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2024 Magnetic Resonance Imaging (MRI) Brain

Diagnostic Imaging

MRI-Brain-HH

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Table of Contents

Magnetic Resonance Imaging (MRI) Brain

NCD 220.2
See also, **NCD 220.2**: Magnetic Resonance Imaging at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

MRI General Contraindications

MRI may be contraindicated for **ANY** of the following:

- Safety, related to clinical status (body mass index exceeds MRI capability, intravascular stents within recent 6 weeks)
- Safety, related to implanted devices (aneurysm clips, cochlear implant, insulin pump, spinal cord stimulator)[1]

References: [67] [19] [43]

Preamble: Pediatric Diagnostic Imaging

HealthHelp's clinical guidelines for the Diagnostic Imaging program, are intended to apply to both adults and pediatrics (21 years of age or younger), unless otherwise specified within the criteria.

MRI Brain Guideline

Magnetic resonance imaging (MRI) of the brain is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Aducanumab (Aduhelm) is prescribed (and authorized by the healthplan if appropriate) for Alzheimer's disease or cognitive impairment.
   References: [2]
2. Arteriovenous malformation (AVM) or fistula (AVF) is suspected or known.
3. Cancer is suspected or known for **ANY** of the following:
   a. Cancer screening (including non-central nervous system (CNS) cancers and hereditary cancer syndromes). (See the **National Comprehensive Cancer Network [NCCN] Guidelines** for more information.)

[1]Some implanted devices that were once absolute contraindications to a MRI may now be accepted, including if the specific MRI is able to accommodate the device or the device itself is deemed safe for MRI.

b. Recurrence or metastasis is suspected.

c. Staging evaluation

d. Surveillance following the NCCN Guidelines recommended schedule. (See the **National Comprehensive Cancer Network [NCCN] Guidelines** for more information.)

References: [4] [28] [30]

4. Central sleep apnea is known from polysomnogram, age is over 1 year and central neurological cause (eg, chiari malformation, infectious/inflammatory disease, tumor) is suspected. (***NOTE:** *Must be in the absence of chronic opioid use, heart failure, high altitude or treatment emergent central sleep apnea*).

5. Cerebral spinal fluid (CSF) abnormality (eg, Arnold chiari, cranial arteriovenous malformation [AVM], hematoma, hydrocephalus, infection, leak, shunt malfunction, spontaneous intracranial hypotension [SIH], syrinx or syringomyelia) is suspected or known.
References: [6]

6. Congenital anomaly (eg, craniosynostosis, macrocephaly, microcephaly) is suspected or known.
References: [71] [79] [1]

7. Cranial nerve and/or visual abnormalities are suspected or known and **ANY** of the following:

   a. Bell's palsy (peripheral facial nerve palsy) evaluation and **ALL** of the following:.

      i. Atypical signs/symptoms (eg, dysphagia, fever, headache, stiff neck) **OR** recurrent

      ii. Facial twitching/spasms prior to onset

      iii. Persistent for 2 to 4 months

   b. Binocular diplopia and intracranial pathology is suspected **AND** ophthalmologic exam is abnormal.

   c. Bulbar symptoms (eg, difficulty chewing, dysarthria, dysphagia, dysphonia, facial muscle weakness) are present.

   d. Cranial nerve palsy (cranial nerve IX through XII) evaluation

   e. Cranial neuropathy, multiple

   f. Hemifacial spasm evaluation

   g. Horner's syndrome is symptomatic (eg, anhidrosis, miosis, ptosis), localizing the lesion to the central nervous system (CNS).

h. Occipital neuralgia evaluation to exclude a structural lesion

i. Optic neuritis evaluation

j. Ophthalmologic, physical or neurological exam is abnormal (eg, optic atrophy, ocular nerve palsies, papilledema, pathologic nystagmus, visual field deficit).

k. Pseudobulbar symptoms (eg, dysarthria, dysphagia, facial weakness, sudden, stereo-typed emotional outbursts that are not reflective of mood) are present.

l. Sensorineural hearing loss on audiogram is asymmetric.

m. Strabismus, in a pediatric individual, **AND** developmental delay or fundoscopic exam is abnormal.

n. Trigeminal neuralgia evaluation

o. Vocal cord lesions or vocal cord paralysis evaluation

References: [92] [52] [72] [35] [68] [39] [36] [14] [87] [102] [116] [16]

8. Global development delay (GDD) is known or developmental delay **AND** neurological exam is abnormal.

9. Infectious or inflammatory disease (eg, abscess, meningitis, neurosarcoidosis, complications of rhinosinusitis, vasculitis) is suspected or known.
References: [58] [70] [33] [44] [108]

10. Mass, neoplasm, tumor, cyst or lesion is known and **ANY** of the following:

a. Arachnoid cyst evaluation follow-up, and **EITHER** of the following:

i. Age is less than 4 years old, serial imaging is warranted.

ii. Age is older than 4 years old and newly symptomatic (eg, headaches, hydrocephalus, increased intracranial pressure, local mass effect, visual/ endocrine dysfunction) are new or progressing.

b. Dermoid cysts/sinuses are midline **AND** intracranial extension is suspected.

c. Histiocytic neoplasms (eg, Erdheim-Chester disease, Langerhans cell histiocytosis, Rosai-Dorfman disease) are known, to monitor treatment response or for surveillance.

d. Low-grade tumor (WHO I to II) (eg, astrocytoma, glioma, meningioma, glioma) is known for **ANY** of the following:

i. Evaluation of new or changing neurological symptoms (eg, dizziness, headache, facial paralysis).

ii. Surveillance per **National Comprehensive Cancer Network (NCCN) Guidelines**. (*See **Surveillance** section*)

iii. Treatment response assessment

e. Neurocutaneous syndromes tumor is known, to monitor for **ANY** of the following:

i. Neurofibromatosis 1 and **ANY** of the following:

A. Intracranial tumors are known, for follow-up.

B. Tumors are suspected based on clinical evaluation.

ii. Neurofibromatosis 2 for screening when asymptomatic; follow-up annually beginning at age 10 years

iii. Sturge Weber syndrome to rule out intracranial involvement

iv. Tuberous sclerosis; follow-up every 1 to 3 years until age 25

v. Von Hippel Landau syndrome; follow-up every 2 years

f. Pineal cyst is known, size 5 mm or more, **AND** presents with atypical features (eg, ataxia, gaze paralysis, headache, nausea/vomiting, papilledema).

g. Pituitary adenoma is known, for follow-up for **ANY** of the following:

i. Functioning adenoma to assess treatment response **OR** 1 year follow-up after drug holiday

ii. Macroadenoma is asymptomatic (10 mm or more); follow-up every 6 to 18 months or post-surgical follow-up every 1 to 2 years.

iii. Microadenoma is asymptomatic **AND** non-functioning (less than 10 mm); repeat in one year, every 2 to 3 years, if stable.

iv. Neuroendocrine signs (nausea, pain, vomiting) are new.

h. Rathke cleft cyst is known, for follow-up for **ANY** of the following:

i. Asymptomatic, follow-up at 1 year, 3 years and 5 years

ii. Neurological symptoms are new.

iii. Post-treatment follow-up, yearly for 5 years

iv. Prior imaging is abnormal, non-diagnostic or indeterminate.

i. Soft tissue mass of the head is known **AND** prior imaging (ultrasound, X-ray) is non-diagnostic or indeterminate.

