:** | ● In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; or  
|                                  |   – With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); or  
|                                  |   – With scoliosis related to other pathologic processes such as neurofibromatosis; or  
|                                  |   – For pre-operative evaluation of severe scoliosis                        |
| **CONGENITAL SPINE ANOMALIES**    | ● Lumbar spine dysraphism and other congenital anomalies involving the lumbar spine and/or spinal cord  
|                                  |   – Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies |
| **TETHERED CORD AND OTHER CONGENITAL ANOMALIES INVOLVING THE LUMBAR SPINE AND/OR LOWER SPINAL CORD (CONUS MEDULLARIS), FILUM TERMINALE OR NERVE ROOTS** | |
| **SYRINGOHYDROMYELIA (SYRINX)**   |                                                                             |

### REFERENCE/LITERATURE REVIEW:

5. Staiger TO, Pauuw DS, Deyo RA, Jarvik JG. Imaging studies for acute low back pain. When and when not to order them. Postgraduate Medicine Online 1999;105(4).
<table>
<thead>
<tr>
<th>Reference/Literature Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiology 2001; 220:393-399.</td>
</tr>
</tbody>
</table>
MR Angiography (MRA)  
**Spinal Canal**

**CPT CODES:**

72159..............Magnetic Resonance Angiography of Spinal Canal

**STANDARD ANATOMIC COVERAGE:**

- Scan coverage depends on the specific clinical indication for the spinal canal MRA.
- General landmarks extend from the cranio-cervical junction through the lumbosacral region.

**IMAGING CONSIDERATIONS:**

- MRA of the spinal canal is an infrequently requested exam. Potential applications which have been described include evaluation of spinal arteriovenous fistula (AVF) and arteriovenous malformation (AVM). These vascular lesions are usually detected by MRI or myelography. Intra-arterial digital subtraction angiography (DSA) of the spinal vasculature may be necessary to define the precise location and type of vascular abnormality.
- MRI of the spinal canal CPT 72159 includes imaging of the entire spinal canal. Requests for multiple exams to address each anatomic area of the spinal canal are inappropriate.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

**MAGNETIC RESONANCE ANGIOGRAPHY OF THE SPINAL CANAL:**

- MR Angiography (MRA) of the spinal canal is an evolving technology under clinical development. This clinical application of MRA and its impact on health outcomes will continue to undergo review, as new evidence-based studies are published. Interval routine coverage for MR angiography of the spinal canal is not generally available and is not considered the standard of care at this time.
**Computed Tomography (CT)**

**Upper Extremity**

### CPT CODES:

- 73200.............CT upper extremity, without contrast
- 73201.............CT upper extremity, with contrast
- 73202.............CT upper extremity, without contrast, followed by re-imaging with contrast

### STANDARD ANATOMIC COVERAGE:

- Scan coverage depends on the specific clinical indication for the exam and varies considerably, based on anatomic considerations (from shoulder through fingers) and clinical manifestations.
- Depending on the protocol used, the CT data acquisition(s) may allow for diagnostic multi-planar reconstructions through the region of interest.

### IMAGING CONSIDERATIONS:

- Conventional radiographs should be obtained before advanced imaging in the majority of cases.
- CT is often the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or Radionuclide Bone Scintigraphy.
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary.
- In osteomyelitis, CT may be helpful in defining bone sequestra.
- For evaluation of musculoskeletal tumors, MRI is generally preferred over CT, unless there is a contraindication to performance of an MRI exam.
- Conservative treatment includes 4-6 weeks of physical therapy, temporary joint rest or immobilization and medications, such as non-steroidal anti-inflammatory drugs (NSAIDs), as directed by the patient’s Physician.
- Use of contrast (intravenous or intra-articular for CT arthrogram) is at the discretion of both the ordering and imaging physicians.
- A complete CT of the upper extremity includes imaging of the entire arm. When imaging is requested for the right and left extremity, a maximum of two CT exams is allowed.
- Brachial Plexus imaging: The brachial plexus is a network of nerves in the neck, passing under the clavicle and into the axilla. Assign either a CT or MRI of the upper extremity for imaging the brachial plexus.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

### COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY CT:

The following diagnostic indications for Upper Extremity CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

#### INFECTIOUS AND INFLAMMATORY PROCESS

- Including but not limited to the following:
  - Abscess
  - Septic Arthritis
  - Osteomyelitis – when MRI is contraindicated or when defining a suspected bone sequestra

#### PALPABLE MASS ON PHYSICAL EXAM

#### PRIMARY (BENIGN AND MALIGNANT) BONE OR SOFT TISSUE TUMOR
### COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY CT:

<table>
<thead>
<tr>
<th><strong>NEUROPATHIC OSTEODYSTROPHY (CHARCOT JOINT)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Following conventional radiographs, when there is need for additional diagnostic information from a CT exam to direct treatment decisions (such as concern for an underlying infectious process)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>OSTEONECROSIS [AVASCULAR NECROSIS (AVN); ASEPTIC NECROSIS]</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Requires initial plain films, prior to advanced imaging</td>
</tr>
<tr>
<td>● MRI is often the preferred imaging modality, particularly for evaluation in the early stages of Osteonecrosis</td>
</tr>
<tr>
<td>● Common anatomic locations for Osteonecrosis in the Upper Extremity are:</td>
</tr>
<tr>
<td>- Humeral Head</td>
</tr>
<tr>
<td>- Radial Head</td>
</tr>
<tr>
<td>- Carpal Navicular Bone</td>
</tr>
<tr>
<td>- Lunate Bone (lunate osteonecrosis also referred to as Kienbock’s disease)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>FRACTURE EVALUATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● To confirm a suspected (occult) fracture or</td>
</tr>
<tr>
<td>● To define the extent of an acute fracture and position of fracture fragments, or</td>
</tr>
<tr>
<td>● To assess fracture healing, for callous formation and solid bony union</td>
</tr>
</tbody>
</table>

| **INTRA-ARTICULAR LOOSE BODY, INCLUDING SYNOVIAL OSTEOCHONDROMATOSIS** |

| **CT ACCOMPANYING AN ARTHROGRAM (CT ARTROGRAPHY)** |

| **HEMARTHROSIS (BLOODY JOINT EFFUSION), DOCUMENTED BY ARTHROCENTESIS** |

<table>
<thead>
<tr>
<th><strong>REFERENCE/LITERATURE REVIEW:</strong></th>
</tr>
</thead>
</table>
## Magnetic Resonance Imaging (MRI)
### Upper Extremity (Any Joint)

### CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>73221</td>
<td>MRI upper extremity, any joint, without contrast</td>
</tr>
<tr>
<td>73222</td>
<td>MRI upper extremity, any joint, with contrast</td>
</tr>
<tr>
<td>73223</td>
<td>MRI upper extremity, any joint, without contrast, followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

### STANDARD ANATOMIC COVERAGE:

- Scan coverage depends on the specific clinical indication for the exam and varies considerably, based on anatomic (from shoulder joint through hand/digits) and clinical considerations.
- MRI routinely provides multi-planar imaging through the region of interest.

