Cigna Medical Coverage Policies – Radiology
Head Imaging Guidelines

Effective February 1, 2021

Instructions for use

The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer's particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer's benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by eviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

These guidelines include procedures eviCore does not review for Cigna. Please refer to the Cigna CPT code list for the current list of high-tech imaging procedures that eviCore reviews for Cigna.

Head Imaging Guidelines

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Abbreviations for Head Imaging Guidelines

ACTH	adrenocorticotropic hormone
AD	Alzheimer's Disease
ADH	antidiuretic hormone
AION	arteritic ischemic optic neuritis
AVM	arteriovenous malformation
CBCT	Cone-beam computerized tomography
CMV	cytomegalovirus
CSF	cerebrospinal fluid
CT	computed tomography
CTA	computed tomography angiography
DNA	deoxyribonucleic acid
DWI	diffusion weighted imaging (for MRI)
EEG	electroencephalogram
ENT	Ear, Nose, Throat
ESR	erythrocyte sedimentation rate
FDG	fluorodeoxyglucose
FSH	follicle-stimulating hormone
FTD	Frontotemporal Dementia
GCA	giant cell arteritis
GCS	Glasgow Coma Scale
HIV	human immunodeficiency virus
LH	luteinizing hormone
MMSE	mini mental status examination
MRA	magnetic resonance angiography
MRI	magnetic resonance imaging
MRN	magnetic resonance neurography
MS	multiple sclerosis
MSI	magnetic source imaging
NAION	non-arteritic ischemic optic neuritis
NPH	normal pressure hydrocephalus
PET	positron emission tomography
PML	progressive multifocal leukoencephalopathy
PNET	primitive neuro ectodermal tumor
PWI	perfusion weighted imaging (for MRI)
SAH	subarachnoid hemorrhage
SIADH	Syndrome of Inappropriate Antidiuretic Hormone Secretion
SLE	systemic lupus erythematosus
TIA	transient ischemic attack
TMJ	temporomandibular joint disease
TSH	thyroid-stimulating hormone
VBI	vertebrobasilar insufficiency
VP	ventriculoperitoneal
XRT	radiation therapy

HD-1: General Guidelines

HD-1.0: General Guidelines

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination and appropriate laboratory studies should be performed prior to considering the use of an advanced imaging (CT, MR, Nuclear Medicine) procedure. An exception can be made if the individual is undergoing a guideline-supported, scheduled follow-up imaging evaluation.
  - The clinical evaluation should include a relevant history and physical examination, including a neurological examination (unless the request is for a scheduled follow-up of known problems such as MS, tumors, or hydrocephalus, scheduled surveillance with no new symptoms, screening asymptomatic individual due to family history or otherwise meet criteria for repeat imaging), as well as appropriate laboratory studies and non-advanced imaging modalities
    - A detailed neurological exam is required prior to advanced imaging except in the following scenarios:
      - Tinnitus, TMJ, Sinus or mastoid disease, ear pain, hearing loss, eye disease, and epistaxis. (A relevant physical exam is still required.)
      - The request is from a neurologist or neurosurgeon who has seen the individual since onset of symptoms
  - Other meaningful contact (telephone call, electronic mail or messaging) with an established individual can substitute for a face-to-face clinical evaluation

HD-1.1: General Guidelines – Anatomic Issues

- If two studies using the same modality both cover the anatomic region of clinical interest, only one is generally needed, with the exception of the following scenarios:
  - CT Maxillofacial (CPT® 70486, CPT® 70487, or CPT® 70488) or CT Orbital/Temporal bone (CPT® 70480, CPT® 70481, or CPT® 70482): both cover the structures of the orbits, sinuses, and face. Two separate imaging studies are only supported if there is suspicion of simultaneous involvement of more posterior lesions, especially of the region involving the middle or inner ear.
  - Pituitary Gland: one study (either MRI Brain [CPT® 70553] or MRI Orbit, Face, Neck [CPT® 70543]) is adequate to report the imaging of the pituitary. If a previous routine MRI Brain was reported to show a possible pituitary tumor, a repeat MRI with dedicated pituitary protocol may be performed.
  - Internal Auditory Canal: (IAC) MRI can be reported as a limited study with one code from the set (CPT® 70540, CPT® 70542, or CPT® 70543), but should not be used in conjunction with MRI Brain codes (CPT® 70551, CPT® 70552, or CPT® 70553) if IAC views are performed as part of the brain.
  - Mandible (jaw): CT Maxillofacial (CPT® 70486, CPT® 70487, or CPT® 70488) or CT Neck (CPT® 70490, CPT® 70491, or CPT® 70492) can be used to report imaging of the mandible. CT Neck will also image the submandibular space.
    - If MRI is indicated, MRI Orbit, Face, Neck (CPT® 70540, CPT® 70542, or CPT® 70543) can be used to report imaging of the mandible and submandibular space.

- MRI Temporomandibular Joint(s) (TMJ) is reported as CPT® 70336. This code is inherently bilateral and should not be reported twice on the same date of service.

HD-1.2: General Guidelines – Modality

- MRI is preferable to CT for most indications. For exceptions, See **HD-1.4: General Guidelines – CT Head.**
- MRI may be performed for these indications following an initial CT:
  - MRI Brain without and with contrast (CPT® 70553) may be performed to follow-up abnormalities seen on CT Head without contrast (CPT® 70450) when a mass, lesion, or infection is found.
  - MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) (preferred) may be performed to follow-up abnormalities seen on CT Head without contrast (CPT® 70450) when there is suspected Multiple Sclerosis or other demyelinating disease.
  - MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) may be performed to follow up on stroke or TIA when initial CT Head was done on emergent basis.
  - MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) for evaluation of new onset seizures.

HD-1.3: General Guidelines – MRI Brain

- MRI Brain with contrast (CPT® 70552) should not be ordered except to follow-up on a very recent non-contrast study (within two weeks).

The AMA CPT manual does not describe nor assign any minimum or maximum number of sequences for any CT or MRI study. Both MRI and CT imaging protocols are often influenced by the individual clinical situation of the individual and additional sequences are not uncommon. There are numerous MRI sequences that may be performed to evaluate specific clinical questions, and this technology is constantly undergoing development. Additional sequences, however, are still performed and coded under the routine MRI Brain CPT® 70551, CPT® 70552, or CPT® 70553.

HD-1.4: General Guidelines – CT Head

- Scenarios in which MRI is contraindicated (i.e. pacemakers, ICDs, cochlear implants, aneurysm clips, orbital metallic fragments, etc.)
- CT Head without contrast (CPT® 70450) in nearly all cases, to show:
  - Mass effect
  - Blood/blood products
  - Urgent/emergent settings due to availability and speed of CT
  - Trauma
  - Recent hemorrhage, whether traumatic or spontaneous
  - Bony structures of the head evaluations including dystrophic calcifications
  - Hydrocephalus evaluation and follow-up (some centers use limited non-contrast "fast or rapid MRI" (CPT® 70551) to minimize radiation exposure in children - these requests may be approved).
  - Prior to lumbar puncture in individuals with cranial complaints (without contrast) (CPT® 70450)

HD-1.5: General Guidelines – CT and MR Angiography: (CTA and MRA)

- MRA Head may be performed without contrast (CPT® 70544), with contrast (CPT® 70545), or without and with contrast (CPT® 70546).
- CTA Head is performed without and with contrast (CPT® 70496)
- MRA Neck may be done either without contrast (CPT® 70547), with contrast (CPT® 70548), or without and with contrast (CPT® 70549), depending on facility preference and protocols and type of scanner
- MRA Head or CTA Head may be considered with suspected intracranial vascular disease, for example:
  - Pulsatile tinnitus
  - Hemifacial spasm if consideration for surgical decompression
  - Evaluation of stroke or TIA (See **HD-21: Stroke/TIA**)
  - Trigeminal neuralgia failed medical therapy
  - Cerebral sinus thrombosis suspected with increased intracranial pressure (refractory headaches, papilledema, diagnosis of pseudotumor cerebri)
  - Aneurysm suspected with acute "thunderclap" headache syndrome and appropriate screening or evaluation of known subarachnoid hemorrhage
  - Intra-cranial pre-operative planning if there is concern of possible vascular involvement or risk for vascular complication from procedure
  - Suspicion of vasculitis based on supporting clinical evidence
  - NOTE: Evaluation of posterior circulation disease requires both neck and head MRA/CTA to visualize the entire vertebral-basilar system.
  - MRA Head without, with, or without and with contrast or CTA Head for follow up of aneurysm clipping or coiling procedures (See **HD-12.1: Intracranial Aneurysms**)

- CT and MR Venography (CTV and MRV) are reported with the same codes as the CTA/MRA counterpart (there is no specific code for CT/MR venography):
  - If arterial and venous CT or MR studies are both performed in the same session, only **one** CPT® code should be used to report both procedures
  - MRA without and with contrast with venous sinus thrombosis to differentiate total from subtotal occlusion

HD-1.6: General Guidelines – PET Coding Notes

- Metabolic Brain PET should be reported as Metabolic Brain PET (CPT® 78608)
- Amyloid Brain PET should be reported as limited PET (CPT® 78811) or limited PET/CT (CPT® 78814)

HD-1.7: General Guidelines – Other Imaging Situations

- Nausea and vomiting, persistent, unexplained and a negative GI evaluation: can undergo MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553).
- Screening for metallic fragments before MRI should be done initially with Plain x-ray.
  - The use of CT Orbital to rule out orbital metallic fragments prior to MRI is rarely necessary
  - Plain x-rays are generally sufficient; x-ray detects fragments of 0.12 mm or more, and CT detects those of 0.07 mm or more
- Plain x-ray is generally sufficient to screen for aneurysm clips
- CPT® 76377 (3D rendering requiring image post-processing on an independent workstation) can be considered when performed in conjunction with conventional angiography (i.e.: conventional 4 vessel cerebral angiography).
- MRI Brain without and with contrast (CPT® 70553) is approvable for consideration of neurosarcoidosis.
- Repeat Imaging Indications including CSF flow shunting and Ventriculostomy
  - Rapid MRI Brain without contrast (CPT® 70551) or CT Head without contrast (CPT® 70450) is indicated in the postoperative period following shunt placement or ETV, with further follow-up imaging 6-12 months after the procedure and then every 12 months for individuals with stable clinical findings or as ordered by a specialist (neurologist or neurosurgeon) or any provider in consultation with a specialist
- Shunting into the peritoneum (VP shunts) can give rise to abdominal complications, but these are generally symptomatic, so surveillance imaging of the abdomen is not indicated. If symptomatic, abdomen imaging (MRI or CT) may be approved as ordered by a specialist or any provider in consultation with a specialist
- For facial feminization/masculinization: Preoperative CT/MRI requests (for either a diagnostic or unlisted CPT code) of the CT Maxillofacial without contrast (CPT® 70486) with or without 3D rendering (CPT® 76376 or CPT® 76377) and CT Neck with contrast (CPT® 70491) are considered medically necessary once the facial

feminization/masculinization and laryngoplasty surgeries have been approved or do not require prior authorization. Preoperative imaging is considered not medically necessary if the surgery has been deemed not medically necessary.

References

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5. ACR-ASNR-SPR Practice Parameter for the Performance of Computed Tomography (CT) of the Extracranial Head and Neck Revised 2016. (Resolution 14). https://www.acr.org/-/media/ACR/Files/Practice-Parameters/CT-Head-Neck.pdf.
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7. Shosha E, Dubey D, Palace J, et al. Area postrema syndrome. Neurology. 2018;91(17). doi:10.1212/wnl.0000000000006392.
8. Singh P, Yoon SS, Kuo B. Nausea: a review of pathophysiology and therapeutics. Therapeutic Advances in Gastroenterology. 2015;9(1):98-112. doi:10.1177/1756283x15618131.
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HD-2: Taste and Smell Disorders

HD-2.1: Taste and Smell Disorders

- MRI Brain without and with contrast (CPT® 70553) or without contrast (CPT® 70551) and/or MRI Orbit, Face, and Neck without (CPT® 70540) or without and with contrast (CPT® 70543) is considered with unexplained unilateral or bilateral anosmia (inability to perceive odor) or dysgeusia (complete or partial loss of taste)
- CT Maxillofacial (CPT® 70486, CPT® 70487 or CPT® 70488) considered initially if sinus or facial bone disorders is suspected.
- For individuals who test positive for SARS-CoV-2, MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is approvable for neurologic symptoms or signs other than change in taste or smell for consideration of other pathology. See **HD-21.1: Stroke/TIA**

Background and Supporting Information

- In those individuals with consideration of COVID-19 due to signs/symptoms, testing to identify for SARS-CoV-2 is encouraged

References

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2. DeVere R. Disorders of taste and smell. *Continuum*. 2017 Apr;23(2):421-446.
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HD-3: Ataxia

HD-3.1: Ataxia

- MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) is considered in all individuals with ataxia:[1]
  - MRI Cervical, Thoracic and/or Lumbar spine without contrast (CPT® 72141, CPT® 72146, CPT® 72148)[1] if spinal disease is suspected
  - If these symptoms are acute and stroke is suspected, See **HD-21: Stroke/TIA**
  - If MS is suspected, See **HD-16: Multiple Sclerosis (MS) and Related Conditions**
  - CT Head without contrast (CPT® 70450) and/or CT Temporal Bone without contrast (CPT® 70480) can be added[1] if these symptoms are acute following head trauma. See **HD-13: Head and Facial Trauma**
- If brain tumor is suspected, See **ONC-2: Primary Central Nervous System Tumors** in the Oncology Imaging Guidelines.
- MRI Brain without contrast (CPT® 70551), or CT Head without contrast (CPT® 70450) if there is a contraindication to MRI, is considered for those with gait abnormalities, cognitive impairment and/or urinary symptoms (e.g. urgency, frequency and/or incontinence) for the evaluation of Normal Pressure Hydrocephalus

References

1. American College of Radiology (*ACR) Appropriateness Criteria*® Ataxia. Last review date: 2018.
2. Graff-Radford NR, Jones DT. Normal Pressure Hydrocephalus. CONTINUUM: Lifelong Learning in Neurology. 2019;25(1):165-186. doi:10.1212/con.0000000000000689.