References: [114] [64] [20] [106] [74] [110] [59] [121] [53] [37] [111] [54]

11. Mass, neoplasm, tumor, cyst or lesion is suspected and **ANY** of the following:

a. Brain tumor is suspected and neurological symptoms are acute, new or progressing.

b. CNS lesion is suspected with vertigo and neurological signs (eg, ataxia, change in sensation, double vision, weakness, vision loss).

c. Pituitary tumors are suspected and **ANY** of the following:

i. Central diabetes insipidus (low ADH)

ii. Genetic disorder (eg, MEN1), that predisposes individual to increases risk of pituitary tumor, is known.

iii. Neurologic findings (eg, compression of the optic chiasm, diplopia, gaze palsy)

iv. Pituitary apoplexy with sudden onset of neurological and hormonal symptoms

v. Pituitary gland hypofunctioning or hyperfunctioning is suspected based on hormone testing (eg, acromegaly, central hyperthyroidism, Cushing disease, elevated prolactin) **OR** hormonal testing (eg, growth hormone deficiency, hypogonadotrophic hypogonadism, hypopituitarism).

vi. Precocious puberty in a child (male age is less than 9, female age is less than 8) and central cause is suspected based on hormonal studies.

Refereneces: [86] [110] [59]

12. Multiple Sclerosis (MS) is suspected or known and **ANY** of the following: (***NOTE**: *In the pediatric population, use a similar scan frequency for disease and therapeutic monitoring. Increase frequency of imaging (eg, every 6 months) in children with highly active disease or in situations where imaging will change management*.)

a. Dissemination in time (DIT) is demonstrated for diagnosis (every 6 to 12 months).

b. MRI disease activity is **NOT** associated with new symptoms on routine follow-up scan; repeat scan in 6 months.

c. Neurologic signs (eg, fatigue, numbness, tingling) are suspicious for MS and **EITHER** of the following:

i. Clinically isolated syndrome (eg, brain stem syndrome, optic neuritis, transverse myelitis)

ii. Neurological signs are recurrent, variable and **NOT** attributed to another etiology.

d. New baseline establishment and **NO** recent imaging (within 12 months), postpartum **OR** 3 to 6 months after switching disease modifying therapy

e. Progressive multifocal leukoencephalopathy (PML) surveillance when on natalizumab (Tsyabri®) and **ANY** of the following:

i. Anti-John Cunningham (anti-JC) virus antibody negative; follow-up annually

ii. High-risk individuals who switch from natalizumab to other therapeutics; follow-up severy 3 to 4 months for up to 12 months.

iii. PML occurrence (eg, anti-JC virus antibody index values [greater than 0.9], previously treated with immunosuppressive therapies, seropositive for JC virus and have been treated with natalizumab for at least 18 months) is high risk; follow-up every 3 to 4 months.

iv. Treatment is started: follow-up in 12 months.

f. Signs are new **AND** exacerbation is suspected.

g. Subclinical disease activity assessment every 1 to 2 years while on disease modifying therapy (DMRT), less frequently when stable for 2 to 3 years.

References: [24] [115] [33] [10]

13. Neurodegenerative conditions for **ANY** of the following:

a. Movement disorder (eg, facial palsy or spasm, focal/lateral movement disorder, Huntington's disease, Parkinson's disease) is suspected or known. (*__NOTE:__ *MRI is __NOT__ indicated for essential tremor, isolated focal dystonia or Tourette's Syndrome*.)

b. Neurocognitive disorders (eg, Alzheimer's disease, cognitive impairment, dementia, diffuse Lewy body) evaluation with mental status score of **EITHER** the mini-mental state examination (MMSE) or Montreal cognitive assessment (MoCA) of less than 26 or other similar mental status instruments/formal neuropsychological testing showing at least mild cognitive impairment **AND** a completed basic metabolic work-up (such as thyroid function testing, liver function testing, complete blood count, electrolytes and B12).

c. Neurodegeneration with brain iron accumulation is suspected.

References: [45] [9] [51] [101] [77] [60]

14. Peri-procedural care to guide pre-procedure or invasive procedure planning or post-procedural follow-up
References: [6]

15. Prior MRI brain imaging is non-diagnostic or indeterminate. (*__NOTE__: *One follow-up is appropriate to evaluate for changes since preceding imaging finding[s]. Further surveillance is appropriate when lesion is specified as "highly suspicious" or there is a change since last exam.*)

16. Seizure disorder and epilepsy is suspected or known and seizures are **ANY** of the following: (*__NOTE__: *Imaging is **NOT** indicated for idiopathic focal seizures, generalized epilepsy wth typical features, simple febrile seizures*.)
    a. Activity or pattern is changed.
    b. Known and **NO** prior imaging
    c. Medically refractory
    d. Unprovoked and new onset
    e. Symptomatic with syncope **AND** neurological deficits (eg, altered mental status, dizziness, tremors)

    References: [61] [9] [109]

17. Stroke, transient ischemic attack (TIA) **OR** vascular disease is suspected or known and **ANY** of the following:
    a. Cavernous malformations or other low flow vascular malformations are suspected.
    b. Central venous thrombosis is suspected.
    c. Coagulopathy is known **OR** active anticoagulant use.
    d. Familial first-degree (child, parent, sibling) or personal history of brain aneurysm(s).
    e. Hemorrhage, hematoma or vascular abnormalities are known, for follow-up.
    f. Sensory or motor deficits are acute, new or fluctuating (limb weakness, speech difficulties, visual loss, lack of coordination, or mental status changes).
    g. Sickle cell disease and **EITHER** of the following:
        i. Silent cerebral infarcts are suspected, age is 2 years old or more, with known Hemoglobin SS (HbSS) sickle cell disease or Hemoglobin S Beta (HbSß) thalassemia.
        ii. Neurological signs (eg, headache, paresthesias, sensory changes) are present.
    h. Subarachnoid hemorrhage is suspected and prior imaging (CT or CTA) is non-diagnostic or indeterminate.
    i. Vertigo, **AND** cerebrovascular disease risk factors (eg, coronary artery disease, diabetes, hypertension) are known and stroke is suspected.

    References: [101]

18. Symptom evaluation for **ANY** of the following:

a. Cyclical vomiting syndrome or abdominal migraine with neurological symptoms (eg, altered mental status, dizziness, tremors)

b. Headache for **ANY** of the following:

i. Chronic headaches with change in pattern or intensity (eg, last longer, more frequent or severe).

ii. Migraine aura is atypical and complex (eg, aura lasts more than 60 minutes, **NO** aura, visual or sensory illusions).

iii. New, acute and/or sudden-onset headache with **ANY** of the following:

A. Age is 50 years or older.

B. Cancer history

C. Coagulopathy is known **OR** active anticoagulant use.

D. Familial first-degree (child, parent, sibling), or personal history of arteriovenous fistula (AVF) or brain aneurysm. (*__NOTE__: *Combination studies with CTA Brain, CTA Neck may be appropriate.*)

E. Fever

F. Immunocompromised status

G. Intracranial bleeding/stroke history

H. Pregnancy or puerperium

I. Sentinel headache (eg, thunderclap, "worst headache of my life") occurs with rapid intensity **AND** lasts less than 48 hours and prior imaging (CT,CTA, MRA) are non-diagnostic or indeterminate.