### IMAGING CONSIDERATIONS:

- Conventional radiographs of the upper extremity are to be obtained before advanced diagnostic imaging is performed, in the majority of cases.
- Use of contrast (intravenous or intra-articular) is at the discretion of both the ordering and imaging physicians.
- CT is often the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or Radionuclide Bone Scintigraphy.
- MRI is used more often to evaluate internal derangements of the joints and related tendinous, ligamentous and cartilaginous structures.
- MRI is also useful for evaluation of possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy. One exception for osteomyelitis is detection of bone sequestra, which may be better depicted with CT.
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary.
- For evaluation of musculoskeletal tumors, MRI is generally preferred over CT, unless there is a contraindication to performance of an MRI exam.
- For suspected osteonecrosis, MRI is often more sensitive than CT and bone scintigraphy.
- Implanted surgical hardware, including joint prostheses, may produce sufficient local artifact to preclude adequate imaging through the region containing hardware.
- Conservative treatment includes 4-6 weeks of physical therapy, temporary joint rest or immobilization and medications, such as non-steroidal anti-inflammatory drugs (NSAIDs), as directed by the patient’s Physician.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.
- When a request is received for a MR arthrogram of the shoulder, enter CPT codes 73221, MRI upper extremity, any joint. Do not enter the MR Angiography (MRA) CPT code 73225.
- When requested, a code for an MRI of the upper extremity, any joint, may be entered for each major joint area of the arm.
  - Shoulder
  - Elbow
  - Wrist

### Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
IMAGING CONSIDERATIONS:

- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the lumbar spine.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY MRI:

The following diagnostic indications for Upper Extremity MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

This section contains:
- General Indications for Upper Extremity MRI in Joint Evaluation
- Additional Indications for Shoulder Joint
- Additional Indications for Shoulder Imaging: Specific Criteria
- Additional Indications for Elbow
- Additional Indications for Wrist and Hand Imaging

General Indications for Upper Extremity MRI in Joint Evaluation:

SIGNIFICANT TRAUMA
- Usually preceded by initial plain film radiographs

FRACTURE EVALUATION
- To confirm a suspected (occult) fracture or
- To define the extent of an acute fracture and position of fracture fragments, or
- To assess fracture healing, for callous formation and solid bony union

NEUROPATHIC OSTEODYSTROPHY (CHARCOT JOINT)
- Following conventional radiographs, when there is need for additional diagnostic information from an MRI exam to direct treatment decisions (such as concern for an underlying infectious process)

LIGAMENT AND TENDON INJURIES
- If no response to 4-6 weeks of conservative treatment
Common Diagnostic Indications for Upper Extremity MRI:

<table>
<thead>
<tr>
<th>Joint Locking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Instability (Sensation of Joint Giving Way)</td>
</tr>
<tr>
<td>Osteonecrosis [Avascular Necrosis (AVN); Aseptic Necrosis]</td>
</tr>
<tr>
<td>• Requires initial plain films, prior to advanced imaging</td>
</tr>
<tr>
<td>• Common anatomic locations for Osteonecrosis in the Upper Extremity are:</td>
</tr>
<tr>
<td>– Humeral Head</td>
</tr>
<tr>
<td>– Radial Head</td>
</tr>
<tr>
<td>– Carpal Navicular Bone</td>
</tr>
<tr>
<td>– Lunate Bone (lunate osteonecrosis also referred to as Kienbock’s disease)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Osteochondral Lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrarticular Loose Body, Including Synovial Osteochondromatosis</td>
</tr>
<tr>
<td>MRI Accompanying an Arthrogram (MR Arthrography)</td>
</tr>
<tr>
<td>Hemarthrosis (Bloody Joint Effusion), Documented by Arthrocentesis</td>
</tr>
<tr>
<td>Infectious and Inflammatory Processes</td>
</tr>
<tr>
<td>• Including but not limited to the following:</td>
</tr>
<tr>
<td>– Abscess</td>
</tr>
<tr>
<td>– Septic Arthritis</td>
</tr>
<tr>
<td>– Osteomyelitis</td>
</tr>
</tbody>
</table>

| Palpable Mass on Physical Exam |
| Pre and Post Operative Evaluation |
| Primary (Benign and Malignant) Bone or Soft Tissue Tumor |
| Metastatic Tumor |
| • Involving the soft tissues and/or osseous structures |

| Soft Tissue Tumors |
| Abnormality on X-Ray or Bone Scintigraphy |
| Persistent Upper Extremity Pain – Unresponsive to 4-6 Weeks of Conservative Treatment |
| Suspected Entrapment Neuropathy [Cubital Tunnel Detail], Carpal Tunnel Not Considered Medically Necessary |

**Additional Indications for the Shoulder Joint:**

| Rotator Cuff Tear |
| • When the diagnosis is uncertain, conservative treatment should be instituted for 4-6 weeks, to monitor response to therapy |

| Glenoid Labral Tear |
| Other Glenoid Labral and Associated Ligamentous Lesions |
| • Including but not limited to the following: |
|   – Bankart Lesion |
|   – Bankart Variation Lesions |
|   – ALPSA (Anterior Labroligamentous Periosteal Sleeve Avulsion) Lesion |
|   – HAGL (Humeral Avulsion of the Inferior Glenohumeral Ligament) Lesion |

| Suspected Occult Shoulder Fracture |
| • With high clinical suspicion and negative or inconclusive shoulder radiographs |
**COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY MRI:**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesive Capsulitis</td>
<td>Following physical therapy</td>
</tr>
</tbody>
</table>

**Additional Indications for Shoulder Imaging: Specific Criteria**

**Symptoms and Physical Assessment Indicating the Need for MRI After Four Weeks of Physical Therapy, Including at Least Two of the Following:**

- Anterior or posterior shoulder instability
- External rotation pain or weakness
- Impingement signs
- Loss of abduction
- Persistent pain with activity

**Additional Indications for Elbow Imaging:**

- Epicondylitis: Generally considered a clinical diagnosis and imaging not medically necessary.
- If unresponsive to conservative treatment, specialist evaluation should be obtained prior to advanced imaging.