HD-4: Behavioral Disorders

HD-4.0: Behavioral Disorders – General Information

- Autism: See **PEDHD-17: Autism Spectrum Disorders** in the Pediatric Head Imaging Guidelines

HD-4.1: Behavioral Disorders

- Psychiatric diagnoses do not routinely require advanced imaging.
- MRI Brain without contrast (CPT® 70551), or MRI Brain without and with contrast (CPT® 70553), or CT Head without contrast (CPT® 70450)
  - Acute mental status change, disturbance in consciousness or arousal state
  - Psychotic disorders (including schizophrenia), bipolar disorder and related disorders may require advanced imaging in the following atypical clinical presentations:
    - Acute first episode onset
    - Late onset over age 40
    - Presentation of new symptoms in co-incident with comorbid serious medical illness
    - Non-auditory hallucinations (e.g., visual, tactile, olfactory) with no known etiology
    - Nonresponse to adequate medication trials
    - Symptoms of an organic brain disorder (e.g., focal deficits, severe headache, or seizures)
- Prior to ECT treatment, utilize to screen for intracranial disease: either MRI Brain without contrast (CPT® 70551) or CT Head without contrast (CPT® 70450)

References

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HD-5: Chiari and Skull-Base Malformation

- See **PEDHD-9: Chiari and Skull Base Malformations** in the Pediatric Head Imaging Guidelines

HD-6: Facial Palsy (Bell's Palsy)

HD-6.1: Facial Palsy

Typical features of Bell's palsy include spontaneous onset over 72 hours, otherwise normal neurological and systemic examination, variable initial ipsilateral temporal and auricular pain, and slow improvement over several months. Unless "red flags" are present, imaging is not necessary.

- MRI Brain without and with contrast (CPT® 70553) (with attention to posterior fossa and IACs) or without contrast (CPT® 70551) and/or MRI Orbit, Face and Neck without contrast (CPT® 70540) or with and without contrast (CPT® 70543) are considered with the following "red flags" of unexplained facial paresis/paralysis in clinical scenarios with:
  - Trauma to the temporal bone
  - History of tumor, systemic cancer, HIV or Lyme disease
  - No improvement in 8 weeks
  - No full recovery in 3 months
  - Gradual onset over weeks to months
  - Vertigo or hearing loss
  - Bilateral involvement
  - Other atypical or inconsistent features including:
    - Second episode of paralysis on the same side
    - Paralysis of isolated branches of the facial nerve
    - Paralysis associated with other cranial nerve
- MRI Brain without and with contrast (CPT® 70553) may be considered for known sarcoidosis with suspected neurosarcoid or CNS involvement

HD-6.2: Hemifacial Spasm

- MRI Brain without and with contrast (CPT® 70553)
- May add CTA Head (CPT® 70496) or MRA Head (CPT® 70544, CPT® 70545, or CPT 70546) prior to a vascular decompression surgical procedure to clarify the vascular anatomy in individuals who have failed conservative medical management

References

1. Baugh RF, Basura GJ, Ishii LE, et al. Clinical practice guideline. Bell's Palsy Executive Summary. *Otolaryngol. Head Neck Surg. 2013 Nov 4;149(5):656-663.*
2. ACR Appropriateness Criteria® Cranial neuropathy. *American College of Radiology (ACR).* Revised 2017.
3. Yaltho TC and Jankovic J. The many faces of hemifacial spasm: differential diagnosis of unilateral facial spasms. *Mov Disord*. 2011 Aug 1; 26(9):1582-1592.
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HD-7: Recurrent Laryngeal Palsy

HD-7.1: Recurrent Laryngeal Palsy

- The following can be considered with unilateral vocal cord/fold palsy identified by laryngoscopy[1]
  - MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) **and** MRI Orbit, Face and Neck with and without contrast (CPT® 70543) or CT Neck with contrast (CPT® 70491)
  - CT Chest with contrast (CPT® 71260) may be added with left vocal cord palsy

Reference

1. ACR Appropriateness Criteria® Cranial neuropathy. *American College of Radiology (ACR).* Revised 2017.

HD-8: Dementia

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HD-8.1: Dementia

- For acute mental status change See **HD-4.1: Behavioral Disorders**.
- MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) or CT Head without contrast (CPT® 70450) is considered after an initial clinical diagnosis of dementia[3,4] has been established based on a detailed history of memory loss with impairment of day-to-day activities confirmed by family members or others with knowledge of the individual's status, Neuropsychological testing can be performed when history and bedside mental status examination cannot provide a confident diagnosis.
  - This may include abnormal bedside mental status testing such as Mini-Mental Status Exam (MMSE) with score <26, Montreal Cognitive Assessment Survey (MoCA) with score <26, Memory Impairment Screen (MIS) with score <5, or the St. Louis University Mental Status (SLUMS) with score <21.
- MRI Brain without contrast (CPT® 70551) or CT Head without contrast (CPT® 70450) if there is a contraindication to MRI, is considered for those with gait abnormalities, cognitive impairment and/or urinary symptoms (e.g. urgency, frequency and incontinence) for the evaluation of Normal Pressure Hydrocephalus. (See **HD-3.1: Ataxia**)

Background and Supporting Information

- 3D Brain imaging in dementia
  - 3D analysis of the temporal lobes and hippocampus (also known as volumetric analysis or Neuro Quant) (CPT® 76377) lacks sufficient specificity and sensitivity to be clinically useful in the evaluation or follow up of individual with dementia. It's use is limited to research studies and it is otherwise considered to be investigational and experimental in routine clinical practice. Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support

HD-8.2: Dementia - PET

Send these requests for Medical Director Review.

CPT® 78608 is used to report FDG PET metabolic brain studies for dementia, seizure disorders, and dedicated PET tumor imaging studies of the brain.

CPT® 78609 is used to report PET Brain perfusion studies that are not performed with

CPT® 78811 (limited PET) or CPT 78814 (limited PET/CT) are used to report Amyloid Brain PET (these codes are for static images to measure amyloid, as opposed to the FDG PET which is a metabolic study).

- FDG PET for Dementia and Neurodegenerative Diseases
  - FDG Brain PET (CPT® 78608) may be useful in distinguishing between Alzheimer's disease and Frontotemporal dementia. It is otherwise considered investigational and experimental for the purpose of diagnosis and management of mild cognitive impairment and other forms of dementia including, but not limited to, Lewy Body disease, Parkinson's disease, Normal Pressure Hydrocephalus and Chronic Traumatic Encephalopathy. Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support. Appropriate documentation should support concern for one of the variants of Frontotemporal dementia (Behavioral Variant or Primary Progressive Aphasia type FTD) based on a detailed history and exam findings (which may include neuropsychological testing) and meet the following criteria:
    - Meets diagnostic criteria for AD and FTLD; and
    - Has a documented cognitive decline of at least 6 months; and
    - Evaluation has ruled out specific alternative neurodegenerative disease or causative factors; and
    - Cause of clinical symptoms is uncertain; and
    - The results are expected to help clarify the diagnosis between FTLD and AD and help guide future treatment.
  - Medicare covers FDG PET for individuals with a recent diagnosis of dementia and documented cognitive decline of at least six months who meet diagnostic criteria for both Alzheimer's disease (AD) and Frontotemporal Dementia (FTD).
    - The individual must have been evaluated for specific alternate neurodegenerative diseases or other causative factors, but the etiology of the symptoms remains unclear
    - Other conditions must also be met. For the complete coverage policy, See the Medicare National Coverage Determinations (NCD) Manual, Section 220.6.13
    - Medicare also covers FDG PET for individuals with mild cognitive impairment or early dementia when the study is performed in the context of a CMS-approved clinical trial. Requirements are detailed in Section 220.6.13 of the NCD Manual
    - All other uses of FDG PET for individuals with a presumptive diagnosis of dementia-causing neurodegenerative disease for which CMS has not specifically indicated coverage continue to be noncovered. Examples of noncovered indications described in the NCD include: possible or probable Alzheimer's disease (AD), clinically typical frontotemporal dementia (FTD), dementia of Lewy bodies, and Creutzfield-Jacob disease.

    http://www.cms.gov/Regulations-and-guidance/Guidance/Manuals/downloads/ncd103c1_Part4.pdf.

- Amyloid Brain PET
  - Amyloid Brain PET (CPT® 78811 or CPT® 78814) imaging is considered experimental and investigational in the diagnosis of Alzheimer's disease and in differentiating between Alzheimer's disease and other

neurodegenerative/neurologic disorders. Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support.

- Amyloid PET studies may be approved one time for Medicare individuals enrolled in approved clinical trials under Coverage with Evidence Development (CED) program. For CMS, approval with CED is available for individuals enrolled in studies approved by CMS. See the link below for a list of the CMS approved clinical trials: https://www.cms.gov/Medicare/Coverage/Coverage-with-Evidence-Development/Amyloid-PET.html
  - Medicare will reimburse for Brain PET only through CED
  - Only one study will be paid per beneficiary and the radiopharmaceutical must be FDA-approved. Examples of radiopharmaceuticals which met this qualification include Amyvid™ (florbetapir F18), Neuraceq™ (florbetaben F18), Tauvid (flortaucipir F18) and Vizamyl™ (flutemetamol F18)

Background and Supporting Information

The frontotemporal dementias (FTDs) are a group of neurodegenerative disorders that differ from Alzheimer's disease. The basic pathology involves accumulation of tau proteins in the brain rather than amyloid. Onset tends to be younger (less than 65) and progression usually more rapid than in senile dementia-Alzheimer type (SDAT). There is no treatment, and the medications used to help memory in Alzheimer's disease are not effective.

There are several subtypes of FTD; most common are the behavioral variant with early loss of executive functions, impaired judgment disinhibition and impulsivity, and the semantic variant with primary and progressive loss of language ability. Other less common subtypes include progressive supranuclear palsy, corticobasal syndrome, and FTD associated with motor neuron disease.

Diagnosis is based on clinical features, neuropsychological testing, and brain imaging (preferably MRI) to rule out other structural disease. Metabolic (FDG) PET Brain may also be helpful by demonstrating patterns of abnormality more consistent with FTD than Alzheimer's disease.

For additional information: http://www.alz.org/dementia/fronto-temporal-dementia-ftd-symptoms.asp.

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HD-9: Epilepsy/Seizures

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HD-9.1: Epilepsy/Seizures

- MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) may be considered:
  - Evaluation of new onset seizures (including CT Head without contrast (CPT® 70450)
  - Refractory or drug resistant seizures
  - Change in type of seizure
  - Preoperative planning
  - If CT Head without contrast (CPT® 70450) was performed for an initial evaluation for new onset seizure, MRI (as described above) may be approved for additional evaluation
  - Follow-up studies after a previous routine normal study may be considered if performed with special "Epilepsy Protocol" (typically 3T magnet, thin sections with angled slices through hippocampus and temporal lobes)
- CT Head without contrast (CPT® 70450) may be approved for evaluation of structural findings in seizure etiologies that contain dystrophic calcifications, such as with oligodendrogliomas and tuberous sclerosis.
- FDG PET (CPT® 78608) and/or SPECT or SPECT/CT (CPT® 78803) and/or Functional MRI (fMRI) Brain (CPT® 70555 or CPT® 70554) for surgical planning in individuals with refractory seizures who are candidates for epilepsy surgery. (See **HD-24.2: Functional MRI (f-MRI)** for surgical planning; See **ONC-2.1: Primary Central Nervous System Tumors-General Considerations** in the Oncology Imaging Guidelines for additional imaging requests for surgery).
- CTA Head (CPT® 70496) or MRA Head (CPT® 70544. CPT® 70545, or CPT® 70546) for surgical planning

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HD-10: Facial Pain/Trigeminal Neuralgia

HD-10.1: Facial Pain/Trigeminal Neuralgia

- MRI Brain without and with contrast (CPT® 70553) (with special attention to the skull base), and/or facial imaging, MRI Orbit without and with contrast (CPT® 70543) may be of value in a given case, including:
  - Suspected tic douloureux or one of its cranial nerve variants such as glossopharyngeal neuralgia (CN IX)
  - Concern about an underlying diagnosis of multiple sclerosis.
  - Trigeminal neuralgia which involves the ophthalmic nerve, (periorbital or forehead pain), once post-herpetic neuralgia (a complication of shingles), facial pain consistent with trigeminal branch nerve involvement (infra-orbital or mental nerve) has been excluded by history
- MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA Head (CPT® 70496) may be performed for:
  - Failed medical treatment
  - Surgical planning

Background and Supporting Information

The differential diagnosis of facial pain is extensive, complex, and difficult, and there is considerable case-to-case variation in optimal imaging pathway.