J. Valsalva maneuver related (eg, coughing, exercising, sexual intercourse)

iv. Persistent headache, in a pediatric individual, and **ANY** of the following:

A. Age is less than 6 years old.

B. Increased intracranial pressure is suspected and symptomatic (eg, recurring headache after waking, with or **WITHOUT** nausea/ vomiting).

C. Occipital location

D. Prevents or disrupts sleep

E. Severe and intracranial pathology is suspected (eg, cancer history, coagulopathy, congenital heart disease, hypertension, immune deficiency, neurofibromatosis, sickle cell disease

F. **NO** family history of headache.

v. Symptoms persist or worsen **AND** adherence to physician-directed treatment.

vi. Trigeminal autonomic cephalgia (TAC) (eg, cluster, paroxysmal hemicrania/ hemicrania continua and short-lasting unilateral neuralgiform headache) evaluation. (*__NOTE__: *Imaging is indicated **ONCE** to eliminate secondary causes*.)

c. Mastication muscle weakness is unilateral.

d. Mental status change (eg, amnesia, confusion, inability to follow simple commands, loss of words)

e. Neurological exam with focal abnormality **NOT** evaluated by advanced imaging, or has progressed since prior advanced imaging.

f. Neurological deficits (eg, altered mental status, dizziness, tremors) are new or worsening.

g. Psychological changes (eg, abnormal behaviors, emotions or thoughts) are new or progressing.

h. Syncope **AND** neurological deficits (eg, altered mental status, dizziness, tremors) **OR** seizure is suspected.

References: [93] [112] [65] [101] [6] [62] [92] [65] [51] [61] [103] [46]

19. Trauma is suspected or known and **ANY** of the following:

a. Brain injury is subacute or chronic **AND** there are new cognitive/neurologic deficit(s).

b. Coagulopathy is known **OR** active anticoagulant use.

c. Post concussive syndrome evaluation, when **NO** prior imaging was done, **AND** symptoms are persistent and/or disabling.

d. Symptoms are acute, new or fluctuating, CT is non-diagnostic or indeterminate and **ANY** of the following:

i. Amnesia

ii. Focal neurologic findings

iii. Headache

iv. Increased intracranial pressure signs (eg, headache, vertigo, vomiting)

v. Mental status change

vi. Motor changes

vii. Seizures

viii. Vomiting

References: [85] [104] [99] [46]

20. Vertigo **AND** hearing loss is unilateral and progressive.
References: [51] [102] [5]

Combination CT and MRI for Metastases Evaluation Guideline

Combination CT/MRI studies (5 or less concurrent studies, with a CT or MRI appropriate for cancer location: abdomen, brain, cervical spine, chest, lumbar spine, neck, pelvis and/or thoracic spine) for **ANY** of the following situations:

1. Cancer recurrence or metastasis is suspected.
2. Staging evaluation, for baseline pre-therapy
3. Surveillance following the National Comprehensive Cancer Network (NCCN) Guidelines recommended schedule (*See **Surveillance** section*)

Functional Brain MRI Guideline

A functional magnetic resonance imaging (fMRI) of the brain, for mapping of a lesion in relation to the eloquent cortex (eg, language, motor, sensory or vision centers) is considered medically appropriate when the documentation demonstrates peri-procedural care for **ANY** of the following:

1. Post-procedural evaluation of eloquent cortex for therapeutic follow-up or other documented medical reason clearly explaining the medical necessity for follow-up
References: [48]
2. Pre-procedure planning for brain tumor radiation therapy, focal brain lesion (tumor or vascular malformation) surgery or epilepsy surgery
References: [48]

Combination MRA Brain/MRA Neck/MRI Brain with IAC Guideline

A magnetic resonance angiography (MRA) brain **combined** with MRA neck **AND** magnetic resonance imaging (MRI) brain with internal auditory canal (IAC) is considered medically appropriate when the documentation demonstrates pulsatile tinnitus with suspected arterial vascular and/or intracranial etiology.
Reference: [50]

Combination MRA Brain and MRI Brain Guideline

A magnetic resonance angiography (MRA) of the brain **combined** with magnetic resonance imaging (MRI) of the brain is considered medically appropriate when the documentation demonstrates **ANY** of the following:

I. Headache is acute, with sudden onset, **AND** there is a history of a vascular abnormality or aneurysm history in a 1st degree relative (child, parent, sibling).
Reference: [112]

II. Headache occurs with exercise or sexual activity.
References: [112] [62]

III. Sickle cell disease is known with neurological symptoms.
References: [26] [101]

IV. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently (within last 6 months).
References: [101] [41]

V. Thunderclap headache, when a vascular abnormality is suspected.
Reference: [62]

VI. Venous thrombosis (dural sinus thrombosis) is suspected.
Reference: [100]

Combination MRA Brain/MRA Neck/MRI Brain Guideline

A magnetic resonance angiography (MRA) brain **combined** with MRA neck **AND/OR** magnetic resonance imaging (MRI) brain is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Carotid or vertebral artery dissection is suspected, with focal or lateralizing neurological deficits.
Reference: [34]

2. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently.
References: [101] [41]

3. Indications above are approvable, age is less than 8 years old, anesthesia is needed **AND** concurrent intracranial pathology is suspected.

Combination MRA Brain/MRA Neck/MRI Brain with IAC Guideline

A magnetic resonance angiography (MRA) brain **combined** with MRA neck **AND** magnetic resonance imaging (MRI) brain with internal auditory canal (IAC) is considered medically

appropriate when the documentation demonstrates pulsatile tinnitus with suspected arterial vascular and/or intracranial etiology.
Reference: [50]

Combination MRA Neck and MRI Brain Guideline

Magnetic resonance angiography (MRA) neck **combined** with magnetic resonance imaging brain is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently (within last 6 months).
   References: [101] [41]
2. Carotid or vertebral artery dissection is suspected, with focal or lateralizing neurological deficits.
   Reference: [34]

Combination MRI Brain/MRI Cervical Spine/MRI Lumbar Spine/MRI Thoracic Spine (any combination) Guideline

A magnetic resonance imaging (MRI) of the brain **combined** with MRI cervical spine, MRI lumbar spine **AND/OR** MRI thoracic spine, in **ANY** combination, is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Arnold Chiari malformation is suspected, for initial evaluation.
2. Arnold Chiari is known.
   References: [107] [98] [89]
3. Cerebrospinal fluid (CSF) leak is suspected (eg, cerebrospinal-venous fistula, orthostatic headache, otorrhea, post lumbar puncture headache, post spinal surgery headache, rhinorrhea, spontaneous idiopathic intracranial hypotension [SIH]).
   References: [29]
4. Drop metastasis from the brain or spine
5. Leptomeningial carcinomatosis is suspected.
   References: [95]
6. Neurocutaneous syndrome tumor evaluation and monitoring
   References: [113]