**Biceps Tendon Rupture**

- At insertion onto radial tuberosity

**Triceps Tendon Rupture**

- From olecranon insertion site

**Medial Collateral Ligament Tear**

**Preoperative Assessment Heterotopic Ossification**

**Capsellar Osteochondritis**

**Suspected Occult Elbow Fracture**

- With high clinical suspicion and negative or inconclusive elbow radiographs

**Additional Indications for Wrist and Hand Imaging:**

**Triangular Fibrocartilage Complex (TFCC) Tear**

**Scaphoid Fracture**

**Ulnar Collateral Ligament Tear (Gamekeeper’s Thumb)**

**REFERENCE/LITERATURE REVIEW:**

REFERENCE/LITERATURE REVIEW:


Magnetic Resonance Imaging (MRI)
Upper Extremity (Non-Joint)

**CPT CODES:**

- 73218.................MRI upper extremity, any joint, without contrast
- 73219.................MRI upper extremity, any joint, with contrast
- 73220.................MRI upper extremity, any joint, without contrast, followed by re-imaging with contrast

**STANDARD ANATOMIC COVERAGE:**

- Scan coverage depends on the specific clinical indication for the exam and varies considerably, based on anatomic (from shoulder joint through hand/digits) and clinical considerations.
- MRI routinely provides multi-planar imaging through the region of interest.

**IMAGING CONSIDERATIONS:**

- Conventional radiographs should be obtained before advanced diagnostic imaging is performed, in the majority of cases.
- CT is often the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete or non-displaced fractures may be better imaged with MRI or Radionuclide Bone Scintigraphy.
- MRI is often the preferred modality for evaluation of soft tissue abnormalities and for interrogation of possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy. One exception for osteomyelitis is detection of bone sequestra, which may be better depicted with CT.
- If radiographic findings are typical of osteomyelitis, advanced diagnostic imaging may not be necessary.
- Use of contrast is at the discretion of both the ordering and imaging physicians.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.
- When requested, a code for a MRI of the upper extremity, non-joint may be entered for each major area of the arm.
  - Upper arm
  - Lower arm (forearm)
  - Hand
- Brachial Plexus Imaging: The brachial plexus is a network of nerves in the neck, passing under the clavicle and into the axilla. Assign either a CT or MRI of the upper extremity (non-joint) for imaging the brachial plexus.
- Conservative treatment includes 4-6 weeks of physical therapy, temporary joint rest or immobilization and medications, such as non-steroidal anti-inflammatory drugs (NSAIDs), as directed by the patient’s Physician.

**Patient Compatibility Issues:**

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

**Biosafety Issues:**

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemaker...
IMAGING CONSIDERATIONS:

- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:
- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the lumbar spine.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY MRI (NON-JOINT):

The following diagnostic indications for Upper Extremity MRI (Non-Joint) are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

<table>
<thead>
<tr>
<th>INFECTIOUS AND INFLAMMATORY PROCESSES</th>
</tr>
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<tbody>
<tr>
<td>- Including but not limited to the following:</td>
</tr>
<tr>
<td>- Abscess</td>
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<tr>
<td>- Osteomyelitis</td>
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<tr>
<td>- Inflammatory Myopathy</td>
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<tr>
<td>- Myositis</td>
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<tr>
<th>PALPABLE MASS ON PHYSICAL EXAM</th>
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<tr>
<th>PRIMARY (BENIGN AND MALIGNANT) BONE OR SOFT TISSUE TUMOR</th>
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<tbody>
<tr>
<td>- Involving the soft tissues and/or osseous structures</td>
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<thead>
<tr>
<th>SOFT TISSUE TUMORS</th>
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<thead>
<tr>
<th>SIGNIFICANT TRAUMA</th>
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<tbody>
<tr>
<td>- Usually preceded by initial plain film radiographs</td>
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<table>
<thead>
<tr>
<th>FRACTURE EVALUATION</th>
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</thead>
<tbody>
<tr>
<td>- To confirm a suspected (occult) fracture or</td>
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<tr>
<td>- To define the extent of an acute fracture and position of fracture fragments</td>
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<tr>
<td>- To assess fracture healing, for callous formation and solid bony union</td>
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<table>
<thead>
<tr>
<th>PRE- AND POST-OPERATIVE EVALUATION</th>
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<tr>
<th>ABNORMALITY ON X-RAY OR BONE SCINTIGRAPHY</th>
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<tr>
<th>PERSISTENT UPPER EXTREMITY PAIN – UNRESPONSIVE TO 4-6 WEEKS OF CONSERVATIVE TREATMENT</th>
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<tr>
<th>SUSPECTED ENTRAPMENT NEUROPATHY [CUBITAL TUNNEL DETAIL ], CARPAL TUNNEL NOT CONSIDERED MEDICALLY NECESSARY</th>
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<table>
<thead>
<tr>
<th>BRACHIAL PLEXOPATHY</th>
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</thead>
</table>
### COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY MRI (NON-JOINT):

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRACHIAL PLEXUS MASS</td>
</tr>
<tr>
<td>ULNAR COLLATERAL LIGAMENT TEAR (GAME KEEPER’S THUMB)</td>
</tr>
</tbody>
</table>

### REFERENCE/LITERATURE REVIEW:

CT Angiography (CTA) and MR Angiography (MRA)
Upper Extremity

CPT CODES:
73206..............Computed tomographic angiography, upper extremity, with contrast material(s), including noncontrast images, if performed, and image postprocessing
73225..............Magnetic resonance angiography, upper extremity, without and with contrast  (Note: Upper Extremity MRA is not currently a covered benefit by the Centers for Medicare and Medicaid Services, through a National Coverage Determination)

STANDARD ANATOMIC COVERAGE:
● Depends on the specific anatomic area of interest, from the axillary region through the hand and digits.

IMAGING CONSIDERATIONS:
● CT and MR angiographic techniques include arterial and/or venous assessment, depending on the clinical indication.
● Other generally available non-invasive arterial studies of the upper extremity circulation should be considered prior to advanced diagnostic imaging with CTA or MRA. These include segmental systolic pressure measurements, plethysmographic analysis, Continuous wave Doppler and/or duplex ultrasonography.
● CT Angiography utilizes the data obtained from standard CT imaging. A request for a CT exam in addition to a CT Angiography of the same anatomic area during the same imaging session is inappropriate.
● For MR arthrography of the upper extremity, see CPT codes 73221-73223.
● For imaging the brachial plexus, see CT upper extremity or MRI upper extremity, non-joint.
● Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
● Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY CTA AND MRA:
The following diagnostic indications for Upper Extremity CTA and MRA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

STENO-OCCCLUSIVE DISEASE
● Usually atherosclerotic in origin

THROMBOEMBOLIC DISEASE – ARTERIAL OR VENOUS

ANEURYSM

ARTERIAL ENTRAPMENT SYNDROME

ARTERIO-VENOUS MALFORMATION (AVM) OR FISTULA (AVF)