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HD-11: Headache

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HD-11.1: Headache Non-Indications

Neuroimaging is not usually warranted in individuals with migraine and a normal neurologic examination.

- Advanced imaging of the head is NOT indicated for any of the following:
  - Primary headache disorder in the absence of focal neurological deficits or "red flags" (headaches that meet criteria for migraine or tension variety) (See **HD-11.2: Headaches with Red Flags**)
  - Chronic headaches or intermittent recurring headaches with a normal exam, and no significant recent changes in pattern or character of headache

Background and Supporting Information

Cervicogenic Headache - Defined as headaches caused by a disorder of the cervical spine, usually accompanied by neck pain or other signs and symptoms of cervical disease. Typical findings include reduced cervical range of motion, side-locked pain, and symptoms exacerbated by provocative maneuvers such as head movement or digital pressure. If suspected clinically, MRI Cervical Spine may be considered. See **SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features (Including Stenosis) and Trauma** in the Spine Imaging Guidelines

HD-11.2: Headaches with Red Flags

- Red flags:
  - Unusual symptoms or history
  - Cancer history or immunosuppression (See **HD-11.8: Cancer or Immunosuppression**)
  - Sudden onset (See **HD-11.3: Sudden Onset of Headache**)
  - Headache accompanied by seizures, vomiting, focal neurological complaints, visual change, acute hypertension or altered mental status (See **ONC-2.1: Primary Central Nervous System Tumors – General Considerations** in the Oncology Imaging Guidelines and **HD-21.1: Stroke/TIA**)
  - New onset age >50 (See **HD-1.7: New Headache Onset Older than Age 50**)
  - History of head trauma (See **HD-11.12: Post Trauma** and **HD-13: Head and Facial Trauma**)
  - Headache awakens individual from sleep
  - Headache precipitated by cough or valsalva, physical exertion, or sexual activity (See **HD-11.11: Physical Exertion**)
  - Currently pregnant (including pregnancy and the immediate postpartum period) (See **HD-11.10: Pregnancy**)
  - Hypercoagulable state or bleeding disorder (See **HD-11.9: Abnormal Blood Clotting**)
  - Abnormal exam findings (altered mental status, papilledema, focal signs or symptoms (unilateral weakness or sensory loss), loss of coordination, seizures, gait disturbance, cranial nerve abnormality, vision loss, nystagmus, dysarthria, dysphagia, fever, meningismus)

- If any of the above unusual symptoms or history are present advanced imaging studies may be considered; see relevant section below.
- If any of the above abnormal examination findings or chronic headache with significant change in character, severity or frequency of headache (For example: rapidly increasing headache intensity or frequency, transformation of established migraine to chronic daily headaches):
  - MRI Brain without and with contrast (preferred study) (CPT® 70553); or
  - MRI Brain without contrast (CPT® 70551); or
  - CT Head without contrast (preferred study) (CPT® 70450)
  - MRA/MRV Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA/CTV Head (CPT® 70496) can be added to evaluate the recent onset of a progressive, severe, daily headache, with or without papilledema and concern for cerebral venous sinus thrombosis.
  - For papilledema See **HD-17: Papilledema/Pseudotumor Cerebri**

HD-11.3: Sudden Onset of Headache

- For sudden onset of headache including:
  - Worst, most severe headache ever experienced or thunderclap-type (example: awakening from sleep)
  - Sudden onset unilateral headache, suspected carotid or vertebral dissection or ipsilateral Horner's syndrome
  - Consideration of reversible cerebral vasoconstriction syndrome (RCVS) (typically bilateral headache)
- If any of these sudden onset of headache features are present, the following advanced imaging studies may be considered:
  - CT Head without contrast (preferred study) (CPT® 70450); **or** MRI Brain without contrast (CPT® 70551) **or** MRI Brain without and with contrast (CPT® 70553) **and/or**
  - CTA Head (CPT® 70496), **or** MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546)
  - MRA Neck (CPT® 70547, CPT® 70548, or CPT® 70549) or CTA Neck (CPT® 70498) may also be performed if arterial dissection is suspected
- Repeat MRA/CTA Head and Neck imaging in 2-4 weeks is approvable if suspicion of Reversible Cerebral Vasoconstriction Syndrome (RCVS) is high

See **HD-12.1: Intracranial Aneurysms** and **HD-21.1: Stroke/TIA**

HD-11.4: Trigeminal Autonomic Cephalgias

- Trigeminal autonomic cephalgias includes cluster headache short-lasting, unilateral, neuralgiform headache attacks with conjunctival injection and tearing (SUNCT) syndromes; short-lasting unilateral neuralgiform headache attacks with cranial autonomic symptoms (SUNA) and hemicrania continua.
  - May also include pituitary screening[1,12]
- Cluster Headache (may also include pituitary)
- The following advanced imaging studies may be considered for trigeminal autonomic cephalgias and cluster headache:
  - MRI Brain without and with contrast (preferred study) (CPT® 70553); or
  - MRI Brain without contrast (CPT® 70551)

See **HD-10: Facial Pain/Trigeminal Neuralgia**

HD-11.5: Skull Base, Orbit, Periorbital or Oromaxillary

- Skull base, orbital, periorbital or oromaxillary[1] imaging is appropriate for concern of skull base tumors in individuals with head and neck cancers, skull base abnormalities seen on previous imaging, any invasive sinus infections as well as sinus tumors or orbital tumors with intracranial extension.
- In these clinical scenarios, ONE of the following procedures may be considered:
  - MRI Brain and Orbits without and with contrast (preferred study) (CPT® 70553 and CPT® 70543); **or**
  - MRI Brain and Orbits without contrast (CPT® 70551 and CPT® 70540); **or**
  - CT Head and Orbits without and with contrast (CPT® 70470 and CPT® 70482); **or**
  - CT Head and Orbits with contrast (CPT® 70460 and CPT® 70481)

HD-11.6: Suspected Intracranial Extension of Sinusitis or Mastoiditis

- For suspected intracranial extension of sinusitis or mastoiditis, transverse sinus thrombosis, epidural or subdural abscess, **not** cervicogenic:
  - MRI Brain without and with contrast (CPT® 70553) (See **PEDHD-16.2: Ear Pain** in the Pediatric Head Imaging Guidelines)
  - CT Head without and with contrast (CPT® 70470); **or**
  - CT Head with contrast (CPT® 70460)

HD-11.7: New Headache Onset Older than Age 50

- For new onset headache in individuals older than 50 years of age the following may be considered:
  - MRI Brain without and with contrast (preferred study) (CPT® 70553); **or**
  - MRI Brain without contrast (CPT® 70551); **or**
  - CT Head without contrast (CPT® 70450)
  - If Giant Cell Arteritis is suspected, MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) may be added

HD-11.8: Cancer or Immunosuppression

- For new headache in individuals with cancer or who are immunocompromised, the following may be considered:
  - MRI Brain without and with contrast (preferred study) (CPT® 70553); **or**
  - MRI Brain without contrast (CPT® 70551)

HD-11.9: Abnormal Blood Clotting

- MRI Brain without and with contrast (CPT® 70553); **or** MRI Brain without (CPT® 70551) or CT Head without contrast (CPT® 70450)
  - New onset headaches in individual with hypercoagulable states or bleeding disorder including pregnancy and the immediate postpartum period
    - MRA/MRV Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA/CTV Head (CPT® 70496) may be added if there is concern for venous sinus thrombosis
  - Individuals with potential for bleeding diathesis
    - Taking anticoagulants or two or more antiaggregants or having a medical condition that predisposes to bleeding (for example, liver failure).

HD-11.10: Pregnancy

- For new onset headache during pregnancy or immediate post-partum period (within 3 months after delivery) the following may be considered:
  - MRI Brain without contrast (Gadolinium relatively contraindicated in pregnancy) (CPT® 70551), Postpartum: MRI Brain without and with contrast (CPT® 70553) if not breastfeeding, if unsure, MRI Brain without contrast (CPT® 70551);
  - MRA/MRV Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA/CTV Head (CPT® 70496) may be added if there is concern for venous sinus thrombosis.
- For post LP/epidural anesthesia - See **HD-11.15: Low Pressure Headache and CSF Leak**

HD-11.11: Physical Exertion

- For onset of headache with Valsalva maneuver, cough, physical exertion, change in position, **or** sexual (post-coital) activity, but not merely a worsening of a pre-existing headache with these activities, the following procedures may be considered:
  - MRI Brain without and with contrast (preferred study) (CPT® 70553); **or**
  - MRI Brain without contrast (CPT® 70551); **or**
  - CT Head without contrast (CPT® 70450); **AND/OR**
  - MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) **or**
  - CTA Head without and with contrast (CPT® 70496)

HD-11.12: Post-Trauma

- For post-traumatic headaches within 2 weeks of the injury See **HD-13: Head and Facial Trauma**
- For post-traumatic headaches persisting for longer than 2 weeks following the injury, the following may be considered:
  - CT Head without contrast (CPT® 70450); **or**
  - MRI Brain without contrast (CPT® 70551); **or**
  - MRI Brain without and with contrast (CPT® 70553) if post-traumatic infection is suspected

HD-11.13: Acute Systemic Infections

- For acute systemic infections with meningeal neck stiffness the following may be considered:
  - MRI Brain without and with contrast (preferred study) (CPT® 70553); or MRI Brain without contrast (CPT® 70551)
  - MRA/MRV Head (CPT® 70544, CPT® 70545, or CPT® 70546)
- See **HD-14.1: CNS Infection**

HD-11.14: Hydrocephalus Shunts

- For Hydrocephalus Shunts See **PEDHD-7.3: Hydrocephalus** in the Pediatric Head Imaging Guidelines

HD-11.15: Low Pressure Headache and CSF Leak

- Evaluation of suspected CSF leak (rhinorrhea/otorrhea) or refractory post-lumbar puncture/low pressure headache may include:
  - MRI Brain without and with contrast (CPT® 70553), and
  - MRI Cervical, Thoracic and Lumbar Spine, which according to facility protocols may be completed without contrast (CPT® 72141, CPT® 72146, and CPT® 72148), with and without contrast (CPT® 72156, CPT® 72157, and CPT® 72158) or with contrast only (CPT® 72142, CPT® 72147, and CPT® 72149) or CT myelography (CT Cervical, Thoracic, and Lumbar Spine with contrast [CPT® 72126, CPT® 72129, CPT® 72132])
- CT Maxillofacial without contrast (CPT® 70486) if concern for CSF rhinorrhea
- CSF Leakage Detection (CPT® 78650) for evaluation of CSF rhinorrhea, otorrhea, or refractory post-lumbar puncture
- Cisternogram (CPT® 78630) can be approved for the following:
  - Known hydrocephalus with worsening symptoms
  - Suspected obstructive hydrocephalus

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HD-12: Aneurysm and AVM

HD-12.1: Intracranial Aneurysms

- CTA Head (CPT® 70496) or MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) can be performed in ANY of the following clinical scenarios:
  - Symptoms or signs of cerebral aneurysm, including:
    - "Thunderclap headache" See **HD-11.3: Sudden Onset of Headache**
    - Third nerve palsy with pupillary involvement (pupil-sparing third nerve palsies are not caused by external compression)
    - Suspicion of aneurysm bleed [CT Head or MRI Brain or CSF exam showing evidence of subarachnoid hemorrhage (SAH) or intracerebral hemorrhage]
    - Abnormal CT Head or MRI Brain suggesting possible aneurysm

  - Screening for High Risk Populations as defined by the following criteria (screening usually begins at age 20 unless unusual circumstances as aneurysms are uncommon in children and adolescents):
    - Positive Family History: Two or more first degree relatives (parent, sibling, or child) with history of cerebral aneurysm or SAH: screening every 5 years beginning at age 20
      - One first degree relative (parent, sibling, or child) with history of cerebral aneurysm or SAH may also have one screening study but risks and benefits should be discussed with individual
    - Autosomal dominant polycystic kidney disease
    - Aortic coarctation or bicuspid aortic valve
    - Neurofibromatosis Type 1
    - Type 4 (Vascular) Ehlers-Danlos Syndrome
    - Marfan's Syndrome
    - Loeys-Dietz Syndrome
    - Microcephalic osteodysplastic primordial dwarfism
    - Individuals with previous history of SAH or treatment for cerebral aneurysm: continued surveillance and screening every 5 years
    - Presence of an azygos anterior cerebral artery
    - Diagnosis of fibromuscular dysplasia (one screening study after confirmed diagnosis)
  - CTA Head (CPT® 70496) may be performed to confirm questionable or equivocal findings on an initial MRA Head
  - Follow up of known cerebral aneurysm
    - Known incidentally discovered aneurysms which have never bled. The optimal interval and duration of recommended follow up in the literature are undefined. The risk of aneurysm rupture is related to size, location (posterior circulation is higher risk), and individual factors including age, sex (higher for female), and history of smoking and hypertension.
    - Follow up at 6 months, 12 months and then annually for up to 5 years or until aneurysm is determined to be stable; and then at decreasing frequency, generally every 5 years unless judged to be at higher risk (see above risk factors).
  - Follow up of treated aneurysms, clipping or coiling (with or without SAH)

        - Follow up at 3 to 6 month intervals for the first year, then 6 to 12 months for up to 2 years, then annually to ensure that aneurysm is not recanalizing. If stable and occluded at last imaging then follow up surveillance every 5 years.
    - MRI Brain without contrast (CPT® 70551) or with and without (CPT® 70553) may be added if there are new signs, symptoms or clinical findings, or to evaluate giant aneurysm (>2.5 cm).
- MRI Spinal (Cervical, Thoracic, Lumbar (without and with contrast) [CPT® 72156, CPT® 72157, CPT® 72158]) is appropriate to evaluate individuals with SAH and negative studies for brain aneurysm in whom spinal abnormalities (i.e. AVM) may be suspected as the cause of hemorrhage.