Combination MRI Brain/MRI Cervical Spine/MRI Thoracic Spine Guideline

A magnetic resonance imaging (MRI) brain **combined** with MRI cervical spine **AND/OR** MRI thoracic spine (any combination) is considered medically appropriate when the documentation demonstrates evaluation is needed for **ANY** of the following:

1. MS is known, prior to initiation or change of disease modification treatment **OR** to establish new baseline.
   References: [115] [33]
2. MS **AND** spine disease are known, for follow-up:
   A. 6 to 12 months after starting or changing a treatment
   B. Every 1 to 2 years while on disease modifying therapy, less frequently when stable for 2 to 3 years
3. Neuromyelitis optica spectrum disorders (eg, recurrent or bilateral optic neuritis, recurrent transverse myelitis)
   References: [21]

Combination MRI Brain/MRI Face and/or Sinus Guideline

A magnetic resonance imaging (MRI) of the brain **combined** with MRI of the face/sinus(s) is considered medically appropriate when the documentation demonstrates **ANY** of the following conditions:

1. Granulomatosis with polyangiitis (Wegener's granulomatosis disease)
   References: [22] [38] [69]
2. Trigeminal neuralgia/neuropathy with atypical features (eg, bilateral hearing loss, dizziness/vertigo, numbness, visual changes, sensory loss), to evaluate the extracranial nerve course.
   References: [92] [112] [16] [25]
3. Vascular malformation of the face, when extension into brain is suspected.
4. Indications above are approvable, age is less than 8 years old, anesthesia is needed **AND** concurrent intracranial pathology is suspected.

Combination MRI Brain/MRI Face/MRI Neck/MRI Sinus Guideline

A magnetic resonance imaging (MRI) of the brain **combined** with MRI face, MRI neck **AND** MRI sinus is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Bell's palsy (peripheral facial nerve palsy) evaluation and **ALL** of the following:
    a. Atypical signs/symptoms (eg, dysphagia, fever, headache, stiff neck) **OR** recurrent
    b. One time imaging with MRI, within 1 month of onset of symptoms
    c. Persistent symptoms, repeat imaging at 6 months
2. Cranial nerve palsy (CN IX-XII) for evaluation of extracranial nerve course
   References: [39]
3. Granulomatosis with polyangiitis (Wegener's granulomatosis) disease
   References: [22] [69] [38]
4. Trigeminal neuralgia or neuropathy with atypical presentation for evaluation of extracranial nerve course
   References: [116] [92]
5. Indications above are approvable, age is less than 8 years old, anesthesia is needed **AND** concurrent intracranial pathology is suspected.

Combination MRI Brain and MRI Orbit Guideline

A magnetic resonance imaging (MRI) of the brain **combined** with MRI of the orbit(s) is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Congenital abnormality with unilateral vision loss in a child.
   References: [7]
2. Neuromyelitis optica spectrum disorder is suspected or known with bilateral, recurrent or severe optic neuritis.
   References: [21]
3. Optic disk swelling (papilledema) occurs bilaterally, with vision loss.
   References: [120] [7]
4. Optic neuritis is suspected.
   References: [92] [52] [83] [87]
5. Optic neuropathy or unilateral optic disk swelling of unclear etiology, for diagnosis or treatment planning

References: [14] [92]

6. Retinoblastoma is suspected.
   References: [81]
7. Vision loss and optic tumor is suspected, with or **WITHOUT** neurofibromatosis history, in a child.
8. Indications above are approvable, age is less than 8 years old, anesthesia is needed **AND** concurrent intracranial pathology is suspected.

Combination MRI Brain with Internal Auditory Canal (IAC) Guideline

A magnetic resonance imaging (MRI) of the brain **combined** with internal auditory canal (IAC) is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Acoustic neuroma (Schwannoma) or cerebellopontine angle tumor is suspected and symptomatic (eg, altered sense of taste, disturbed balance or gait, facial weakness, headache, unilateral hearing loss by audiometry, unilateral tinnitus).
   References: [11]
2. Bell's palsy (peripheral facial nerve palsy) evaluation and **ALL** of the following:
   a. Atypical signs/symptoms (eg, dysphagia, fever, headache, stiff neck) **OR** recurrent
   b. One time imaging with MRI, within 1 month of onset of symptoms
   c. Persistent symptoms, repeat imaging at 6 months
3. Cerebral spinal fluid (CSF) otorrhea is intermittent (*__NOTE__: *CSF fluid should always be confirmed with Beta-2 transferrin assay laboratory testing*. *Magnetic resonance imaging [MRI]/Nuclear cisternography for intermittent leaks, computed tomography [CT] for active leaks*).
4. Cholesteatoma is suspected.
   References: [11] [102]
5. Congential/childhood sensiorneural hearing loss is suspected, due to structural abnormality (eg, brain parenchyma, CNVII or membranous labyrinth). (*__NOTE__: *Computed tomography [CT] is preferred for osseous anatomy and malformations of the inner ear*.)
6. Glomus tumor is suspected.
7. Hearing loss is sensorineural and asymmetric on audiogram.
   References: [102]
8. Mastoiditis, acute, is suspected as a complication of acute otitis media.

9. Pulsatile tinnitus
   References: [50]
10. Tinnitus is non-pulsatile and unilateral.
    References: [50] [5]
11. Vertigo is recurrent, chronic and symptomatic with brain stem neurologic deficits (eg, cranial nerve palsy, impaired consciousness, sensory deficits)
    References: [5] [102]
12. Indications above are approvable, age is less than 8 years old, anesthesia is needed **AND** concurrent intracranial pathology is suspected.

LCD 37373
See also, **LCD 37373**: MRI and CT Scans of Head and Neck at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 35175
See also, **LCD 35175**: MRI and CT Scans of the Head and Neck at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 35391
See also, **LCD 35391**: Multiple Imaging in Oncology at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

Brain and Head Surveillance

Bone Cancer Surveillance

NCCN Bone Cancer Version 2.2024

Bone cancer surveillance includes **ANY** of the following:

1. Chondrosarcoma surveillance for **ANY** of the following:
   a. Atypical cartilaginous tumor surveillance with **ALL** of the following:

i. Chest imaging every 6 to 12 months for 2 years, then annually as clinically indicated

ii. Primary site X-rays and/or cross-sectional imaging magnetic resonance imaging (MRI) (± contrast) or computed tomography (CT) (with contrast) every 6 to 12 months for 2 years, then annually as clinically indicated

b. Low-grade, extracompartmental appendicular tumor, grade I axial tumors or high-grade (grade II or III, clear cell or extracompartmental) tumors surveillance with **ALL** of the following:

i. Chest imaging every 3 to 6 months, may include CT at least every 6 months for 5 years, then annually for at least 10 years, as clinically indicated

ii. Primary site X-rays and/or cross-sectional imaging MRI (with and without contrast) or CT (with contrast) as clinically indicated.