DISSECTION

INTRAMURAL HEMATOMA

PRE- AND POST-OPERATIVE OR INTERVENTIONAL VASCULAR PROCEDURE – FOR LUMINAL PATENCY VERSUS RE-STENOSIS (DUE TO ATHEROSCLEROSIS, THROMBOEMBOLISM, INTIMAL HYPERPLASIA OR OTHER CAUSE) AS WELL AS POST-PROCEDURAL COMPLICATIONS (SUCH AS PSEUDOANEURYSMS RELATED TO SURGICAL BYPASS GRAFTS OR VASCULAR STENTS)
## COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY CTA AND MRA:

### DIALYSIS GRAFT EVALUATION
- Following duplex Doppler assessment

### RAYNAUD’S SYNDROME

### VASCULITIS

### VASCULAR INVASION OR COMPRESSION BY A MUSCULOSKELETAL NEOPLASM

## REFERENCE/LITERATURE REVIEW:

## CPT CODES:

- 73700..............CT lower extremity without contrast
- 73701..............CT lower extremity with contrast
- 73702..............CT lower extremity without contrast, followed by re-imaging with contrast

## STANDARD ANATOMIC COVERAGE:

- Scan coverage depends on the anatomic area of concern and varies considerably, based on anatomic (from hip through toes) and clinical considerations.
- Depending on the protocol used, the CT data acquisition(s) may allow for diagnostic multi-planar reconstructions through the region of interest.

## IMAGING CONSIDERATIONS:

- Conventional radiographs should be obtained before advanced imaging in the majority of cases.
- CT is often the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or Radionuclide Bone Scintigraphy.
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary.
- In osteomyelitis, CT may be helpful in defining bony sequestra.
- Use of contrast (intravenous and intra-articular) is at the discretion of both the ordering and imaging physicians.
- A complete CT of the Lower Extremity includes imaging of the entire leg. When imaging is requested for the right and left extremity, a maximum of two CT exams is allowed.
- Conservative treatment includes 4-6 weeks of physical therapy, temporary joint rest or immobilization and medications, such as non-steroidal anti-inflammatory drugs (NSAIDs), as directed by the patient’s Physician.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

## COMMON DIAGNOSTIC INDICATIONS FOR LOWER EXTREMITY CT:

*The following diagnostic indications for Lower Extremity CT are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:*

### INFECTIOUS AND INFLAMMATORY PROCESS
- Including but not limited to the following:
  - Abscess
  - Septic Arthritis
  - Osteomyelitis – when MRI is contraindicated or when defining a suspected bone sequestra

### PALPABLE MASS ON PHYSICAL EXAM

### TUMOR EVALUATION
- Involving the soft tissues and/or osseous structures
- When MRI is contraindicated or when evaluating osseous involvement by tumor

### SIGNIFICANT TRAUMA
- Usually preceded by initial plain film radiographs
### COMMON DIAGNOSTIC INDICATIONS FOR LOWER EXTREMITY CT:

#### FRACTURE EVALUATION
- To confirm a suspected (occult) fracture or
- To define the extent of an acute fracture and position of fracture fragments, or
- To assess fracture healing, for callous formation and solid bony union

#### OSTEONECROSIS [AVASCULAR NECROSIS (AVN); ASEPTIC NECROSIS]
- Requires initial plain films, prior to advanced imaging
- MRI is often the preferred imaging modality, particularly for evaluation during the early stages of Osteonecrosis

#### BONE SCINTIGRAPHY ABNORMALITY

#### PERSISTENT LOWER EXTREMITY PAIN – UNRESPONSIVE TO 4-6 WEEKS OF CONSERVATIVE TREATMENT
- Initial assessment on conventional radiographs should be performed
- For hip to assess femoro-acetabular impingement (FAI)

#### SOFT TISSUE TUMORS

#### TARSAL COALITION
- Following foot radiographs

#### NEUROPATHIC OSTEODYSTROPHY (CHARCOT JOINT)
- Following conventional radiographs, when there is need for additional diagnostic information from a CT exam to direct treatment decisions (such as concern for an underlying infectious process)

#### PRE- AND POST-OPERATIVE EVALUATION
- When ordered by an operating surgeon in pre-and post-op situations

#### CT ACCOMPANYING AN ARTHROGRAM (CT ARTHROGRAPHY)

#### When the patient’s condition meets the lower extremity MRI guidelines, but MRI is either contraindicated or the patient is claustrophobic and cannot tolerate MRI examination.

### REFERENCE/LITERATURE REVIEW:

CPT CODES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>73718</td>
<td>MRI lower extremity, other than joint, without contrast</td>
</tr>
<tr>
<td>73719</td>
<td>MRI lower extremity, other than joint, with contrast</td>
</tr>
<tr>
<td>73720</td>
<td>MRI lower extremity, other than joint, without contrast followed by re-imaging with contrast</td>
</tr>
<tr>
<td>73721</td>
<td>MRI lower extremity, any joint, without contrast</td>
</tr>
<tr>
<td>73722</td>
<td>MRI lower extremity, any joint, with contrast</td>
</tr>
<tr>
<td>73723</td>
<td>MRI lower extremity, any joint, without contrast followed by re-imaging with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Scan coverage depends on the specific clinical indication and varies considerably, based on anatomic and clinical considerations.
- If medically appropriate, an MRI exam may be requested for each major area of the right and left lower extremities:
  - Hip
  - Thigh
  - Knee
  - Lower Leg (calf)
  - Ankle
  - Foot (includes toes)
- Routine MRI examinations provide multi-planar imaging of the joint or non-joint region(s) of interest.

IMAGING CONSIDERATIONS:

- Conventional radiographs should be obtained before advanced imaging in the majority of cases.
- Use of contrast (intravenous and intra-articular) is at the discretion of both the ordering and imaging physicians.
- CT is often the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or Radionuclide Bone Scintigraphy.
- MRI is often used to evaluate soft tissue abnormalities and to interrogate for possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy. One exception for osteomyelitis is detection of bone sequestra, which may be better depicted with CT.
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary.
- For suspected osteonecrosis, MRI is often more sensitive than CT or bone scintigraphy.
- Implanted surgical hardware, including joint prostheses, may produce sufficient local artifact to preclude adequate imaging through the region containing hardware.
- For suspected Baker’s cysts, ultrasound should be performed before advanced imaging exams.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.
- MRI lower extremity (joint or non-joint) is appropriate for imaging the hip joint. For imaging both hips, a MRI of the pelvis may be sufficient to answer the diagnostic question. See CPT codes 72195-72197.
- Conservative treatment includes 4-6 weeks of physical therapy, temporarily joint rest or immobilization and medica-
tions, such as non-steroidal anti-inflammatory drugs (NSAIDs), as directed by the patient’s Physician.

Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
IMAGING CONSIDERATIONS:

- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging

Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI of the lumbar spine.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g., deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR LOWER EXTREMITY MRI:

The following diagnostic indications for Lower Extremity MRI are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information.