HD-12.2: Arteriovenous Malformations (AVMs) and Related Lesions

- MRI Brain without and with contrast (CPT® 70553) or without contrast (CPT® 70551) may be considered in the following clinical scenarios:
    - AVM is suspected based on a history of SAH.
    - Screening for:
        - Hereditary hemorrhagic telangiectasia syndrome (Osler Weber Rendu) See **PEDHD-10.2: Pediatric Intracranial Arteriovenous Malformations (AVM)** in the Pediatric Head Imaging Guidelines
        - Familial cavernous malformation: Screening should include MRI Brain without or without and with contrast (with gradient echo images).
    - 3D imaging (CPT® 76377) may be approved with MRI Brain if requested
- CTA Head (CPT® 70496) or MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546), can be performed if screening MRI Brain is positive.
- If a cerebral cavernous malformation is diagnosed in the brainstem or presented with a focal neurological deficit (ex. seizure) or intracranial hemorrhage, vessel and head imaging (MRI Brain without and with contrast (CPT® 70553) or without contrast (CPT® 70551), AND/OR MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA Head (CPT® 70496)) may be repeated when requested
- MRI Brain without and with contrast (CPT® 70553) or without contrast (CPT® 70551), AND/OR MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA Head (CPT® 70496) for repeat advanced imaging when requested by a specialist or any provider in consultation with a specialist.

Background and Supporting Information

Trauma is the most common reason for subarachnoid hemorrhage. Ruptured berry aneurysm is the most common reason for non-traumatic subarachnoid hemorrhage in adults.

Small aneurysms are present in about 1% to 2% of adults, but very few ever reach a size for which bleeding is a risk (>5 mm). Small (<3 to 4 mm) unruptured aneurysms in those with no personal history of SAH have a 0.1% to 0.5% a year rate of bleeding. The risk of cerebral aneurysm with family history ranges from 2% with one first degree relative to 30% to 35% for identical twin or two parents. The risks and benefits of screening these populations need to be considered before advanced imaging.

AVMs most often come to clinical notice either by bleeding or by acting as a seizure focus. They are usually congenital, recognized later in life and have an initial risk of bleeding of 2% per year.

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HD-13: Head and Facial Trauma

HD-13.1: Head Trauma

Individuals with head trauma are at risk for facial and cervical trauma.

See **SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features (Including Stenosis) and Trauma** in the Spine Imaging Guidelines

- CT Head without contrast (CPT® 70450) with acute head trauma and ANY of the following modified Canadian CT Head Rule/New Orleans Criteria for those with loss of consciousness, amnesia or disorientation accompanying blunt head trauma within 24 hours. Otherwise, CT Head is not typically indicated unless one of the following is present:
  - Taking one anticoagulant or two antiaggregants, (e.g., aspirin and Plavix)
  - Known platelet or clotting disorder
  - Glasgow coma scale (GCS) score of less than 15 at 2 hours following injury
  - >30 minutes of amnesia before impact
  - Any "dangerous mechanism of injury" including, but not exclusive to:
    - Fall greater than 5 steps down stairs
    - Fall from height greater than 3 feet
    - Any pedestrian motor vehicle accident
    - High impact motor vehicle accident
  - Suspected open skull fracture
  - Signs of basilar skull fracture (Battle's sign, Raccoon eyes, CSF rhinorrhea, cranial nerve palsy, hemotympanum, acute hearing loss)
  - Vomiting
  - Individual >60 years old
  - Alcohol or drug intoxication
  - Visible trauma above clavicles
  - Deficits in short term memory, altered level of alertness, abnormal behavior or focal neurological deficit
  - Seizure
  - Headache
- MRI Brain without contrast (CPT® 70551) is thereafter used when the clinical findings are not explained by the CT results or to evaluate late effect of brain injury
- MRI Brain without and with contrast (CPT® 70553) if post-traumatic infection is suspected
- Follow-up imaging, MRI or CT, for known subdural hematomas, intracerebral hemorrhage, or contusions can be done at the discretion of ordering specialist or any provider in consultation with a specialist. Short term follow-up imaging of acute TBI without neurologic deterioration, noncontrast CT is the most appropriate imaging study, but only in individuals with risk factors (such as subfrontal/temporal intraparenchymal contusions, anticoagulation, >65 years or intracranial hemorrhage. MRI may be approved as a complementary study when neurological findings or symptoms are not sufficiently explained by CT or in subacute and chronic TBI for new, persistent, or slowly progressive symptoms.

- For suspected intracranial venous or arterial injury, CTA/CTV Head (CPT® 70496) and MRA/MRV Head (CPT® 70544, CPT® 70545, or CPT® 70546) are approvable

Background and Supporting Information

SPECT, PET, CT/MRI perfusion, DTI (diffusion tensor imaging), functional MRI, and MR spectroscopy are not considered routine clinical practice at this time.

Recent studies have shown that Diffusion tensor MRI tractography may be more sensitive in demonstrating abnormalities such as axonal injury in closed head injury than conventional MRI, but these techniques are best described presently as research tools and their use in routine clinical practice is not determined.

Decisions regarding return to normal activities, including sports, are made based on the clinical status of the individual and repeat imaging is unnecessary.

In cases of post-traumatic infection, contrast-enhanced MRI or CT may be helpful

HD-13.2: Facial Trauma

- CT Maxillofacial without contrast (CPT® 70486) indicated for any concern regarding significant injury to facial structures including but not limited to:
  - Concern for orbital, maxillary, or mandibular fractures
  - Trauma with associated symptoms of anosmia, hearing, vision or speech changes, vertigo, facial numbness
  - Physical exam findings of CSF rhinorrhea (suspected post traumatic CSF leak), malocclusion, severe focal facial tenderness, focal loss of facial sensation
- CT Orbits/Temporal Bone without contrast (CPT® 70480):
  - Concern for orbital injury or orbital wall fracture
  - Symptoms of diplopia, blurred vision, vision loss
  - Physical exam findings of enophthalmos, entrapment of extraocular muscle(s)
  - Suspicion for temporal bone fracture
  - Suspected post-traumatic (CSF leak)

  Note: Initial x-rays are not required before advanced imaging for the above indications
- CT Head cisternography with contrast if CT Maxillofacial or Temporal bone is inconclusive (See **HD-11.15: Low Pressure Headache and CSF Leak**)

Background and Supporting Information

Imaging is not necessary in the evaluation of simple nasal fractures if tenderness and swelling is limited to the nasal bridge, the individual can breathe through each naris, and there is no septal hematoma.

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HD-14: CNS and Head Infection

HD-14.1: CNS and Head Infection

- Signs of intracranial infection include: 1) headaches, seizures, meningeal signs (neck stiffness), or new focal neurological deficits in a setting of fever or elevated white blood cell count (WBC); 2) known infection elsewhere; 3) or immunosuppression. ONE of the following studies may be considered for suspected intracranial infection if any of these signs of infection are present:
  - MRI Brain without and with contrast (CPT® 70553) (preferred) or MRI Brain without contrast (CPT® 70551)
  - CT Head (CPT® 70450, CPT® 70460, or CPT® 70470) in cases where MRI is contraindicated
- See **HD-20.2: Skull Base Osteomyelitis (SBO)**, **HD-29.1: Sinus and Facial Imaging**,**HD-30.2: Dental/Periodontal/Maxillofacial Imaging**, and **HD-32.1:Eye Disorders and Visual Loss**
- FDG Brain PET (CPT® 78608) may be performed to evaluate individuals suspected of having encephalitis, including autoimmune encephalitis, if diagnosis remains unclear after evaluation with MRI Brain, CSF analysis, and lab testing including serology, if appropriate.

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HD-15: Movement Disorders

HD-15.1: Movement Disorders

- The majority of movement disorders are diagnosed based on a clinical diagnosis and do not require imaging. These include:
  - Typical Parkinson's Disease
  - Essential Tremor or tremors of anxiety or weakness
  - Restless Leg Syndrome
  - Tics or spasms which can be duplicated at will
- MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is considered in the following clinical scenarios:
  - Atypical Parkinsonism because of unusual clinical features (for example, persistent unilateral signs and symptoms, young onset under age of 50, rapid progression), incomplete or uncertain medication responsiveness, or clinical diagnostic uncertainty. These cases should be forwarded for Medical Director Review.
  - Suspected Huntington Disease
- Evaluation for surgical treatment of Essential Tremor or Parkinson's disease
  - Deep Brain Stimulator (DBS) placement
    - MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) and unlisted CT procedure code (CPT® 76497) are approvable.
  - MR guided Focused Ultrasound
    - CT Head without contrast (CPT® 70450) to evaluate bone density and MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast CPT® 70553) are approvable
  - Repeat imaging studies, MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) and CT Head without contrast (CPT® 70450), are approvable when ordered by a specialist or any provider in consultation with a specialist if greater than 6 months old and/or for new symptoms/signs
  - Post op imaging is approvable when ordered by a specialist or any provider in consultation with a specialist for either procedure
- MRI Brain with and without (CPT® 70553) for initial imaging for suspected motor neuron disease
- Dementia associated with movement disorder, See **HD-8: Dementia**

Background and Supporting Information

There is little evidence to support the use of MRA/CTA, and PET in the evaluation of movement disorders.

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HD-16: Multiple Sclerosis (MS) and Related Conditions

HD-16.1: Multiple Sclerosis (MS)

- MRI Brain without and with contrast (CPT® 70553) and/or MRI Cervical and Thoracic Spine without and with contrast (CPT® 72156 and CPT® 72157) use in these clinical scenarios requires:
  - Clinical suspicion based on recurrent episodes of variable neurological signs and symptoms or clinically isolated syndromes
  - Baseline exclusion of appropriate alternative conditions that can mimic MS
  - Brain and Spine without and with contrast studies are preferred for initial imaging. However, if there is an allergy or significant concerns to gadolinium, (ex. GFR is compromised), then unenhanced studies could be approved
- MRI Orbit without contrast (CPT® 70540) or without and with contrast (CPT® 70543) may be considered if optic neuritis is suspected, in addition to the above scenario
- At diagnosis, MRI Cervical Spine without or without and with contrast (CPT® 72141 or CPT® 72156) and MRI Thoracic Spine without or without and with contrast (CPT® 72146 or CPT® 72157) is recommended for prognostic information
- MRI Brain with contrast (CPT® 70552) may be approved within 2 weeks of previous non-contrast study, if the non-contrast study showed incidental evidence of possible demyelinating disease, as the presence of enhancing lesions may be helpful in confirming the diagnosis.
  - MRI Brain with and without contrast (CPT® 70553) is appropriate, if non-contrast study was performed more than 2 weeks prior to the request for repeat imaging
- If the diagnosis is still equivocal after initial screening repeat studies in 3 to 6 months may be performed
  - Evidence does not support the use of 3T MRI as being more effective than 1.5T units for diagnosis or follow up of MS. Requests for repeat imaging should meet guidelines for timeliness as noted within these guidelines regardless of type of facility requested
- MRI Lumbar Spine is not needed since Cervical and Thoracic studies will usually visualize the entire spinal cord
- Repeat Brain and/or Spine imaging in an established individual may be considered in the following scenarios:
  - New episode of neurological deficit or re-evaluation of the diagnosis
  - Every 3-6 months until stable on disease modifying therapy
  - Annual surveillance in stable individuals
  - Re-establish baseline when instituting or changing immune-modulating agents (typically 6 months after the start of a new therapy)
  - Symptoms suggestive of Progressive Multifocal Leukoencephalopathy (PML) during Tysabri therapy (or other medications with similar risk).
    - Screening for individuals on natalizumab (Tysabri) or other medications with risk of PML (Progressive Multifocal Leukoencephalopathy)
      - MRI Brain every 6 months while on treatment

        - MRI Brain every 3-6 months for high risk individuals positive for serum JC virus antibody and >18 months natalizumab exposure
    - Repeat imaging requests for MRI without contrast or without and with contrast for follow up may be approved when requested by a specialist or any provider in consultation with a specialist (as long as request otherwise meets criteria above).
- Family members need not be screened, unless they exhibit suspicious signs or symptoms suggestive of MS.

Background and Supporting Information

- Multiple Sclerosis is common and variable with more women affected and at a younger age than men. MS tends to be relapsing-remitting (improves between episodes), relapsing-progressive (worsens with attacks) and chronic progressive (gradual and steady neurological decline).
- Medications with similar risks of PML as Tysabri include: Dimethyl fumarate (Tecfidera), Fingolimod (Gilenya), Ocrelizumab (Ocrevus), Mavenclad (cladribine), Vumerity (diroximel fumarate), Soliris (eculizaumab), Zeposia (ozanimod), Lemtrada (alemtuzumab), Bafiertam (monomethyl fumarate), Rituxan (rituximab)
- Sagittal MRI Spinal Cord with phased array detector coil (CPT® 72156 or CPT® 72157) is an alternative spinal imaging.
- 3D imaging in the evaluation of Multiple Sclerosis is not approvable as a separate code as most scanners are capable of 3D acquisitions or other imaging sequences may be done.