2. Chordoma surveillance with **ALL** of the following:

a. Chest imaging every 6 months, with CT included, annually for 5 years, then annually thereafter as clinically indicated

b. Imaging of primary site, timing and modality (eg, MRI ± CT [both with contrast], X-ray) as clinically indicated up to 10 years

3. Ewing Sarcoma after primary treatment completed and stable/improved disease, surveillance with **ALL** of the following:

a. Chest imaging with X-ray or CT: every 2 to 3 months

b. Primary site imaging with MRI ± CT (both with contrast) and X-ray, increase intervals after 24 months and after 5 years, annually as clinically indicated (indefinitely) (*__NOTE__: *Consider PET/CT [head-to-toe] and/or bone scan.*)

4. Giant cell tumor of the bone surveillance with **ALL** of the following:

a. Chest imaging every 6 to 12 months for 4 years, then annually thereafter as clinically indicated

b. Surgical site imaging as clinically indicated (eg, CT and/or MRI, both with contrast, X-ray)

5. Osteosarcoma surveillance with primary site and chest imaging (using same imaging that was done for initial work-up) for **ANY** of the following: (*__NOTE__: *Consider PET/CT [head-to-toe] and/or bone scan*.)

a. Image every 3 months for years 1 and 2

b. Image every 4 months for year 3

c. Image every 6 months for years 4 and 5

d. Image annually for year 6 and thereafter, as clinically indicated

Central Nervous System (CNS) Cancer

NCCN Central Nervous System Cancer Version 2.2024

Central nervous system (CNS) cancer surveillance includes **ANY** of the following:

1. Brain metastasis, limited **OR** extensive, image with brain magnetic resonance imaging (MRI) every 2 to 3 months for 2 years, then every 4 to 6 months indefinitely
2. Glioma and **ANY** of the following:
    a. Low-grade glioma, image with brain MRI every 3 to 6 months for years 3 through 5, then at least annually as clinically indicated
    b. High grade glioma, image with brain MRI 2 to 8 weeks after radiation therapy, then every 2 to 4 months for 3 years, then every 3 to 6 months indefinitely
3. Hereditary cancer syndromes, image with brain MRI and **ANY** of the following:
    a. Li-Fraumeni syndrome, follow-up annually [57]
    b. Multple endocrine neoplasia 1, follow-up every 3 to 5 years, starting at the age of 5 years. [88]
    c. Neurofibromatosis 2, image with brain IAC, follow-up annually, starting at age of 10 years [32]
    d. Sturge-Weber syndrome: follow-up once after age 1 year to determine intracranial involvement, if less than age 1 year, only if symptomatic [23]
    e. Tuberous Sclerosis, follow-up every 1 to 3 years, until the age of 25 years [55]
    f. Von Hippel Landau, follow-up every 2 years, starting at age 8 years [94]
4. Meduloblastoma, image with brain MRI every 3 months for 2 years, then every 6 to 12 months for years 5 through 10, then every 1 to 2 years as clinically indicated.
5. Meningiomas, WHO Grade 1 or 2 **OR** unresectable, image with brain MRI at months 3, 6 and 12, then every 6 to 12 months for 5 years, then every 1 to 3 years as clinically indicated
6. Primary CNS lymphoma, image with brain MRI every 3 months for 1 year, then every 6 months for years 2 through 5, then annually indefinitely (*__NOTE__: *for individuals with previous spine disease, concurrent spine imaging and cerebrospinal fluid (CSF) sampling as clinically indicated*)

7. Primary spinal cord tumors and **ANY** of the following:
    a. Low-grade tumors, image with spine MRI every 3 to 6 months until year 5, then at least annually indefinitely
    b. High-grade tumors, image with spine MRI every 2 to 6 weeks after treatment, then every 2 to 4 months until year 3, then every 3 to 6 months until year 5, then every 6 to 12 months indefinitely
8. Spine metastasis, image with spine MRI or computed tomography (CT) 1 to 3 months after treatment, then every 3 to 4 months for 1 year, then clinically as indicated

Head and Neck Cancers Surveillance

NCCN Head and Neck Cancers Version 4.2024

Head and neck cancers surveillance for locoregionally advanced disease after treatment, includes **ANY** of the following:

1. Short-term surveillance (less then 6 months after treatment), if there is high-risk of early recurrence, symptoms of early recurrence or before starting adjuvant post-operative therapy:
    a. Computed tomography (CT) and/or magnetic resonance imaging (MRI) within 3 to 4 months post-operatively to establish a new baseline for future comparisons
    b. FDG positron emissions tomography/computed tomography (FDG PET/CT) should be performed within 3–6 months of definitive radiation or systemic therapy/RT.
    c. Incomplete response is suspected: CT or MRI scan earlier (eg, 4 to 8 weeks) based on the clinical situation. (*__NOTE__: *Consider an ultrasound [US] of the neck for targeted sampling.*)
2. Long-term surveillance (6 months or more from end-of-treatment, up to 5 years after treatment) with ultrasound, CT, MRI, PET/CT and/or FDG PET/CT (as appropriate) to obtain surveillance for lesions that are recurrent, second primary or at distant sites.[2]

Histiocytic Neoplasms Surveillance

NCCN Histiocytic Neoplasms Version 1.2024

Histiocytic neoplasms surveillance imaging includes **ANY** of the following:

[2]Per the National comprehensive cancer network (NCCN) Guidelines for Head and Neck Cancers, there are no consensus guidelines for the surveillance imaging type, frequency or duration for locoregionally advanced disease. If an FDG PET/CT at 3 months post-treatment is negative, there are no data to support substantial benefit for further routine imaging when asymptomatic with negative exam. In the absence of multi-institutional prospective data, a tailored approach to surveillance with attention to tumor type, stage, prognostic factors, symptomatology, and physical exam changes or restrictions is recommended.

1. Erdheim-Chester disease surveillance imaging includes **ANY** of the following:
    a. FDG-positron emission tomography/computed tomography (PET/CT) every 3 to 6 months for the 1st 2 years after starting therapy until stabilization of disease, then as clinically indicated
    b. Organ specific imaging with CT (+ contrast) or MRI (± contrast) every 3 to 6 months until disease stabilization and then every 6 to 12 months
2. Langerhans cell histiocytosis surveillance imaging includes FDG-PET/CT (preferred), FDG-PET or CT/magnetic resonance imaging (MRI) every 3 to 6 months for the first 2 years after completion of therapy, then no more than annually (*__NOTE__: *for individuals who are asymptomatic with a single-site bone lesion, imaging surveillance can end after 1 year, with continued tracking of symptoms*)
3. Rosai-Dorfman disease (RDD), surveillance imaging includes **ANY** of the following: (*__NOTE__: *for individuals who are asymptomatic with a single-site bone lesion, imaging surveillance can end after 1 year, with continued tracking of symptoms*)
    a. FDG-PET/CT every 3 to 6 months after starting therapy until stabilization of disease
    b. Organ specific imaging with CT (+ contrast) or MRI (± contrast) every 3 to 6 months until disease stabilization and then every 6 to 12 months

Melanoma: Uveal Surveillance

NCCN Melanoma: Uveal Version 1.2024

Uveal melanoma surveillance imaging includes **ANY** of the following:

1. Low risk disease surveillance imaging every 12 months for 5 years or clinically as indicated, includes **ANY** of the following:
    a. Chest/abdomen/pelvis computed tomography (CT) (+ contrast)
    b. Chest X-ray (dual subtraction)
    c. Magnetic resonance (MR) (+ contrast) or ultrasound of liver
2. Medium risk disease surveillance imaging every 6 to 12 months for 10 years, then as clinically indicated, includes **ANY** of the following:
    a. Chest/abdomen/pelvis CT (+ contrast)
    b. Chest X-ray (dual subtraction)
    c. MR (+ contrast) or ultrasound of liver
3. High risk disease surveillance imaging every 3 to 6 months for 5 years, then every 6 to 12 months for 10 years, then clinically as indicated, includes **ANY** of the following:

a. Chest/abdomen/pelvis CT (+ contrast)

b. Chest X-ray (dual subtraction)

c. MR (+ contrast) or ultrasound of liver

Neuroendocrine and Adrenal Cancer Surveillance

NCCN Neuroendocrine and Adrenal Tumors Version 1.2023

Neuroendocrine and adrenal cancer surveillance includes **ANY** of the following[3]:

1. Adrenal gland tumors surveillance imaging includes **ANY** of the following:
    a. Localized disease: chest computed tomography (CT) (± contrast) and abdominal CT or magnetic resonance imaging (MRI) (+ contrast) every 12 weeks to 12 months up to 5 years, then clinically as indicated
    b. Locoregional unresectable or metastatic disease; chest CT (± contrast) and abdominal/pelvic CT or MRI (+ contrast) or FDG positron emission tomography (PET)/CT every 12 weeks to 12 months up to 5 years, then clinically as indicated
2. Carcinoid syndrome surveillance imaging includes **BOTH** of the following:
    a. Abdominal/pelvic multiphasic CT or MRI every 12 weeks to 12 months and chest CT (± contrast) as clinically indicated
    b. Echocardiogram every 1 to 3 years or as clinically indicated
3. Gastrointestinal (GI) tract (jejunum/ileum/colon, duodenum, rectum), lung and/or thymus neuroendocrine tumor (NET) surveillance includes imaging post-resection with **ANY** of the following:
    a. Jejunum/ilium/colon, duodenum, rectum and thymus, surveillance imaging with abdominal ± pelvic multiphasic CT or MRI according to **ONE** of the following levels of frequency:[4]
        i. Within 12 weeks to 12 months postoperatively
        ii. After 12 months, image every 12 to 24 months for 10 years
        iii. After 10 years as clinically indicated
    b. Lung/thymus tumors surveillance chest CT (± contrast) for primary tumors, (as clinically indicated for primary GI tumors) according to **ONE** of the following levels of frequency:
        i. Within 12 weeks to 12 months postoperatively

[3]No surveillance is indicated for appendiceal tumors 2 cm or smaller without aggressive features.
[4]High-grade tumors may be appropriate for more frequent monitoring.

ii. After 12 months, image every 12 to 24 months for 10 years

iii. After 10 years as clinically indicated

4. Grade 3, well-differentiated neuroendocrine surveillance includes chest CT (± contrast) as clinically indicated for **ANY** of the following:

   a. Locally advanced/metastatic disease with favorable biology (low Ki-67 [eg, less than 55%], positive somastatin receptor [SSTR] based PET imaging) includes abdominal/pelvic MRI (+ contrast) or abdominal/pelvic multiphasic CT for surveillance with **ANY** of the following:

      i. Resectable disease surveillance every 12 weeks to 24 weeks for 2 years, then every 6 to 12 months for up to 10 years and chest CT as clinically indicated

      ii. Unresectable disease surveillance every 12 weeks to 24 weeks (depending on tumor biology) **AND** chest CT (± contrast); if clinically indicated.

   b. Locally advanced/metastatic disease with unfavorable biology (high Ki-67 [eg 55% or higher], rapid growth rate, FDG avid tumors, negative SSTR-based PET imaging), includes surveillance imaging, every 8 weeks to 12 weeks (depending on tumor biology) with **ALL** of the following:

      i. Abdominal/pelvic MRI (+ contrast) or abdominal/pelvic multiphasic CT and FDG PET/CT as clinically indicated

      ii. Chest CT (± contrast) as clinically indicated

   c. Locoregional disease (resectable) abdominal/pelvic MRI (+ contrast) or abdominal/pelvic multiphasic CT with frequency of **ONE** of the following:

      i. Every 12 weeks to 24 weeks for 2 years (depending on tumor biology, Ki-67) and chest CT as clinically indicated

      ii. Every 6 months to 12 months for up to 10 years (depending on tumor biology, Ki-67) and chest CT as clinically indicated

   d. Multiple endocrine neoplasia, type 1 (MEN1) screening surveillance for **ANY** of the following tumor types: (*__NOTE__: *For prolonged surveillance, imaging studies without radiation are preferred.*)

      i. Bronchial/thymic NETs: chest CT or MRI (+ contrast) every 1 to 3 years

      ii. PanNET: abdominal/pelvic CT or MRI (+ contrast) every 1 to 3 years and consider serial endoscopic ultrasound (EUS)

      iii. Parathyroid: if calcium rises, re-image with neck ultrasound and/or parathyroid sestamibi with single-photon emission computed tomography (SPECT) scan (SPECT-CT preferred) or 4D-CT

iv. Pituitary: pituitary or sella MRI (+ contrast) of the pituitary every 3 to 5 years

e. Poorly differentiated large or small cell carcinoma and/or mixed neuroendocrine/ non-neuroendocrine neoplasm or unknown primary, imaging surveillance includes **ALL** of the following:

i. Resectable surveillance imaging includes **EITHER** chest CT (± contrast) with abdominal/pelvic MRI (+ contrast) **OR** chest/abdominal/pelvic multiphasic CT; every 12 weeks for the 1st year, and every 6 months thereafter

ii. Locoregional unresectable or metastatic disease surveillance imaging includes **EITHER** chest CT (± contrast) with abdominal/pelvic MRI (+ contrast) **OR** chest/abdominal/pelvic multiphasic CT; every 6 weeks to 16 weeks

f. Postoperative from potentially curative surgery surveillance for at least 10 years (longer if high-risk)

5. Pancreatic neuroendocrine tumor surveillance imaging, post-resection, includes chest CT (± contrast) as clinically indicated and abdominal multiphasic CT or MRI with imaging frequency of **ONE** of the following:[4]

a. Within 3 to 12 months postoperatively

b. After 12 months, image every 6 to 12 months for 10 years

c. After 10 years as clinically indicated

6. Pheochromocytoma/Paranganglioma surveillance imaging and **ANY** of the following:

a. Resectable disease, post-resection includes chest CT (± contrast) and abdominal/ pelvic CT or MRI (+contrast), if clinically indicated with imaging frequency of **ONE** of the following:

i. 12 weeks to 12 months after resection

ii. Every 6 to 12 months for the 1st 3 years

iii. Annually up to 10 years, then as clinically indicated

b. Locally unresectable disease or distant metastases includes **ANY** of the following:

i. Chest/abdominal/pelvic CT with contrast

ii. Chest CT (± contrast) and abdominal/pelvic MRI without contrast (if risk for hypertensive episode)

iii. FDG-PET/CT for bone dominant disease

iv. MIBG (meta-iodobenzylguanidine) with single-photon emission computerized tomography/CT (SPECT) (if previous MIBG-positive or concern for disease progression) prior to considering radionuclide therapy

v. SSTR-PET/CT or SSTR-PET/MRI (if previous SSTR-positive or concern for disease progression) prior to considering radionuclide therapy