This section contains:
- General Indications for Lower Extremity MRI
- Additional Indications for the Hip Joint
- Additional Indications for Knee Imaging
- Additional Indications for Ankle and/or Foot Imaging

General Indications for Lower Extremity MRI:

SIGNIFICANT TRAUMA
- Usually preceded by initial plain film radiographs

FRACTURE EVALUATION
- To confirm a suspected (occult) fracture or
- To define the extent of an acute fracture and position of fracture fragments
- To assess fracture healing, for callous formation and solid bony union

OSTEONECROSIS [AVASCULAR NECROSIS (AVN); ASEPTIC NECROSIS]
- Requires initial plain films, prior to advanced imaging
- MRI is often the preferred imaging modality, particularly for evaluation during the early stages of Osteonecrosis

OSTEOCHONDRAL LESION

INFECTIOUS AND INFLAMMATORY PROCESSES
- Including but not limited to the following:
### COMMON DIAGNOSTIC INDICATIONS FOR LOWER EXTREMITY MRI:

- Abscess
- Inflammatory Myopathy
- Myositis
- Osteomyelitis
- Septic Arthritis

<table>
<thead>
<tr>
<th>INTRA-ARTICULAR LOOSE BODY, INCLUDING SYNOVIAL OSTEOCHONDROMATOSIS</th>
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<tr>
<th>HEMARTHROSIS (BLOODY JOINT EFFUSION), DOCUMENTED BY ARTHROCENTESIS</th>
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<tr>
<th>JOINT LOCKING</th>
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<tr>
<th>JOINT INSTABILITY (SENSATION OF JOINT GIVING WAY)</th>
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<tr>
<th>PALPABLE MASS ON PHYSICAL EXAM</th>
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</table>

- Excluding a suspected Baker’s cysts (in popliteal regions), which should be imaged initially with Ultrasound

<table>
<thead>
<tr>
<th>TUMOR EVALUATION</th>
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</table>

- Involving the soft tissues and/or osseous structures

<table>
<thead>
<tr>
<th>BONE SCINTIGRAPHY ABNORMALITY</th>
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<table>
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<tr>
<th>PERSISTENT LOWER EXTREMITY PAIN – UNRESPONSIVE TO 4-6 WEEKS OF CONSERVATIVE TREATMENT</th>
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<tr>
<th>MRI ACCOMPANYING AN ARTHROGRAM (MR ARTHROGRAPHY)</th>
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<thead>
<tr>
<th>PRE- AND POST-OPERATIVE EVALUATION</th>
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</table>

- When ordered by an operating surgeon in pre-and post-op situations

### Additional Indications for the Hip Joint:

<table>
<thead>
<tr>
<th>OCCULT HIP FRACTURE</th>
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- With high clinical suspicion and negative or inconclusive hip radiographs

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<thead>
<tr>
<th>LEGG-CALVÉ PERTHES DISEASE</th>
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</table>

- Eponym for osteonecrosis (infarction) of bony epiphysis in femoral heads, usually in 4-8 year old age range
- Requires initial radiographic evaluation

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<tr>
<th>SLIPPED CAPITAL FEMORAL EPIPHYSIS</th>
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- Atraumatic fracture through the physeal plate; affected population is often overweight teenagers
- Requires initial radiographic evaluation

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<thead>
<tr>
<th>LABRAL TEAR</th>
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### Additional Indications for Knee Imaging:

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<thead>
<tr>
<th>MENISCAL TEAR/INJURY</th>
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</thead>
</table>

- Suspected pre-operatively, based on physical exam findings which include but are not limited to:
  - McMurray test
  - Locking
  - Buckling sensation
  - Medial and/or lateral joint line tenderness

<table>
<thead>
<tr>
<th>CRUCIATE (ANTERIOR AND/OR POSTERIOR) LIGAMENT TEAR</th>
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</thead>
</table>

- Suspected pre-operatively, based on physical exam findings which include but are not limited to:
  - Lachman test
  - Anterior and posterior drawer tests

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<thead>
<tr>
<th>COLLATERAL (MEDIAL AND LATERAL) LIGAMENTOUS TEAR</th>
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<tr>
<th>POSTEROLATERAL COMPLEX INJURY</th>
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COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY MRI:

POST-OPERATIVE EVALUATION FOLLOWING REPAIR OF A LIGAMENTOUS OR TENDINOUS TEAR, WITH NEW SYMPTOMS

CHONDROMALACIA PATELLA

OSTEOCHONDRITIS DISSECANS

Additional Indications for Hip, Knee, Ankle and/or Foot Imaging:

LIGAMENT AND TENDON INJURIES
- If not responsive to four weeks of conservative therapy
- Including but not limited to the following tendons:
  - Hamstring
  - Quadriceps
  - Achilles Tendon
  - Posterior Tibial Tendon
  - Anterior Tibial Tendon
  - Peroneus Tendons

TARSAL COALITION
- Following foot radiographs
- Coalition may be partial or complete, as well as bony, cartilaginous or fibrous
- CT may be preferred for bony coalition
- Calcaneonavicular and talocalcaneal are the most common locations

TARSAL TUNNEL
- If not responsive to four weeks of conservative therapy
- Neuropathy secondary to entrapment or compression of the posterior tibial nerve or its branches in the fibro-osseous tunnel, deep to the flexor retinaculum

MORTON’S NEUROMA

NEUROPATHIC OSTEODYSTROPHY (CHARCOT JOINT)
- Following foot radiographs, when there is need for additional diagnostic information from an MRI exam to direct treatment decisions (such as concern for an underlying infectious process)

DIABETIC FOOT DISEASE
- For suspected osteomyelitis, radiographs should be performed prior to advanced imaging:
  - If findings are positive for osteomyelitis, the patient should be treated and advanced imaging may not be required
  - If radiographs are negative and the clinical probability for osteomyelitis is low, scintigraphy may be performed with either a triple-phase Technetium-99m bone scan or Indium-111 leukocyte scan
  - If radiographs are negative and clinical suspicion for osteomyelitis is high, MRI should be performed. Use of intravenous contrast for MRI evaluation of the diabetic foot may be helpful, if not contraindicated.

SOFT TISSUE TUMORS

REFERENCE/LITERATURE REVIEW:

REFERENCE/LITERATURE REVIEW:

CT Angiography (CTA) and MR Angiography (MRA)
Lower Extremity

CPT CODES:

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>73706</td>
<td>Computed tomographic angiography, lower extremity, with contrast material(s), including noncontrast images, if performed, and image postprocessing</td>
</tr>
<tr>
<td>73725</td>
<td>Magnetic resonance angiography, lower extremity, without and with contrast</td>
</tr>
</tbody>
</table>

STANDARD ANATOMIC COVERAGE:

- Depends on the area of interest and may extend from the iliofemoral regions through the feet.