HD-16.2: Neuromyelitis Optica and NMO Spectrum Disorders

- Neuromyelitis Optica (NMO, Devic's disease) is an autoimmune disease causing inflammation and demyelination of the optic nerve, spinal cord and brain. Diagnosis is based on the clinical presentation, MRI findings, and presence of auto-antibodies.
- MRI Brain without and with contrast (CPT® 70553), MRI Orbit without and with contrast (CPT® 70543), MRI Cervical and Thoracic Spine without and with contrast (CPT® 72156, CPT® 72157)
    - Suspected Neuromyelitis Optica
    - New symptoms or signs in individual with known Neuromyelitis Optica
    - Surveillance for recurrent disease should occur with any new neurologic signs, or yearly, or when requested by a neurology specialist or any provider in consultation with a specialist in the treatment of this condition.
    - Non-contrast studies may be considered when requested by a specialist or any provider in consultation with a specialist
- Repeat imaging requests for MRI Brain without contrast or with and without contrast (CPT® 70551 or CPT® 70553) for follow up may be approved when requested by a specialist or any provider in consultation with a specialist

Background and Supporting Information

- Medications with similar risks of PML as Tysabri include: Dimethyl fumarate (Tecfidera), Fingolimod (Gilenya), Ocrelizumab (Ocrevus), Mavenclad (cladribine), Vumerity (diroximel fumarate), Soliris (eculizaumab), Zeposia (ozanimod), Lemtrada (alemtuzumab), Bafiertam (monomethyl fumarate), Rituxan (rituximab)
- Sagittal MRI Spinal Cord with phased array detector coil (CPT® 72156 or CPT® 72157) is an alternative spinal imaging.
- 3D imaging in the evaluation of Neuromyelitis Optica and NMO Spectrum Disorders is not approvable as a separate code as most scanners are capable of 3D acquisitions or other imaging sequences may be done.

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HD-17: Papilledema/Pseudotumor Cerebri

HD-17.1: Papilledema/Pseudotumor Cerebri

- See **HD-32.1: Eye Disorders and Visual Loss**
- Papilledema and Pseudotumor Cerebri
  - MRI Brain without and with contrast (CPT® 70553) can be considered when there is suspected elevated intracranial pressure and papilledema such as with pseudotumor cerebri (idopathic intracranial hypertension) to exclude cerebral mass lesions, obstructive hydrocephalus etc.
  - MRI Orbit without and with contrast (CPT® 70543) or CT Orbit without and with contrast (CPT® 70482) may be considered if there is concern for orbital pseudotumor or a primary bilateral orbital disorder. See **HD-32: Eye Disorders and Visual Loss** regarding concern for orbital pseudotumor or primary orbital disorder.
  - Repeat imaging may be considered to evaluate either:
    - Shunt dysfunction in those individuals who have had ventriculoperitoneal (VP) or lumboperitoneal (LP) shunts
    - Clinical deterioration (with worsening or new neurological signs and symptoms)
  - MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA Head (CPT® 70496) for suspected venous sinus thrombosis.
    - CT and MR Venography (CTV and MRV) are reported with the same codes as the CTA/MRA counterpart. If arterial and venous CT or MR studies are both performed in the same session, only **one** CPT® code should be used to report both procedures
    - See **HD-21.1: Stroke/TIA**

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HD-18: Paresthesias

HD-18.1: Paresthesias

Requests will be sent for Medical Director Review. Paresthesia(s) (localized numbness and tingling) are symptoms of a local (nerve entrapment for example), regional (Multiple Sclerosis for example) or central (stroke for example) disorder.[1,2] Advanced imaging can be considered initially, based on the highest suspicion disorder, according to these guidelines.

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HD-19: Pituitary

HD-19.1: Pituitary

- Endocrine laboratory studies should be performed prior to considering advanced imaging, except in the cases of stable, non-functioning microadenomas or macroadenomas and cysts.
- MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) with a specific pituitary protocol that includes fine cuts through the sella is the primarily performed pituitary imaging:
  - MRI Orbit, Face, Neck without and with contrast (CPT® 70543) or CT Head without and with contrast (CPT® 70470) are alternatives
  - CT Head without contrast (CPT® 70450) or without and with contrast (CPT® 70470) and/or CT Maxillofacial without contrast (CPT® 70486) may be used in addition to MRI to visualize perisellar bony structures in the preoperative evaluation of certain sellar tumors and for preoperative planning for transphenoidal approaches.
  - CTA Head (CPT® 70496) or MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) for surgical planning
  - MRI Brain without and with contrast (CPT® 70553) covers both brain and dedicated pituitary if performed at the same time; no additional CPT® codes are needed
- Repeat imaging for incidentally found lesions on other studies:
  - MRI Brain without and with contrast (CPT® 70553) or MRI Orbit/Face/Neck without and with contrast (CPT® 70543) follow-up dedicated pituitary study may be obtained if a pituitary abnormality is reported incidentally on a MRI Brain or CT Head performed for other reasons, (MRI Brain without and with contrast [CPT® 70553] covers both brain and dedicated pituitary if performed at the same time; no additional CPT® codes are needed); further evaluation and subsequent imaging dependent on specific imaging and biochemical laboratory evaluation findings.
- For Amenorrhea: See **PV-3.1: Amenorrhea** in the Pelvic Imaging Guidelines

Pituitary Imaging

Indication	Initial Imaging	Repeat Imaging
Microadenoma: Nonfunctioning, unexplained pituitary asymmetries, or incidentally found small tumors (<10 mm)	➢ MRI Brain without contrast and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551)	➢ MRI Brain without contrast and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) at 12 months and then (if stable in size), every 1-2 years for 3 years, and less frequently thereafter based on clinical status
Macroadenoma (≥10 mm): Nonfunctioning and not surgically removed (including those with a sizable post-operative remnant)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) every 6 months for the first year and then (if stable in size), every year for 3 years, and less frequently thereafter based on clinical status (longer if craniopharyngioma)
Acromegaly* **(**Elevated IGF-1 confirmed by lack of suppression of growth hormone on glucose suppression testing)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) ◆ At least 12 weeks after surgery to evaluate for residual tumor ◆ If treated with Pegvisomant, 6 to 12 months after treatment initiated, then annually if stable ◆ Long-term follow-up imaging based on clinical and biochemical status at the request of a specialist or any provider in consultation with a specialist
Cushing's Disease** (Pituitary ACTH excess leading to hypercortissolism)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) ◆ At least 12 weeks after surgery as new baseline ◆ Annually after bilateral adrenalectomy for Cushing's disease or ectopic ACTH production ◆ Long-term follow-up imaging based on clinical and biochemical status at the request of a specialist or any provider in consultation with a specialist
Rathke's cleft cyst/ Simple cyst	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) in one year; if stable and without mass effect or invasion into surrounding structures, no further imaging is required

Indication	Imaging
Prolactinomas* **	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) with: ◆ Diagnosis: ■ Unexplained prolactin level above normal range ◆ On Dopamine Agonist (DA) therapy with good response: ■ Macroadenomas 3 months after start of DA therapy ■ Microadenomas 1 year after start of DA therapy ■ To decide on stoppage of therapy after ~2 years if in "remission" (normal PRL and no visible tumor on MRI). ◆ On Dopamine Agonist therapy with suboptimal response: ■ PRL levels rise ■ New symptoms develop (galactorrhea, vision, headaches, pituitary deficiency) ■ If on high dose maximal DA and no plans for surgery/radiation therapy use guideline for microadenoma or macroadenoma ◆ After Dopamine Agonist therapy: ■ Rise in PRL level ■ For DA stoppage at menopause, use guideline for microadenoma or macroadenoma ◆ Galactorrhea/nipple discharge with normal prolactin and thyroid function levels: See **BR-7: Nipple Discharge/Galactorrhea** in the Breast Imaging Guidelines
TSH, FSH, ACTH and LH producing adenomas (inappropriate pituitary hypersecretion of TSH, FSH or LH)**	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) when hormone levels are inappropriately elevated and there is a concern for a pituitary lesion. ➢ Refer to appropriate post-operative, or Microadenoma/Macroadenoma guidelines based on the size of the lesion and initial management. ◆ Long-term follow-up imaging based on clinical and biochemical status at the request of a specialist or any provider in consultation with a specialist
Male Hypogonadism***	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) if ONE of the following: ◆ Severe secondary hypogonadism (e.g., morning serum testosterone level <150 ng/dl and low or normal LH and FSH levels) ◆ Serum testosterone ≥150 ng/dl but below normal range, free or bioavailable morning testosterone level below normal range and low or normal LH and FSH levels accompanied by ONE of the following: ■ Panhypopituitarism ■ Hyperprolactinemia ■ Signs of tumor mass effect (headache, visual impairment, or visual field defect) ■ Elevated sex hormone binding globulin (SHBG)
Hypopituitarism	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551)

Indication	Initial Imaging	Repeat Imaging for Non-Operative Care
Diabetes Insipidus (DI)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) if: ◆ Laboratory testing consistent with DI (serum osmolality should be high and urine osmolality should be low) and etiology uncertain	**NA**
Syndrome of Inappropriate ADH (SIADH)	➢ MRI Brain without and with contrast (CPT® 70553) or MRI Brain without contrast (CPT® 70551) if: ◆ Etiology remains uncertain or is thought to be in the nervous system; ◆ Urine osmolality should be high and serum osmolality low	**NA**
Other Pituitary Region Tumors******	➢ Evaluation may require CT in addition to MRI to evaluate for hyperostosis. Requests will be sent for Medical Director Review.	

Background and Supporting Information

- ***Acromegaly**: Rarely, biochemically confirmed acromegaly with a normal pituitary gland on MRI may occur. Somatostatin receptor scintigraphy (Octreoscan) of thorax and abdomen and growth hormone-releasing hormone (GHRH) level may be considered to evaluate ectopically located disease.
- ****Cushing's Disease:** It is important to differentiate Cushing's syndrome (hypercortisolism from any source) from Cushing's disease which is ACTH hypersecretion from the pituitary gland. Hypercortisolism is quantified by 24hour urine cortisol collection, low dose dexamethasone suppression test and/or late night salivary cortisol measurement. ACTH is elevated in Cushing's disease and ectopic sources of ACTH production, but suppressed in other causes of hypercortisolism. A high dose dexamethasone suppression test can help determine if the elevated ACTH is from a pituitary or ectopic source. Petrosal sinus sampling may be required for tumor localization preoperatively in the setting of a normal pituitary MRI or a small adenoma. These tumors may be managed with surgery, medical therapy, radiation and/or bilateral adrenalectomy.
- ***Prolactinoma:** To establish the diagnosis of hyperprolactinemia, a single measurement of serum prolactin is recommended; a level above the upper limit of normal confirms the diagnosis as long as the serum sample was obtained without excessive venipuncture stress. Long-term or inadequately treated primary hypothyroidism can cause pituitary hyperplasia that may mimic a pituitary tumor. Routine imaging surveillance during pregnancy is not recommended due to risk to fetus. Repeat imaging with MRI without gadolinium is performed for new or worsening symptoms, such as headaches or visual symptoms. In women with microprolactinomas, it may be possible to discontinue dopaminergic therapy when

menopause occurs. Surveillance for increasing size of the pituitary tumor should continue on a periodic basis.

- ****TSH, FSH, or LH producing adenomas**: These are the least common of all hormonally active pituitary tumors. Individuals with TSH secreting adenomas have inappropriate TSH elevation in the setting of hyperthyroidism (elevated thyroid hormone levels). Almost all gonadotroph adenomas are clinically non-functioning. The infrequent presentation of a functioning gonadotroph adenoma should be differentiated clinically from appropriate FSH and LH elevation seen in low estrogen states (including menopause) as well as primary hypogonadism (testicular failure). Functioning TSH, FSH or LH pituitary adenomas may be managed with surgical, radiation and/or medical therapies.
- *****Male Hypogonadism**: Alterations in sex hormone-binding globulin (SHBG) can impact testosterone levels. Free or bioavailable testosterone concentrations should be measured when total testosterone concentrations are close to the lower limit of the normal range and when altered SHBG levels are suspected (e.g. moderate obesity, nephrotic syndrome, hypo- and hyperthyroidism, use of glucocorticoids, progestins, estrogens, and androgenic steroids, anticonvulsants, acromegaly, diabetes mellitus, aging, HIV disease, liver cirrhosis, hepatitis). LH and FSH should be obtained to evaluate for secondary (central) hypogonadism, once low testosterone level is confirmed.
- *******Other Pituitary Region Tumor**: Craniopharyngiomas arise in the parasellar area. About 10% of meningiomas arise in this area.

HD-19.2: Additional Imaging

- For imaging in the immediate post-operative period or for acute surgical complications, See **ONC-2.1: Primary Central Nervous System Tumors** in the Oncology Imaging Guidelines.
- A routine post-operative MRI is generally done at 3 months and/or at the discretion of or in consultation with a specialist.
- Frequency of follow-up imaging depends on the post-operative size and/or functional status of the pituitary adenoma. Refer to the grid sections for Microadenoma/Macroadenoma as well as those for disorders of pituitary hormone excess.
- Individuals with hyper-functioning tumors such as acromegaly, Cushing's disease, and excess TSH secretion may be treated with a combination of surgery, medical therapy and radiation. Long-term monitoring of clinical status and repeat imaging at the discretion of or in consultation with a specialist is appropriate.