TIP

NCCN recommends following the surveillance protocols from designated guidelines for the following hereditary endocrine neoplasia syndromes :

- Thyroid cancer guideline, use for: Multiple endocrine neoplasia, type 2 (MEN2) with genetic evaluation of inherited syndromes
- Kidney cancer, use for:
  - Hereditary paraganglioma/pheochromocytoma syndrome
  - Tuberous sclerosis complex (TSC1 and TSC2)
  - von Hippel Lindau syndrome (VHL)
- Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic, use for:
  - Neurofibromatosis type 1 (NF1)
  - Li-Fraumeni syndrome (TP53)
  - Lynch syndrome (MLH1, EPCAM/MSH2, MSH6, PMS2)
- Genetic/Familial High-Risk Assessment: Colorectal, use for:
  - Lynch syndrome (MLH1, EPCAM/MSH2, MSH6, PMS2)
  - Familial adenomatous polyposis (APC)

Occult Primary Cancer Surveillance

NCCN Occult Primary Cancer Version 2.2024

Occult primary cancer surveillance imaging for long-term surveillance includes diagnostic tests based on symptomatology

Soft Tissue Sarcoma Surveillance

NCCN Soft Tissue Sarcoma Version 1.2024

Soft tissue sarcoma surveillance includes **ANY** of the following: ***NOTE**: *Contrasted imaging is preferred; for long term surveillance to minimize radiation exposure, X-rays or MRI may be substituted.*

1. Desmoid tumor (aggressive fibromatosis) imaging surveillance includes **ANY** of the following:
    a. CT or MRI every 3 to 6 months for 2 to 3 years, then every 6 to 12 months thereafter
    b. Ultrasound may be considered for select locations (eg, abdominal wall) for long-term follow-up
2. Retroperitoneal/intra-abdominal, after resection imaging surveillance includes CT or MRI (consider PET/CT) every 3 to 6 months for 2 to 3 years, then every 6 months for the next 2 years, then annually.
3. Stage IA/IB tumor surveillance includes **ALL** of the following:
    a. Chest imaging with CT (+contrast) or MRI (± contrast) as clinically indicated
    b. Magnetic resonance imaging (MRI) at baseline and periodically (frequency based on estimated recurrence)
4. Stage II/III resectable with acceptable functional outcomes surveillance includes **ANY** of the following:
    a. Chest imaging with CT (+contrast) or MRI (± contrast) at end of treatment and periodic imaging of primary site (based on estimated risk of locoregional recurrence)
    b. Chest imaging and imaging of primary site with CT (+contrast) or MRI (± contrast) as clinically indicated
5. Stage II, III or select stage IV (any T, N1, M0), resectable with adverse functional outcomes **OR** unresectable primary disease surveillance imaging includes **ANY** of the following:
    a. Baseline and periodic imaging of primary site as clinically indicated
    b. Chest imaging with CT (+contrast) or MRI (± contrast) as clinically indicated
6. Stage IV synchronous disease imaging surveillance includes **ANY** of the following:
    a. Chest and other known metastatic sites imaging with CT (+contrast) or MRI (± contrast) as clinically indicated

b. MRI (± contrast) (preferred) and/or CT (+ contrast) at baseline and periodically (frequency based on estimated recurrence)

MRI Brain Procedure Codes

Table 1. MRI Brain Associated Procedure Codes

CODE	DESCRIPTION
70551	Magnetic resonance (eg, proton) imaging, brain (including brain stem); without contrast material
70552	Magnetic resonance (eg, proton) imaging, brain (including brain stem); with contrast material(s)
70553	Magnetic resonance (eg, proton) imaging, brain (including brain stem); without contrast material, followed by contrast material(s) and further sequences
70554	Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration
70555	Magnetic resonance imaging, brain, functional MRI; requiring physician or psychologist administration of entire neurofunctional testing
0866T	Quantitative magnetic resonance image (MRI) analysis of the brain with comparison to prior magnetic resonance (MR) study(ies), including lesion detection, characterization, and quantification, with brain volume(s) quantification and/or severity score, when performed, data preparation and transmission, interpretation and report, obtained with diagnostic MRI examination of the brain

MRI Brain Summary of Changes

MRI Brain guideline had the following version changes from 2023 to 2024:

- Added the following to keep in line with current evidence:
  - "Cavernous malformations" under "Stroke"
  - "Cerebrovascular disease" under "Vertigo"
  - Indications under "Arachnoid cyst"
  - Indications under "Sickle cell disease"
  - "Migraine aura is atypical" under "Headache"
  - "Precocious puberty in a child" under "Mass, neoplasm, tumor or cyst is suspected"
  - "Prior MRI brain imaging"
  - "Sensorineural hearing loss"
  - Under " Mass, neoplasm, tumor, cyst or lesion is known"
    - "Rathke cleft cyst"
    - "Soft tissue mass of the head"
  - Under "Multiple Sclerosis"

        - Indications under "Neurological symptoms"
        - "MRI disease activity" indication
        - "Signs/symptoms are new"
    - "Vocal cord lesions"
    - "X-linked Adrenoleukodystrophy" indication under "Congenital abnormalities"
- Removed the following criteria/indications per the current evidence:
    - "Anosmia (smell loss)"
    - "Arteriovenous malformation" as CTA/MRA is test of choice
    - "Neurological exam" under "Symptoms"
- Mid-cycle update: added Pediatric Preamble and pediatric indications
- Mid-cycle update: code driven
    - Added the following to keep in line with current evidence:
        - Indications under "Cerebrospinal fluid"
        - Indications under "Congential anomaly"
        - Indications under "Infectious or inflammatory disease)
        - Indications under "Mental status change"
        - Indications under "Vertigo"
        - Parameters under "Recurrence or metastasis"
        - Specific neurological symptoms to "Brain tumor/CNS lesion"
    - Changed from "cancer history" to "Brain cancer history"
    - Combination MRI Brain with IAC changes:
        - added "Hearing loss" indication
        - Indications under "Vertigo"
    - Moved "Headache" from under symptoms
    - Reordered MS indications and added sign/symptoms and "Dissemination in space"
    - Removed the following as evidence does not support the indication:
        - Combined "CNS lesion" with "Brain tumor"
        - "Facial twitching" from "Bell's Palsy"

- "or recurrent" from "Atypical signs/symptoms" under "Bell's Palsy"
- Indications under "Trauma"
- "Medically refractory" from under "Seizure disorder" as it is redundant with activity or pattern change
- "Neurological deficits" from under "Symptom evaluation" as it was redundant
- "Symptomatic with syncope and neurological deficits" as it is redundant