IMAGING CONSIDERATIONS:

- Other generally available non-invasive arterial studies of the lower extremity circulation should be considered prior to advanced diagnostic imaging with CTA or MRA. These may include segmental systolic pressure measurements, plethysmographic analysis, Continuous wave Doppler and/or duplex ultrasonography of the lower extremity arterial or venous circulations.
- MRA should also be considered in patients with a history of either previous contrast reaction to intravascular administration of iodinated radiographic contrast material or atopy.
- CT Angiography utilizes the data obtained from standard CT imaging. An authorization request for a CT exam in addition to a CT Angiography of the same anatomic area during the same imaging session is inappropriate.
- A request for a CT lower extremity venogram is a request for a CTA of the lower extremity. A quick look at the vasculature of the lower extremity at the time of a CT or CTA of the chest for pulmonary embolism evaluation should not be separately entered or reported.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR LOWER EXTREMITY CTA AND MRA:

The following diagnostic indications for Lower Extremity CTA and MRA are accompanied by pre-test considerations as well as supporting clinical data and prerequisite information:

VASCULAR ASSESSMENT FOR LOWER EXTREMITY CLAUDICATION

- CPT Coding for Abdominal Aortic and Run-Off evaluation, which involves image post-processing for three-dimensional reconstructions, should follow:
  - For CTA: 75635 - CTA of Abdominal Aorta and Bilateral Iliofemoral Lower Extremity Run-Off without contrast, followed by re-imaging with contrast
  - For MRA: 74185 - Abdominal MRA and 73725 - Bilateral Lower Extremity MRAs
- Either CTA or MRA is indicated in a patient with classic presenting symptoms of claudication from peripheral arterial disease, such as diminished / absent peripheral pulses and cramping pain in the legs (particularly in the thighs and calves) when walking, which disappears at rest.
- In the absence of classic peripheral symptoms of claudication, then obtain a vascular surgical consultation and perform lower extremity non-invasive arterial evaluation, which may include the following: segmental systolic pressure measurements, segmental limb plethysmography, Continuous wave Doppler and duplex ultrasonography. Ankle brachial indices (ABI) of < 0.9 may undergo advanced imaging. Rest pain or severe occlusive disease typically occurs with ABI < 0.5.
**COMMON DIAGNOSTIC INDICATIONS FOR UPPER EXTREMITY CTA AND MRA:**

<table>
<thead>
<tr>
<th>Pre-Operative Evaluation for Known Lower Extremity Peripheral Arterial Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>● When conventional angiography is contraindicated and lower extremity ultrasound indicates significant disease, but is insufficient for surgical planning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Ischemia</th>
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</thead>
<tbody>
<tr>
<td>● For example, in diabetic vascular disease with ischemic ulcers or gangrene</td>
</tr>
</tbody>
</table>

| Pre- and Post-Operative or Interventional Vascular Procedure – For Luminal Patency Versus Re-Stenosis (Due to Atherosclerosis, Thromboembolism, Intimal Hyperplasia or Other Cause) As Well As Post-Procedural Complications (Such As Pseudoaneurysms Related to Surgical Bypass Grafts or Vascular Stents) |

**Aneurysm**

**Dissection**

**Intramural Hematoma**

**Vasculitis**

**Arterial Entrapment Syndrome**

**Venous Disorders:**

**Venous Thrombosis**

**Venous Compression, Due to Surrounding Mass Effect**

**Arterial and Venous Disorders:**

**Arterio-Venous Malformation (AVM) or Fistula (AVF)**

**Thromboembolic Disease – Arterial or Venous**

**Vascular Invasion or Compression by a Musculoskeletal Neoplasm**

### Reference/Literature Review:

REFERENCE/LITERATURE REVIEW:


Positron Emission Tomography (PET)
Other PET Applications, Including Oncologic Tumor Imaging

CPT CODES:

<table>
<thead>
<tr>
<th>CPT CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>78811</td>
<td>PET imaging, limited area</td>
</tr>
<tr>
<td>78812</td>
<td>PET imaging, skull to mid-thigh</td>
</tr>
<tr>
<td>78813</td>
<td>PET imaging, whole body</td>
</tr>
</tbody>
</table>

PET/CT IMAGING:

<table>
<thead>
<tr>
<th>CPT CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>78814</td>
<td>PET imaging, with concurrently acquired CT for attenuation correction and anatomic localization; limited area</td>
</tr>
<tr>
<td>78815</td>
<td>PET imaging, with concurrently acquired CT for attenuation correction and anatomic localization; skull base to mid-thigh</td>
</tr>
<tr>
<td>78816</td>
<td>PET imaging, with concurrently acquired CT for attenuation correction and anatomic localization; whole body</td>
</tr>
</tbody>
</table>

COMMONLY USED RADIOPHARMACEUTICAL/SCANNER:

- 2-(fluorine-18) fluoro-2-deoxy-d-glucose (FDG), performed on a dedicated PET or integrated (hybrid) PET/CT scanner.

IMAGING CONSIDERATIONS FOR TUMOR IMAGING:

For PET tumor imaging, AIM’s Guidelines will use the definitions for INITIAL TREATMENT STRATEGY (diagnosis, staging), and SUBSEQUENT TREATMENT STRATEGY (restaging and treatment response monitoring) as provided in the CMS National Coverage Determination for PET Scans. PET for tumor staging is covered subject to the conditions below.

COMMON DIAGNOSTIC INDICATIONS FOR ONCOLOGIC PET:

AIM’s Guidelines do not supersede the enrollee’s health plan specific medical policy for PET usage.

AIM’s Guidelines do not imply enrollee benefit coverage for all diagnoses and/or indications. Benefit coverage is determined solely by the enrollee’s health plan.

PET or PET/CT is considered medically necessary when used for the following oncologic indications:

ONE INITIAL TREATMENT STRATEGY PET or PET/CT for a member with a biopsy-proven solid tumor listed below or myeloma, or one of the tumors listed below which is strongly suspected based on other diagnostic testing AND imaging results are required to determine at least one of the following:

- Whether the patient is a candidate for an invasive diagnostic or therapeutic procedure, such as biopsy;
  - Or
- The optimal anatomic location for an invasive procedure;
  - Or
- The anatomic extent of malignancy when recommended therapy reasonably depends upon the extent of malignancy;

List of malignancies appropriate for Initial Treatment Strategy PET or PET/CT (with exceptions/special considerations noted in parentheses for Melanoma, Breast, and Cervix):

- Head and Neck, including:
  - Lip, Oral Cavity, and Pharynx
COMMON DIAGNOSTIC INDICATIONS FOR ONCOLOGIC PET:

- Nasal cavity, Ear, and Sinuses
- Eye
- Larynx
- Brain and Spinal Cord
- Digestive System, including:
  - Esophagus
  - Stomach
  - Small Intestine
  - Liver and Intrahepatic Bile Ducts
  - Gallbladder & Extrahepatic Bile Ducts
  - Pancreas
  - Retroperitoneum and Peritoneum
  - Colon and Rectum
  - Anus
- Thorax, including:
  - Lung, Non-small Cell
  - Lung, Small Cell
  - Pleura
  - Thymus, Heart, Mediastinum
- Bone/cartilage and Connective/other Soft Tissue
- Skin, including:
  - Melanoma (PET or PET/CT is non-covered for initial staging of regional lymph nodes in patients with melanoma, but is covered for detection of distant metastatic disease in high-risk patients with melanoma)
  - Non-melanoma skin (includes Basal Cell and Squamous Cell)
  - Kaposi’s Sarcoma
- Female and male breast (PET or PET/CT is non-covered for “diagnosis” of breast cancer to evaluate a suspicious breast mass or for initial staging of axillary lymph nodes in patients with breast cancer. However, PET or PET/CT is covered for initial treatment strategy evaluation of a patient with axillary nodal metastasis of unknown primary origin, in a patient with a paraneoplastic syndrome potentially caused by an occult breast cancer, and for detection of distant metastatic disease in high-risk patients with known breast cancer)
- Urogenital organs, including:
  - Uterus and Adnexa
  - Cervix (only if a prior CT or MRI has been negative for extrapelvic metastatic disease)
  - Placenta
  - Ovary
  - Other Female Genitalia
  - Testis
  - Penis and other Male Genitalia
  - Bladder
  - Kidney
- Thyroid and other endocrine glands and related structures (includes Pituitary and Adrenal)
- Cancer of unknown primary origin
- Lymphoma (Hodgkins and Non-Hodgkins)
- Myeloma
- Neuroendocrine tumor
- Other solid tumor not listed except Prostate and Leukemia which are not medically necessary

PET or PET/CT for SUBSEQUENT TREATMENT STRATEGY (to assist the physician in the determination of optimal subsequent anti-tumor treatment strategies) is medically necessary only for the following malignancies
- Head and Neck (non-CNS) including:
  - Lip, Oral Cavity, and Pharynx
COMMON DIAGNOSTIC INDICATIONS FOR ONCOLOGIC PET:

- Nasal Cavity, Ear, and Sinuses
- Larynx
  - Esophagus
- Colon and Rectum
- Lung, Non-Small Cell only
- Melanoma
- Female and Male Breast
- Cervix
- Ovary
- Lymphoma
- Myeloma
  - Thyroid (follicular cell origin only, having been previously treated by thyroidectomy and radiiodine ablation, with a current serum thyroglobulin > 10 ng/mL, and with a negative whole-body I-131 scan within the previous 60 days)

SURVEILLANCE OF ASYMPTOMATIC PATIENTS AFTER THERAPY FOR MALIGNANCY

PET or PET/CT is considered not medically necessary for patients who have completed therapy twelve (12) or more months ago for lymphoma or six (6) or more months ago for all other malignancies unless the patient demonstrates signs, symptoms, laboratory or other objective findings suggestive of recurrence or spread of the original malignancy.

SCREENING:  PET or PET/CT IS NOT COVERED AS A SCREENING TEST (I.E., FOR EVALUATION OF PATIENTS WITHOUT SPECIFIC SIGNS AND SYMPTOMS OF DISEASE).

PET FOR SCREENING OR DIAGNOSIS OF BREAST CANCER IS NOT A COVERED BENEFIT BY CMS OR MULTIPLE HEALTH PLANS.

COMMON DIAGNOSTIC INDICATIONS FOR PET IMAGING OF INFECTIOUS PROCESSES:

FOR DIAGNOSIS OF CHRONIC OSTEOMYELITIS INVOLVING THE AXIAL SKELETON

OTHER CONSIDERATIONS:

PET MAMMOGRAPHY IS AN EVOLVING TECHNOLOGY UNDER CLINICAL DEVELOPMENT. THIS TECHNOLOGY AND ITS IMPACT ON HEALTH OUTCOMES WILL CONTINUE TO UNDERGO REVIEW AS NEW EVIDENCE-BASED STUDIES ARE PUBLISHED. INTERVAL ROUTINE COVERAGE FOR PET MAMMOGRAPHY IS NOT GENERALLY AVAILABLE AND IS NOT CONSIDERED THE STANDARD OF CARE AT THIS TIME.

PET BONE SCANNING IS CURRENTLY ONLY A COVERED BENEFIT BY THE CENTERS FOR MEDICARE AND MEDICAID SERVICES WITH CED. PET BONE SCANNING IS AN EVOLVING TECHNOLOGY UNDER CLINICAL DEVELOPMENT. THIS TECHNOLOGY AND ITS IMPACT ON HEALTH OUTCOMES WILL CONTINUE TO UNDERGO REVIEW AS NEW EVIDENCE-BASED STUDIES ARE PUBLISHED. INTERVAL ROUTINE COVERAGE FOR PET BONE SCANNING IS NOT GENERALLY AVAILABLE AND IS NOT CONSIDERED THE STANDARD OF CARE AT THIS TIME.

REFERENCE/LITERATURE REVIEW:

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REFERENCE/LITERATURE REVIEW:


REFERENCE/LITERATURE REVIEW:

Magnetic Resonance Spectroscopy (MRS)

CPT CODES:
76390................. Magnetic Resonance Spectroscopy (MRS)

STANDARD ANATOMIC COVERAGE:
- Application of MRS has been described in multiple anatomic areas, to further evaluate the biochemical properties of specific tissues.

BACKGROUND:
- MR Spectroscopy is not currently a covered benefit by the Centers for Medicare and Medicaid Services, through a National Coverage Determination.
- MR spectroscopy provides a biochemical profile of different metabolic constituents in tissues. When MRS is performed, metabolites which may be measured include Choline (Cho), N-Acetyl Aspartate (NAA), Creatine (Cr), lactate and lipid.
- Certain ratios of metabolites have been described as suggestive of high grade malignancy. An example is a Choline/Creatine ratio greater the 2:1, compared with the normal ratio from spectroscopic data of approximately 1.
- When performed, MRS usually accompanies an MRI exam.
- Potential uses of MRS that have been described include neuroimaging of brain tissue (for brain tumor differentiation from non-tumor conditions such as necrosis and abscess; cerebrovascular accident; dementia; epilepsy; Parkinson’s disease; mitochondrial disorders), breast lesion assessment and evaluation of lower extremity ischemia.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

MAGNETIC RESONANCE SPECTROSCOPY:
- MR Spectroscopy is an evolving technology under clinical development. This technology and its impact on health outcomes will continue to undergo review, as new evidence-based studies are published. Interval routine coverage for MR spectroscopy is not generally available and is not considered the standard of care at this time.
CPT CODES:

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<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>77084</td>
<td>MRI of Bone Marrow Blood Supply</td>
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STANDARD ANATOMIC COVERAGE:

- MRI of the Bone Marrow Blood Supply is used to image multiple anatomic areas in the axial and appendicular skeleton.