HD-19.3: Empty Sella Turcica

- Enlarged/Empty Sella Turcica: An enlarged sella turcica without evident tumor is an incidental finding on MRI Brain or CT Head from a defect in the dural diaphragm of the sella (especially if there is elevated intracranial pressure from another cause), pituitary surgery, or as a result of a pituitary tumor which has expanded the sella and then infarcted (pituitary apoplexy).
- MRI Brain with and without contrast (pituitary protocol) (CPT® 70553) with thin sections of pituitary or MRI Brain without contrast (CPT® 70551) if requested is approvable. CT Head with and without contrast (CPT® 70470) – If MRI is contraindicated
  - Primary Empty Sella:
    - Incidentally found on other studies, asymptomatic and no related abnormalities: follow up at 2 years. No further imaging unless clinical symptoms develop (neuro-/ophthalmological symptoms, intracranial hypertension, or endocrine/hormonal abnormalities).
    - Following medical or surgical treatment of related endocrine, neurological, or ophthalmological problems: follow up imaging every 6 months in the year after treatment and/or at the request of a specialist or any provider in consultation with a specialist. See **HD-17.1: Papilledema/Pseudotumor Cerebri** for additional imaging recommendations.
  - Secondary Empty Sella:
    - Imaging according to the cause or if clinical disease progression (such as adenomas, infiltrative or malignant disorders, hormonal abnormalities, neuro-/ophthalmological symptoms).

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HD-20: Scalp and Skull

HD-20.1: Scalp and Skull Lesions

The majority of these are benign soft tissue or bony lesions easily defined by physical examination or with skull x-rays or ultrasound.

- Ultrasound can be performed as initial imaging of scalp or skull lesions
- CT Head without or without and with contrast (CPT® 70450 or CPT® 70470) is appropriate for the following scenarios:
  - Any lesion on physician examination and skull x-ray or ultrasound which is not clearly benign.
  - Langerhans' cell histiocytosis, myeloma, and metastatic cancer, when symptoms suggest bony lesions.
- MRI Brain without contrast (CPT® 70551) or with and without contrast (CPT® 70553) may be considered if there is concern for intracranial extension.
- See **HD-30.2: Dental/Periodontal/Maxillofacial Imaging** for mandibular masses and **PEDHD-5.6: Other Indications for Sinus Imaging** in the Pediatric Head Imaging Guidelines for maxillofacial masses

HD-20.2: Skull Base Osteomyelitis (SBO)

- Note: SBO may occur from the temporal bones or paranasal sinuses and imaging should be of the region of origin
- Neuroimaging is indicated in the diagnosis and treatment of skull base osteomyelitis and necrotizing external otitis. The following advanced imaging studies may be considered for the diagnosis of skull base osteomyelitis and necrotizing external otitis:
  - MRI Brain without and with contrast (CPT® 70553)
    - Will be positive earliest in disease
  - CT Head without contrast (CPT® 70450), CT Temporal bone without contrast (CPT® 70480), CT Temporal bone with contrast (CPT® 70481), CT Maxillofacial without contrast (CPT® 70486), CT Maxillofacial with contrast (CPT® 70487) or CT Neck with (CPT® 70491)
    - Will best define bony destruction, but is positive later in disease
  - Gallium-67 Scan
  - Bone Scan
    - Skull base osteomyelitis: + Gallium and + Bone scan
    - Necrotizing otitis externa: + Gallium and - Bone scan
  - Indium WBC may be substituted for, or used in addition to Gallium scanning to evaluate response to therapy and may be especially useful in cases that have undergone surgical debridement.
- Treatment response: Gallium-67 Scan every 4-6 weeks till scan is negative
- Surveillance Scanning: Gallium-67 Scan at 4 weeks and 3 months post treatment

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HD-21: Stroke/TIA

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HD-21.1: Stroke/TIA

- CT Head without contrast (CPT® 70450), CTA Head without and with contrast (CPT® 70496) and CT Neck (CPT® 70498) and CT perfusion (CPT® 0042T) for acute stroke (within the first 24 hours), TIA, or concern for intracerebral or subdural hemorrhage
- MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) to evaluate concern for new stroke or TIA. MRI is preferred for evaluation of late presentation and can be performed after an initial CT Head.
- MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA Head (CPT® 70496) AND MRA Neck (CPT® 70547, CPT® 70548, or CPT® 70549) or CTA Neck (CPT® 70498) may be added to CT Head or MRI Brain for evaluation of stroke or TIA. A previously performed Duplex Ultrasound Carotid Arteries (CPT® 93880), should not preclude the approval of these studies. Duplex Ultrasound Carotid Arteries (CPT® 93880) is not sufficient to image the vertebral arteries.
  - Note: Both MRA or CTA Head and Neck are needed to visualize the posterior vertebrobasilar circulation for evaluation of the vertebrobasilar stroke/TIA (vertigo associated with diplopia, dysarthria, bifacial numbness or ataxia)[1-4] or concern for arterial dissection (risks may include premature stroke [under age 50], head or neck trauma, fibromuscular dysplasia, Ehlers-Danlos syndrome, and chiropractic neck manipulation)
- MR or CT Venography (MRA Head [CPT® 70544, CPT 70545, CPT® 70546] or CTA Head [CPT® 70496]) may be performed to evaluate venous infarcts after diagnosis on MRI Brain or CT Head.
- For consideration of Reversible Cerebral Vasoconstriction Syndrome (See **HD-11.3: Sudden Onset of Headache**)
- One time MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) screening to detect silent cerebral infarcts in adults with HbSS or HbSb thalassemia
- Transcranial Doppler Studies may also be performed for individuals with documented stroke or TIA
- Repeat imaging for follow up and resolution of stroke or hemorrhage as determined by a specialist or any provider in consultation with a specialist.
- Evaluation of paradoxical venous thromboembollism in crytogenic stroke with PFO, See **PVD-12.2: Acute Limb Swelling** in the PVD Imaging Guidelines.
- MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) is approvable in the presence of neurological signs and/or symptoms, including headache, after COVID-19 infection.

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HD-22: Cerebral Vasculitis

HD-22.1: Cerebral Vasculitis

- MRI Brain without and with contrast (CPT® 70553) is considered when CNS vasculitis is suspected
  - MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) and MRA Neck (CPT® 70547, CPT® 70548, or CPT® 70549); OR CTA[3] Head (CPT® 70496) and CTA Neck (CPT® 70498) may be considered in addition to MRI Brain
- If initial vascular imaging is suspicious for vasculitis, may approve 3D rendering (CPT® 76377) with cervicocerebral angiography/arteriography (See **HD-1.7: General Guidelines- Other Imaging Situations**).
- Transcranial Doppler Studies may also be performed for individuals with documented vasculitis or concern for vasospasm (See **HD-24.8: Transcranial Doppler (CPT® 93886)**). Requests require Medical Director Review.
- FDG-PET is not supported due to lack of peer reviewed literature or expert consensus supporting the requested study for vasculitis. Certain imaging studies are considered investigational by various payers, and their coverage policies may take precedence over eviCore's guidelines. Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support

Background and Supporting Information

Classification of vasculitides based on vessel size adapted from Yonder. MRA and CTA are useful for the evaluation of the large proximal arteries; evaluation of a possible small vessel vasculitis may be beyond the resolution of routine MRA and CTA Head. However, other abnormalities, such as atherosclerotic disease, arterial dissection, Moyamoya disease, or reversible cerebral vasoconstriction may be demonstrated. Conventional angiogram is superior to MRA and CTA in demonstrating abnormalities in smaller vessels and is considered the "gold standard" in the evaluation of primary small vessel CNS vasculitis.

Dominant Vessel Involved	Primary	Secondary
Large arteries	➢ Giant cell arteritis ➢ Takayasu's arteritis	Aortitis with rheumatoid disease; Infection (e.g. syphilis)
Medium arteries	➢ Classical polyarteritis nodosa ➢ Kawasaki disease	Infection (e.g. hepatitis B)
Small vessels and medium arteries	➢ Wegener's granulomatosis ➢ Churg–Strauss syndrome ➢ Microscopic polyangiitis	Vasculitis with rheumatoid disease, systemic lupus erythematosus, Sjögren's syndrome, drugs, infection (e.g. HIV)
Small vessels	➢ Henoch-Schönlein purpura ➢ Essential cryoglobulinemia ➢ Cutaneous leukocytoclastic vasculitis	Drugs (e.g. sulphonamides, etc.) Infection (e.g. hepatitis C)

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HD-23: Dizziness, Vertigo and Syncope

HD-23.1: Dizziness/Vertigo

- Evaluation of vertigo or dizziness should include a detailed history and neurological exam as well as orthostatic blood pressure measurements, vestibular testing (tests for nystagmus, head thrust sign, test of skew, Dix-Hallpike maneuver or other positional testing), gait, and/or hearing tests
- MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) when history and exam suggest nonbenign dizziness such as:
  - Episodes lasting hour(s) or are continuous
  - Inconclusive positional testing or equivocal or unusual nystagmus findings, visual disturbances including loss and diplopia, headache, subjective hearing loss, unilateral tinnitus, nausea, vomiting, abnormal cranial nerve findings, ataxia, positive Romberg sign, absent head thrust sign, focal deficits, dysarthria, drop attacks, weakness
  - Failure to respond to vestibular therapy or is unable to participate due to clinical condition
  - Consideration of vestibular migraine as it is a diagnosis of exclusion.
  - See **HD-21: Stroke/TIA**, **HD-11.2: Headaches with Red Flags** and **HD-16 Multiple Sclerosis (MS) and Related Conditions**
- CT Head without contrast (CPT® 70450) or without and with contrast (CPT® 70470) if concern for acute stroke (See **HD-21: Stroke/TIA**) if MRI is contraindicated.
- The Dix-Hallpike maneuver should be performed or the individual should be referred to a clinician who could perform the procedure if Benign Paroxysmal Positional Vertigo (BPPV) is a consideration. (See Practice Notes for exclusions to this confirmatory test.). Brain imaging is approvable if there are inconclusive or unusual findings or if the diagnosis remains unclear.
- Orthostatic hypotension (OH) and the subset of neurogenic orthostatic hypotension (nOH) should require a thorough history and physical including work-up (laboratory studies) and management prior to consideration of advanced imaging. BP/HR monitoring, medication review including reduction and modification(s), cardiology evaluation including EKG as appropriate, autonomic testing, plasma catecholamines, sudomotor function testing (QSART or thermoregulatory sweat testing) and 24-hour ambulatory blood pressure monitoring. Brain imaging is not indicated typically for OH.
- Associated asymmetric hearing loss (See **HD-27: Hearing Loss and Tinnitus**) and concern for vestibular schwannoma or possible Meniere's disease. (Note: MRI Brain should be performed with thin sections of IACs). Limited MRI Brain with attention to internal auditory canals (CPT® 70540, CPT® 70542, or CPT® 70543) can be approved when requested by the provider in place of a complete MRI Brain. Note: Limited MRI codes should not be used in addition to MRI Brain codes; IAC views are performed as additional sequences as part of the brain study. (See **HD-1.1: General Guidelines – Anatomic Issues**).
- CTA Head (CPT® 70496) and CTA Neck (CPT® 70498) or MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) and MRA Neck (CPT® 70547, CPT® 70548, or CPT®

70549) may be added if concern for vertebrobasilar disease including dissection (acute onset vertigo and associated symptoms or signs of weakness, ataxia, drop attacks, visual loss, diplopia, dysarthria).

- CT Temporal Bone without contrast (CPT® 70480) may be added if history of head trauma or concern for superior canal dehiscence, temporal bone fractures in individuals with post-traumatic vertigo and diagnosing erosion in the bony labyrinth from inflammatory or iatrogenic causes. (See Background and Supporting Information below).

Background and Supporting Information

- Posterior Canal BPPV (85-95% of BPPV cases) is defined as:
  - Individual reports repeated episodes of vertigo with changes in head position relative to gravity.
  - Each of the following criteria is fulfilled on physical exam:
    - Vertigo associated with torsional (rotatory), upbeating (toward the forehead) nystagmus is provoked by the Dix-Hallpike test.
    - There is a latency period between the completion of the Dix-Hallpike maneuver and the onset of vertigo and nystagmus.
    - The provoked vertigo and nystagmus increase and then resolve within 60 seconds from the onset of the nystagmus.
- Lateral or Horizontal Canal BPPV (5-15% of BPPV cases) will have horizontal or no nystagmus to which a supine roll test assess for this condition.
- Exclusions for Dix-Hallpike maneuver
  - Individual previously diagnosed with BPPV and who on date of encounter in calendar year does not have positional dizziness or vertigo consistent with active BPPV
  - Individual has refused or declined Dix-Hallpike maneuver
  - Individual has cervical spinal disease (i.e., cervical stenosis, severe kyphoscoliosis, limited cervical range of motion, Down's syndrome, severe rheumatoid arthritis, cervical radiculopathies, Paget's disease, ankylosing spondylitis, low back dysfunction, spinal cord injuries, spinal fractures)
  - Individual unable to lay flat (i.e., severe heart disease)
  - Individual has severe atherosclerotic disease or recent dissection involving the anterior or posterior cerebral circulation
  - Unable to be seated in exam chair (i.e., morbidly obese), or maneuver cannot be safely performed given morbid obesity
- Triggered episodic vestibular syndrome (t-EVS) usually last seconds to minutes with the most common triggers (vs. exacerbating factors) are head motion or change in body position. In the Emergency Department, benign paroxysmal positional vertigo (BPPV) is the second most common cause of t-EVS after orthostatic hypotension. Far lateral rotation of the neck leads to mechanical occlusion of 1 or both vertebral arteries causing temporary symptoms of vertigo and nystagmus when this position is maintained and may occur with the individual upright.

- Diagnoses or conditions associated with OH or nOH include: Parkinson Disease (PD), Multiple System Atrophy (MSA), Pure Autonomic Failure (PAF) or Dementia with Lewy Bodies (DLB), unexplained fall or syncope, peripheral neuropathies secondary to diabetes, amyloidosis and HIV), individuals ≥70 years of age and frail and on multiple medications and individuals with postural (orthostatic) dizziness or nonspecific symptoms that occur when standing. Symptoms may include: lightheadedness or dizziness, the sensation of blacking out, cognitive dysfunction, mental dulling, generalized weakness, neck pain or discomfort in the suboccipital and paracervical region (coat hanger) or playpnea (dyspnea while standing).
- Secondary or advanced laboratory testing is considered for use in select individuals for paraneoplastic syndromes (paraneoplastic panel) and serum and urine protein electrophoresis for monoclonal gammopathy for peripheral neuropathy. See **PN-3: Polyneuropathy** in the Peripheral Nerve Disorders Imaging Guidelines, **ONC-25: Multiple Myeloma and Plasmacytomas** in the Oncology Imaging Guidelines, and **ONC-30.3: Paraneoplastic Syndromes** in the Oncology Imaging Guidelines.
- Superior canal dehiscence is a rare syndrome caused by dehiscence in the boney covering of the superior semicircular canal, and may cause vertigo associated with auditory symptoms including oscillopsia evoked by noise and conductive hearing loss.
- Occlusive carotid artery disease does not cause fainting but rather causes focal neurologic deficits such as unilateral weakness. Thus, carotid imaging will not identify the cause of the fainting and increases cost. Fainting is a frequent complaint, affecting 40% of people during their lifetime. (Choosing Wisely. An initiative of the ABIM Foundation. American Academy of Neurology. February 21,2013.)

HD-23.2: Syncope

- Advanced imaging (CT Head (CPT® 70450) or MRI Brain (CPT® 70551 or CPT® 70553) and vessel imaging (Carotid dopplers (CPT® 93880) and CTA Head (CPT CPT® 70496) or CTA Neck (CPT CPT® 70498) or MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) and/or MRA Neck (CPT® 70547, CPT® 70548, or CPT® 70549) is not indicated for simple syncope without focal signs or symptoms of stroke. A cardiac evaluation should be performed in the absence of focal signs and symptoms including a detailed history and examination (e.g. orthostatics), an EKG and/or additional evaluations including, but not exclusive to cardiac echocardiogram, tilt table testing, holter monitor, external loop recorder, etc.
- See **HD-21.1: Stroke/TIA** and **HD-13.1: Head Trauma**

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HD-24: Other Imaging Studies

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HD-24.1: Treatment Planning

- Advanced imaging (CT and MRI) performed for the purpose of surgical planning and navigation should be coded as Unlisted CT (CPT® 76497) or Unlisted MRI (CPT® 76498)
  - All requests for imaging to be performed for the purpose of surgical planning and navigation should be forwarded to Medical Director Review
- Requests may refer to proprietary brand systems such as Brainlab or Stealth imaging procedures
- This includes requests for intraoperative studies (inpatient studies do not require preauthorization)
- See **HD-29: Sinusitis** for coding for sinus surgery

HD-24.2: Functional MRI (f-MRI)

- f-MRI is useful in pre-operative scenarios to define the “eloquent” areas of brain
- The ordering physician must be a neurologist, neurosurgeon or radiation oncologist or any provider in consultation with one of these specialists. All other requests should be sent for Medical Director Review. It must be evident that brain surgery is planned, and that f-MRI is being performed to map the language centers, or other ”eloquent centers” of the brain
- f-MRI can be approved with PET Brain in epilepsy surgery planning
- Procedure codes for functional MRI:
  - CPT® 70554 MRI Brain, functional MRI, including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration
  - CPT® 70555 MRI Brain, functional MRI; requiring physician or psychologist administration of entire neurofunctional testing
- MRI Brain (CPT® 70551 or CPT® 70553) and/or fMRI (CPT® 70554 or CPT® 70555) can be approved concurrently. (See **Preface-4.3: Unlisted Procedures/Therapy Treatment Planning** in the Preface Imaging Guidelines if Unlisted MRI is requested for surgical planning)

HD-24.3: Magnetic Resonance Spectroscopy (MRS)

- All requests for MRS (CPT® 76390) will be forwarded for Medical Director Review
  - Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support
- MRS involves analysis of the levels of certain chemicals in a pre-selected voxels (small regions) on an MRI scan done at the same time
- MRS is evaluated on a case-by-case basis, and may be considered:
  - Distinguish recurrent brain tumor from radiation necrosis as an alternative to PET (CPT® 78608)
  - Diagnosis of certain rare inborn errors of metabolism affecting the CNS (primarily pediatric individuals)
- Evaluation of certain primary brain tumors where diagnostic accuracy has been established in peer-reviewed literature. See **ONC-2.1: General Considerations**, **ONC-2.2: Low Grade Gliomas** and **ONC-2.3: High Grade Gliomas**

HD-24.4: CSF Flow Imaging

- This is generally performed as a part of a MRI Brain study. It is not coded separately for preoperative evaluation of hydrocephalus and Chiari syndrome, with either features of hydrocephalus or syrinx.
- There is no specific or unique procedure code for this study; it is done as a special sequence of a routine MRI Brain without contrast (CPT® 70551).
- If not previously performed as part of recent study, a second study for the purpose of evaluating CSF flow may be performed.

HD-24.5: CT or MRI Perfusion

- Performed as part of a CT Head or MRI Brain examination in the evaluation of individuals with very new strokes or brain tumors.
- Category III 0042T - “cerebral perfusion analysis using CT”. The study is generally limited to evaluation of acute stroke (<24 hours) to help identify individuals with stroke-like symptoms most likely to benefit from thrombolysis or thrombectomy, to assist in planning and evaluating the effectiveness of therapy for cervical or intracranial arterial occlusive disease and/or chronic cerebral ischemia, identifying cerebral hyperperfusion syndrome following revascularization and following aneurysmal subarachnoid hemorrhage. Other indications are usually regarded as investigational and experimental. Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support.

- There is no specific CPT® code for MRI Perfusion. Perfusion weighted images are obtained with contrast and are not coded separately from a contrasted MRI Brain examination. If MRI Brain without and with contrast is approved, no additional CPT® codes are necessary or appropriate to perform MRI perfusion.

HD-24.6: Magnetic Resonance Neurography (MRN)

- MRN is currently considered investigational. Advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support
- See **PN-7: Magnetic Resonance Neurography (MRN)** in the Peripheral Nerve Disorders (PND) Imaging Guidelines

HD-24.7: Cone Beam Computed Tomography (CBCT)

- Medical Director Review is required
- CPT® Codes: CPT® 70486, CPT® 70487, CPT® 70488, CPT® 70480, CPT® 70482 (No separate 3-D rendering codes should be reported)
- See **HD-30: Temporomandibular Joint Disease (TMJ) and Dental/Periodontal/Maxillofacial Imaging**

HD-24.8: This section intentionally left blank

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HD-25: Epistaxis

HD-25.1: Epistaxis

- All cases should go to Medical Director Review.
- CT Maxillofacial without or with contrast (CPT® 70486 or CPT® 70487) and/or MRI Orbit, Face, and/or Neck without and with contrast (CPT® 70543) is appropriate based on endoscopic findings of mass lesion during ENT examination.

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HD-26: Mastoid Disease or Ear Pain

HD-26.1: Mastoid Disease or Ear Pain

- See **PEDHD-16.2: Ear Pain** in the Pediatric Head Imaging Guidelines

HD-27: Hearing Loss and Tinnitus

HD-27.1: Hearing Loss and Tinnitus

- An initial evaluation including hearing tests, by bedside testing or by formal audiology, is necessary to determine whether an individual's hearing loss is conductive (external or middle ear structures) or sensorineural (inner ear structures, such as cochlea or auditory nerve) hearing loss.
- The history in individuals with tinnitus should include a description of the tinnitus (episodic or constant, pulsatile or non-pulsatile, rhythmicity, pitch, quality of the sound), as well as inciting or alleviating factors. Continuous and pulsatile tinnitus are more concerning for an underlying and significant disorder. Audiometric assessment can be used as initial diagnostic testing particularly in individuals with tinnitus that is unilateral, persistent (>6 months) or associated with hearing difficulties.
- CT Temporal Bone without (CPT® 70480) or MRI Brain without and with contrast (with IAC views) (CPT® 70553) or without contrast (CPT® 70551):
  - Conductive hearing loss should have a CT Temporal Bone initially in the absence of an evident mass in the middle ear
  - Mixed conductive (MC)/Sensorineural (SN) hearing loss or any sudden sensorineural hearing loss (MRI generally preferred for SN see Background and Supporting Information)
  - Unilateral fluctuating or asymmetric hearing loss
  - Cholesteatoma
  - Congenital hearing loss
  - Surgical planning, including cochlear implants (both CT Temporal Bone and MRI Brain may be approved for surgical planning if requested by surgeon)
  - Hearing loss with vertigo (See **HD-23.1: Dizziness, Vertigo, and Syncope**)
  - Pulsatile tinnitus or suspicion for vascular lesions
- MRI Brain without and with contrast (CPT® 70553) for asymmetric or unilateral nonpulsatile tinnitus
- CT Temporal Bone with contrast (CPT® 70481):
  - Glomus tumors or other vascular tumors of the middle ear, and/or surgical planning
  - Acquired sensorineural hearing loss if MRI unavailable or contraindicated
- MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA/CTV Head (CPT® 70496) **AND/OR** MRA Neck (CPT® 70547, CPT® 70548, or CPT® 70549) or CTA Neck (CPT® 70498) **AND/OR** CT Temporal Bone without contrast (CPT® 70480)
  - Pulsatile tinnitus or suspicion for vascular lesions
- Limited Study MRI with attention to internal auditory canal (CPT® 70540, CPT® 70542, CPT® 70543) can be approved when requested by the provider in place of a complete MRI Brain. Note: Limited MRI codes should not be used in addition to MRI Brain codes; IAC views are performed as additional sequences as part of the brain study. (See **HD-1.1: General Guidelines – Anatomic Issues**)

Background and Supporting Information

- Nonpulsatile tinnitus may be describes as ringing, buzzing, or clicking sensations which is constant and nonsynchronous.
- Pulsatile tinnitus is a repetitive sound coinciding with the individual's heartbeat. The symptom may be subjective or objective.
- Sensorineural (SN) hearing loss – MRI is generally preferable to CT. CT Temporal bone is appropriate in post-traumatic SN hearing loss, to evaluate for bony remodeling of the IAC due to vestibular schwannoma and labyrinthine ossification resulting from prior infection and for consideration of otospongiosis, a common cause of MC and SN hearing loss.

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HD-28: Ear Pain (Otalgia)

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HD-28.1: Ear Pain (Otalgia)

- See **HD-26.1: Mastoid Disease or Ear Pain**

HD-29: Sinusitis and Facial Imaging

HD-29.1: Sinus and Facial Imaging

- CT Maxillofacial without contrast (CPT® 70486) or limited CT Sinus without contrast (CPT® 76380) is considered for ANY of the following:
  - Acute sinusitis with no improvement in symptoms after a minimum of 4 weeks of treatment; or concern for complicated sinusitis (See Background and Supporting Information below)
  - Recurrent sinusitis (4 or more episodes of acute sinusitis within the past 12 months without symptoms or signs between episodes)
  - Chronic sinusitis (>12 weeks sinusitis) with at least two of the following signs and symptoms:
    - Mucopurulent drainage
    - Nasal obstruction
    - Facial pain – pressure, fullness
    - Decreased sense of smell

    (Note: A trial of antibiotic therapy is not required prior to imaging if individual meets criteria for chronic sinusitis)
- Surgical candidate (See **Preface-4.3: Unlisted Procedures/Therapy Treatment Planning** in the Preface Imaging Guidelines if unlisted code is requested for surgical planning)
- Studies requested for the purpose of navigation for sinus surgery should be coded CPT® 77011 (CT guidance for stereotactic localization). It is not appropriate to report both CPT® 70486 and CPT® 77011 for the same CT stereotactic localization imaging session. See **Preface 4.2: CT-, MR-, or Ultrasound-Guided Procedures** in the Preface Imaging Guidelines
- For unexplained cough See **CH-3.1: Cough** in the Chest Imaging Guidelines
- CT Maxillofacial without contrast (CPT® 70486) or CT Maxillofacial with contrast (CPT® 70487) or MRI Maxillofacial without and with contrast (CPT® 70543):
  - Sinonasal obstruction, polyp, or suspected mass
  - Suspected orbital complication
  - Suspected invasive fungal sinusitis
  - Osteomyelitis and odontogenic infections (MRI is the preferred modality) See **HD-30.2: Dental/Periodontal/Maxillofacial Imaging**
- MRI Brain with and without contrast (CPT® 70553) for suspected intracranial complication
- CT Orbit without contrast (CPT® 70480) or CT Orbit without and with contrast (CPT® 70482) may be performed alone or added to CT Maxillofacial for:
  - Suspected orbital complications
- For Skull Base Osteomyelitis (SBO) See **HD-20.2: Skull Base Osteomyelitis (SBO)**
- Repeat imaging may be approved for ANY of the following scenarios:
  - An ENT specialist or any provider in consultation with an ENT specialist requests the imaging **and**

- There is no improvement after an additional 3 weeks of conservative treatment after initial imaging was completed; **and**
  - There has been a follow-up visit since the previous imaging; **or**
  - If there is a new abnormality on exam such as obstructing mass
- Planned sinus surgery (Balloon Sinus Ostial Dilation or Functional Endoscopic Sinus Surgery)

Background and Supporting Information

- Rhinosinusitis is defined as inflammation of the nasal cavity and adjacent paranasal sinuses. Acute sinusitis refers to symptom duration <4 weeks, subacute 4 to 12 weeks, and chronic >12 weeks. Complicated sinusitis refers to symptoms suggesting spread of disease into adjacent structures, including orbital or intracranial complications.
- There is no evidence to support advanced imaging of acute (<4 weeks) and subacute (4 to 12 weeks) uncomplicated rhinosinusitis.
- There is no evidence to support routine follow-up advanced imaging after treatment with clinical improvement of sinusitis.