IMAGING CONSIDERATIONS:

- In addition to MRI, several other imaging procedures are available to assess the bone marrow, including skeletal radiographic survey and nuclear scintigraphy.
- To undertake extensive coverage of the skeleton with MRI of the bone marrow blood supply, phased array MR coils are often used.

Patient Compatibility Issues:

- Artifact due to patient motion may have a particularly significant impact on exam quality.
- Metallic implants presence in spine and brain.
- Eye and brain for metallic foreign bodies.
- Breath hold requirements:
  - Some imaging sequences require breath holding and this may be difficult or impossible for some patients.
- Claustrophobic patients:
  - Patients with claustrophobia may need to be premedicated in order to tolerate the imaging procedure. Rarely patients with severe claustrophobia will not be suitable candidates for imaging.

Biosafety Issues:

- Ordering and imaging providers are responsible for considering biosafety issues prior to MRI examination, to ensure patient safety. Among the generally recognized contraindications to MRI exam performance are permanent pacemakers (some newer models are MRI compatible) or implantable cardioverter-defibrillators (ICD), intracranial aneurysm surgical clips that are not compatible with MR imaging, as well as other devices considered unsafe in MRI scanners (including certain implanted materials in the patient as well as external equipment, such as portable oxygen tanks).
- Contrast utilization is at the discretion of the ordering and imaging providers.

Ordering Issues:

- This guideline does not supersede the enrollee’s health plan medical policy specific to MRI Bone Marrow Blood Sparrow.
- There are uncommon circumstances when both CT and MRI exams should be ordered for the same clinical presentation. The specific rationale for each study must be delineated at the time of request.
- In general, follow-up CT and MRI exams should be performed only when there is a clinical change, with new signs or symptoms.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.
### MRI OF THE BONE MARROW BLOOD SUPPLY:

**Indications for MRI of the Bone Marrow:**

**HEMATOLOGICAL MALIGNANCIES ARISING IN THE BONE MARROW, INCLUDING MULTIPLE MYELOMA AND LEUKEMIA**

- To evaluate initial tumor burden within the bone marrow, from neoplastic infiltration and marrow replacement
- To assess post-treatment response to therapy

### REFERENCE/LITERATURE REVIEW:


Quantitative CT (QCT)  
Bone Mineral Densitometry

CPT CODES:

77078..................Computed tomography, bone mineral density study, 1 or more sites; axial skeleton (e.g., hips, pelvis, spine)
77079..................Computed tomography, bone mineral density study, 1 or more sites; appendicular skeleton (peripheral)  
(e.g., radius, wrist, heel)

STANDARD ANATOMIC COVERAGE:

- For central QCT, spine and hip measurements are obtained
- For peripheral QCT, forearm, wrist (distal radius and ulna) and/or heel measurements are usually acquired

IMAGING CONSIDERATIONS:

- Bone mineral densitometry may be performed on the central axial skeleton (i.e., spine, femoral head, proximal femur) or peripheral appendicular skeleton (i.e., forearm, wrist, heel). The axial measurements are considered more clinically significant and represent the standard diagnostic assessment for bone densitometry.
- Central dual x-ray absorptiometry (DXA), also referred to as dual-energy x-ray absorptiometry (DEXA), is the most commonly used test to evaluate bone mineral density and is considered the technology of choice, when available.
- QCT has a high sensitivity for detection of bone loss. However, when compared with DXA, QCT is often less readily available, more expensive and incurs higher radiation exposure.
- QCT is not covered as a screening exam in patients at low risk for osteoporosis.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g. deterioration) or there is a medical intervention which warrants interval reassessment.
- Request for re-imaging due to technically limited exams is the responsibility of the imaging providers.

COMMON DIAGNOSTIC INDICATIONS FOR QUANTITATIVE CT FOR BONE MINERAL DENSITY:

The following diagnostic indications for Quantitative CT to assess Bone Mineral Density are accompanied by pre-test considerations and supporting clinical data

Indications for Central (Axial) Quantitative CT (QCT) Evaluation of Bone Mineral Density:

INITIAL EXAMINATION – WHEN ANY ONE OF THE FOLLOWING CRITERIA ARE MET

- Menopausal or post-menopausal women - as an initial examination to screen for osteoporosis
- Men of 70 years age or older, regardless of risk factors
- Anyone presenting with a fragility or pathologic fracture
- Anyone with a disease or condition associated with development of osteoporosis.
- Including but not limited to the following abnormalities:
  - Anorexia nervosa
  - Chronic liver disease
  - Chronic renal failure
  - Cushing’s syndrome
  - Delayed menarche or untreated premature menopause
  - Heavy alcohol consumption
  - Hypercalciuria
  - Hypogonadism
  - Inflammatory bowel disease
  - Low trauma fractures or vertebral fractures
COMMON DIAGNOSTIC INDICATIONS FOR QUANTITATIVE CT FOR BONE MINERAL DENSITY:

- Malabsorption syndromes
- Primary hyperparathyroidism
- Prolonged immobilization
- Radiographic evidence of osteopenia
- Rheumatoid arthritis
- Thyroid disease

● Anyone on a medication associated with development of osteoporosis.

● Including but not limited to the following medications:
  - Glucocorticoids (e.g., prednisone, prednisolone, decadron, dexamethasone) – treatment for > 3 months
  - Phenytoin (Dilantin) – treatment for > 3 months
  - Heparin – treatment for > 1 month
  - Depo-Provera injectable contraceptive – long-standing use (> 2 years)
  - Lithium treatment
  - Lupron therapy
  - Cytotoxic agents which affect bone density (e.g., adjuvant chemotherapy in many premenopausal females with breast cancer)
  - Proton Pump Inhibitors (PPI) and Histamine-2 (H2) receptor blockers for Gastroesophageal Reflux Disease – in patients over 50 years of age, under treatment for > 3 months

Indications for Central (Axial) Quantitative CT (QCT) Evaluation of Bone Mineral Density:

REPEAT EXAMINATION – WHEN ANY ONE OF THE FOLLOWING CRITERIA ARE MET:

● Anyone under treatment for osteoporosis, to monitor the response to therapy for bone loss – at intervals of every 2 to 3 years

● Untreated individuals who met the criteria for initial evaluation, without significant osteopenia on prior bone densitometry and without interval increased risk for accelerated bone loss – at intervals of every 3 to 5 years

Indications for Peripheral (Appendicular) Quantitative CT (pQCT)

EVALUATION OF BONE MINERAL DENSITY – WHEN THE FOLLOWING CRITERIA IS MET:

● Evaluation of anyone with asymptomatic primary hyperparathyroidism

REFERENCE/LITERATURE REVIEW:


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