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HD-30: Temporomandibular Joint Disease (TMJ) and Dental/Periodontal/Maxillofacial Imaging

HD-30.1: Temporomandibular Joint Disease (TMJ)

- MRI TMJ (CPT® 70336) is the diagnostic study of choice and should be reserved for those who fail a minimum of 6 weeks of non-surgical treatment and who are actively being considered for TMJ surgery
- CT Maxillofacial without contrast (CPT® 70486) or without and with contrast (CPT® 70488) may be performed when there is suspicion of bony involvement from the MRI and if primary bony pathologies are suspected clinically
- Ultrasound (CPT® 76536) can be used to look for the presence of a joint effusion and to evaluate cartilage and disk displacement with open and closed mouth imaging and to guide injections
- TMJ imaging in children with Juvenile Rheumatoid Arthritis, See **PEDHD-25: Temporomandibular Joint (TMJ) Imaging in Children** in the Pediatric Head Imaging Guidelines

HD-30.2: Dental/Periodontal/Maxillofacial Imaging

- All requests will be forwarded to Medical Director Review
- Cone beam CT may be supported for surgical planning when plain x-rays alone are insufficient. Potential indications include but are not limited to:
  - Impacted teeth
  - Supernumerary teeth
  - Dentoalveolar trauma
  - Root resorption
  - Foreign body
  - Odontogenic cysts, tumors, or other jaw pathology
  - Cleft pathology
  - Orthognathic surgery for dentofacial anomalies
  - Osteomyelitis and odontogenic infections (X-ray not required)
  - Bisphosphonate-related osteonecrosis of the jaw (X-ray not required)
  - Salivary gland stones
  - Maxillofacial bone graft planning
  - Dental implants related to tooth loss from injury, trauma, or jaw pathology such as cysts, tumors, or cancer
- Cone Beam CT: Report with CPT® Codes: CPT® 70486, CPT® 70487, CPT® 70488, CPT® 70480, CPT® 70482
- 3-D rendering (CPT® 76376 or CPT® 76377) should NOT be reported separately
- Cone beam CT (CBCT) may also be called i-CAT scanner or mini-CAT scanner

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HD-31: Tinnitus

HD-31.1: Tinnitus

- See **HD-27.1: Hearing Loss and Tinnitus**

HD-32: Eye Disorders and Visual Loss

HD-32.1: Eye Disorders and Visual Loss

- For specific conditions - See Background and Supporting Information that include table of abbreviations
- Examination of ocular complaints and visual loss should include evaluation of pupillary responses, extraocular motility, visual acuity, visual field testing, and fundoscopic exam of retinae.
- MRI Orbits without contrast (CPT® 70540) or MRI Orbits without and with contrast (CPT® 70543) or CT Orbits with contrast (CPT® 70481) or CT Orbits without contrast (CPT® 70480) and/or MRI Brain without contrast (CPT® 70551) or MRI Brain with and without contrast (CPT® 70553):
  - Optic atrophy
  - Optic neuropathy
  - Papilledema/optic disc swelling - See **HD-17.1: Papilledema/Pseudotumor** Cerebri
  - Afferent Pupillary Defect (APD)
  - Pre-chiasm symptoms/signs (including bitemporal field deficit)
- For suspected optic neuritis MRI is preferred modality - See **HD-16.1: Multiple Sclerosis (MS)** and **HD-16.2: Neuromyelitis Optica and NMO Spectrum Disorders**
- Homonymous defects are associated with retrochiasmal pathology - See **HD-21.1: Stroke/TIA**; or **ONC-2: Primary Central Nervous System Tumors** in the Oncology Imaging Guidelines or **ONC-31.3: Brain Metastasis** in the Oncology Imaging Guidelines
- MRI Orbits without contrast (CPT® 70540) or MRI Orbits without and with contrast (CPT® 70543) or CT Orbits with contrast (CPT® 70481):
  - Exophthalmos (including thyroid eye disease), enophthalmos or nontraumatic orbital asymmetry
  - Suspected orbital cellulitis or atypical pre-septal cellulitis, uveitis or scleritis
  - Orbital mass or metastasis
  - Orbital inflammatory syndrome (orbital pseudotumor) and dacryocystitis or dacryoadenitis
- CT Orbit without contrast (CPT® 70480) and/or CT Head without contrast (CPT® 70450)
  - Orbital trauma with visual defect
- Binocular Diplopia from Cranial Nerve Palsies or Intracranial Disease
  - MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553):
    - Fourth Nerve Palsy
    - Sixth Nerve Palsy
    - Internuclear Ophthalmoplegia or Skew deviation
    - Third nerve palsy with pupillary involvement or suspicion of aneurysm
      - MRA Head (CPT® 70544, CPT® 70545, or CPT® 70546) or CTA Head (CPT® 70496) is indicated. (See **HD-12.1: Intracranial Aneurysms**)

- Amaurosis Fugax - See **PVD-3.1: Initial Imaging** in PVD Imaging Guidelines and **HD-21.1: Stroke/TIA**
  - Individuals describe a monocular transient darkening or loss of vision
- Central Retinal Artery Occlusion, Branch Retinal Artery Occlusion, and Ophthalmic Artery Occlusion - See **HD-21.1: Stroke/TIA**
  - Individuals describe a sudden monocular loss of vision or visual field. Etiology is usually embolic and is considered a stroke to the retina

Background and Supporting Information

- Imaging Non-Indications
  - Imaging is not necessary if visual loss or ocular symptom/sign is due to known intrinsic eye disease, such as refractive errors, amblyopia, pterygium, subconjunctival hemorrhage, conjunctivitis, cataracts, macular degeneration, central serous retinopathy, retinal vein occlusion, retinal detachment, etc. Monocular diplopia is not an indication for imaging. Physiologic anisocoria (difference in pupil diameter between the two eyes of 2 mm or less) and surgically distorted pupils are not indications for imaging.
  - Imaging is not typically necessary in cases of ptosis without concern for Horner's or 3rd nerve palsy
- Advanced imaging of the brain and orbit are not routinely paired. Medical necessity for each region is needed to image both regions, based on suspicion of these disorders.
- Orbital imaging alone may be sufficient unless other signs or symptoms suggest brain involvement.
- Autoimmune Retinopathy
  - Suspicion for CAR (Cancer associated retinopathy) or MAR (melanoma associated retinopathy) syndromes - See **ONC-30.3: Paraneoplastic Syndromes** in the Oncology Imaging Guidelines
- Oncologic conditions
  - Retinoblastoma - See **PEDONC-12: Retinoblastoma** in the Pediatric Oncology Imaging Guidelines
  - Uveal (choroidal) melanoma - See **ONC-5.9: Ocular Melanoma** in the Oncology Imaging Guidelines
- Temporal Arteritis (Giant Cell Arteritis) - See **HD-22.1: Cerebral Vasculitis**

- List of Abbreviations and Meanings:

Abbreviation	Meaning
AC	Anterior chamber
APD	Afferent pupillary defect
cc	With correction (current new or old glasses or contact lenses)
C/S	Conjunctiva/sclera
CVF	Confrontation visual field (testing of gross field of view)
DFE	Dilated fundus exam
EOM	Extraocular movements
ET	Esotropia
HT	Hypertropia
I	Iris
IOP	Intraocular pressure
K	Cornea
LLL	Lids, lashes, lacrimal gland
MRx	Manifest refraction
NSC or NS	Nuclear sclerotic cataract
ortho	Eyes are aligned on the same target
OCT	Ocular Coherence Tomography
ph or PH	Pinhole (crude assessment of best-corrected visual acuity)
PVD	Posterior vitreous detachment
sc	Without correction
SLE	Slit lamp examination
Ta	Applanation tonometry (intraocular pressure measurement)
Tp	Tonopen tonometry (intraocular pressure measurement)
Va	Visual acuity
VF	Visual field testing (formal automated perimetry versus confrontation visual field testing)
XT	Exotropia

HD-32.2: Pupillary Abnormalities including Horner's Syndrome

- Anisocoria and Other Pupillary Disorders
  - Physiologic anisocoria (difference in pupil diameter between the two eyes of 2 mm or less) and surgically distorted pupils are not indications for advanced imaging.
  - Dilated pupil from suspected Third nerve palsy - See Binocular Diplopia in **HD-32.1: Eye Disorders and Visual Loss**
  - Horner's Syndrome (See below)
- Horner's Syndrome (anisocoria, ptosis, and ipsilateral anhidrosis) is caused by disruption of sympathetic innervation to the eye and face. Definitive diagnosis may be established by pharmacologic testing of the pupillary response with eye drops. Evaluation and imaging depends on determining whether the cause is a central lesion (brainstem or cervical spinal cord), preganglionic lesion (spinal cord or sympathetic chain in the chest), or postganglionic lesion (neck or carotid artery).
- MRI Brain without contrast (CPT® 70551) or MRI Brain without and with contrast (CPT® 70553) for suspected intracranial or brainstem lesions
- MRI Cervical Spine without contrast (CPT® 72141) or MRI Cervical Spine without and with contrast (CPT® 72156) for suspected spinal cord abnormality
- CT Chest with contrast (CPT® 71260) for suspected chest mass
- CT Neck with contrast (CPT® 70491) for suspected neck mass
- CTA Neck without and with contrast (CPT® 70498) or MRA Neck (CPT® 70547, CPT® 70548, or CPT® 70549) for suspected carotid injury or dissection
- MRI Orbits without contrast (CPT® 70540), MRI Orbits without or with contrast (CPT® 70543) or CT Orbit with contrast (CPT® 70481) for suspected orbit lesion or mass

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HD-33: Acoustic Neuroma and Other Cerebellopontine Angle Tumors

HD-33.1: Acoustic Neuroma and Other Cerebellopontine Angle Tumors

- Initial diagnosis is usually made during evaluation for asymmetric hearing loss and/or vertigo. See **HD-23: Dizziness, Vertigo and Syncope** and **HD-27: Hearing Loss and Tinnitus** for evaluation of those problems
- MRI Brain without and with contrast (CPT® 70553) which should be done with attention to the internal auditory canals for initial diagnosis.
- MRI Brain without contrast (CPT® 70551) may be approved if performed with FIESTA protocol
- MRI Orbits, Neck, or Face without and with contrast (CPT® 70543) may be considered with audiologic or clinical features of retrocochlear hearing loss and a negative MRI Brain and in the rare individual in whom a detailed search is indicated for both a lesion of the cerebellopontine angle **and** lesions of the cerebral hemispheres
- Repeat imaging is approvable annually for 5 years and thereafter may be performed per specialist or any provider in consultation with a specialist.
- MRI Brain without and with contrast with attention to the internal auditory canals (CPT® 70553) is performed after surgical resection and following stereotactic radiation therapy at 6 to 12 months to document the completeness of tumor removal and to serve as a baseline for further follow-up. Additional follow up is done annually for 5 years and every 2 years thereafter.
- See **ONC-2.1: Primary Central Nervous System Tumors- General Considerations** in the Oncology Imaging Guidelines for additional imaging requests for surgery

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HD-34: Pineal/Colloid Cysts

- See **PEDHD-13.2: Pineal/Colloid Cysts** in Pediatric Head Imaging Guidelines

HD-35: Arachnoid Cysts

- See **PEDHD-13.1: Arachnoid Cysts** in Pediatric Head Imaging Guidelines

HD-36: This section intentionally left blank

HD-37: Sleep-Related Requests

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HD-37.1: General Guidelines Sleep-Related Requests

- Oral Appliance: There is a lack of published case-controlled clinical studies in Sleep literature validating the use of advanced imaging with respect to oral appliance therapy (pretreatment assessment). Previous literature has demonstrated support for cephalometric studies (x-ray)[1] in predicting treatment success. Routine use of advanced imaging is not supported at this time
- Hypersomnolence: MRI Brain with and without contrast (CPT® 70553) may be indicated when there are focal neurologic signs or suspicion for an inflammatory neurologic process as the etiology. Recognition and treatment of a comorbid sleep disorders is paramount, and a complete neurologic history and examination should precede any request for advanced imaging[3]
- Central Sleep Apnea: MRI Brain with and without contrast (CPT® 70553) may be indicated for unexplained central sleep apnea syndrome when a primary CNS etiology is suspected; i.e., unassociated with CHF, COPD or other potential etiology. Specific etiologies should be stated for imaging requests, including but not limited to, suspected Chiari malformation, stroke, CNS demyelinating disease, posterior fossa lesion, anoxia or infection[4]

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