MRI Brain Definitions

Abscess is a swollen area within body tissue, containing an accumulation of pus.
Achondroplasia is a bone growth disorder that results in dwarfism due to a genetic mutation in the arms and legs. Achondroplasia is the most common form of short stature (adults less than 4-ft. 10-in. in height).
Acoustic neuromas (vestibular schwannomas) are noncancerous, usually slow growing tumors that form along the branches of the eighth cranial nerve (also called the vestibulocochlear nerve). This nerve leads from the brain to the inner ear and branches into divisions that play important roles in both hearing and balance.
Acromegaly is a disorder caused by excessive production of growth hormone by the pituitary gland and marked especially by progressive enlargement of hands, feet, and face.
Adenoma describes a benign tumor or a glandular structure or of glandular origin.
Alzheimer's disease is a degenerative brain disease of unknown cause that is the most common form of dementia, it usually starts in late middle age or in old age and results in progressive memory loss, impaired thinking, disorientation and changes in personality and mood.
Amnesia is a general term that describes memory loss. The loss can be temporary or permanent, but 'amnesia' usually refers to the temporary variety.
Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease, is a fatal neurodegenerative disease that affects the nerve cells in the brain and spinal cord that control voluntary muscle movement and breathing.
Aneurysm refers to weakness in an artery wall, allowing it to abnormally balloon out or widen.
Anhidrosis is a condition where the sweat glands make little or no sweat.
Anosmia is the loss or impairment of the sense of smell.
Anterior fontanelle is the largest of the six fontanelles, and it resembles a diamond-shape ranging in size from 0.6 cm to 3.6 cm with a mean of 2.1 cm. [2] It forms through the juxtaposition of the frontal bones and parietal bones with the superior sagittal sinus coursing beneath it.

Anti-John Cunningham (anti-JC) virus antibodies are a predictive factor for progressive multifocal leukoencephalopathy (PML) in multiple sclerosis (MS) patients treated with natalizumab. A positive result for anti-JCV antibodies indicates an increased risk of developing PML.
Apoplexy is unconsciousness or incapacity resulting from a cerebral hemorrhage or stroke.
Arachnoid cysts are sacs filled with spinal fluid that are located between the brain or spinal cord and the arachnoid membrane, one of the three membranes that cover the brain and spinal cord.
Arteriovenous fistula (AVF) is an abnormal connection between an artery and a vein. It happens when one or more arteries are directly connected to one or more veins or venous spaces called sinuses.
Arteriovenous malformation (AVM) is a tangle of abnormal blood vessels connecting arteries and veins.
Astrocytomas are tumors that originate from the star-shaped cells (astrocytes) that support the brain. They are the most common brain tumors in adults.
Ataxia is a degenerative disease of the nervous system that causes people to have difficulty coordinating their muscles. This can lead to clumsy, unwieldy or awkward movements. People with ataxia may also lose muscle control in their arms and legs, which can lead to a lack of balance.
Atrophy is a decrease in size or wasting away of a body part or tissue.
Audiogram/Audiometric testing is a graphic representation of the relation of vibration frequency and the minimum sound intensity for hearing.
Aura is a subjective sensation (as of voices or colored lights or crawling and numbness) experienced at the onset of a neurological condition and especially a migraine or epileptic seizure.
Arteriovenous malformation (AVM) is a tangle of abnormal blood vessels connecting arteries and veins.
Bell's palsy is paralysis of the facial nerve producing distortion on one side of the face.
Beta-2 transferrin is a test to detect spinal fluid in body fluids, such as ear or nasal fluid.
Brief Resolved Unexplained Event (BRUE) is an event in an infant that is characterised by a marked change in breathing, tone, colour or level of responsiveness, followed by a complete return to a baseline state, and that cannot be explained by a medical cause. A BRUE is a diagnosis of exclusion.
Bulbar palsy involves problems with function of the glossopharyngeal nerve (CN IX), the vagus nerve (CN X), the accessory nerve (CN XI), and the hypoglossal nerve (CN XII). These all emerge from pathways in the medulla oblongata. A lower motor neuron lesion can impair their function. It includes symptoms such as lip trembling, drooling, dysphonia, weak jaw and facial muscles, pharyngeal muscle weakness.
Central diabetes insipidus (CDI) is a rare condition in which your body doesn't have enough antidiuretic hormone (ADH, or vasopressin), which causes you to pee large volumes of urine and become very thirsty.
Central sleep apnea (CSA) is a breathing disorder that causes your body to decrease or stop the effort of breathing during sleep. It is usually caused by an issue in the brain or heart.

Certain medications (like pain medications) can cause this breathing pattern too. It is different from obstructive sleep apnea (OSA) because the problem is not caused by a blockage of the airway. Types of central sleep apnea include Cheyne-Stokes breathing, drug-induced apnea, high-altitude periodic breathing, idiopathic central sleep apnea, medical condition-induced central sleep apnea and treatment-emergent central sleep apnea. Symptoms of central sleep apnea include difficulty falling asleep, excessive daytime sleepiness (EDS), frequent nighttime awakening, pause in breathing, snoring, and waking up short of breath.

Cerebral Palsy (CP) is a term for a group of neurological disorders that affect a person's ability to move, maintain balance, and posture. CP is the most common motor disability in childhood.

Cerebritis is an acute inflammatory response in the brain that affects the permeability of blood vessels. It's the earliest stage of a brain infection, and can progress to an abscess.

Cerebrospinal fluid (CSF) is a colorless liquid that is comparable to serum, is secreted from the blood into the lateral ventricles of the brain, and serves chiefly to maintain uniform pressure within the brain and spinal cord.

Cerebrospinal fluid (CSF) leak is a leak of cerebrospinal fluid that results from a hole or tear in the dura (the outermost layer of the meninges).

Chiari malformation (Arnold-Chiari syndrome) is a congenital abnormality in which the lower surface of the cerebellum and the lower brain stem protrude into the spinal canal through the foramen magnum.

Cholesteatoma is an epidermoid cyst usually in the brain arising from aberrant embryonic rests and appearing as a compact shiny flaky mass.

Cluster headache is a type of headache that is characterized by severe pain in the eye or temple and tends to recur in a series of attacks.

Coagulopathy is a condition in which the blood's ability to coagulate (form clots) is impaired.

Computed tomography (CT) refers to a computerized X-ray imaging procedure in which a three-dimensional image of a body structure is revealed through a series of cross-sectional images or "slices."

Cranial nerve palsy is a condition that causes a decreased or complete loss of function in one or more cranial nerves.

Craniosynostosis is the premature fusion of the sutures of the skull.

Cushing disease occurs when your body makes too much cortisol, a hormone related to the body's stress response. It's a rare pituitary disorder that is progressive.

Cyclical vomiting syndrome (CVS) is a rare disorder that usually starts in childhood. It causes repeated episodes of being sick (vomiting) and feeling sick (nausea). The cause of CVS is not fully understood. The vomiting episodes are not caused by an infection or another illness.

Cyst is a closed sac having a distinct membrane and developing abnormally in a cavity or structure of the body.

Dementia is a usually progressive condition marked by the development of multiple cognitive deficits, such as memory impairment, aphasia and the inability to plan and initiate complex behavior.
Dermoid cysts are slow-growing, cystic masses that are lined by skin and filled with oil and old skin cells.
Diplopia is a disorder of vision in which two images of a single object are seen (as from unequal action of the eye muscles).
Dissection is the abnormal and usually abrupt formation of a tear or separation of the layers inside the wall of an artery.
Dissemination in space can be established with at least one T2 lesion in at least two of four locations characteristic for MS (juxtacortical, periventricular, infratentorial and spinal cord).
Dissemination in time (DIT) means that there is Multiple Sclerosis-like neurological damage that is occurring at multiple points in time.
Dural venous sinuses are a group of sinuses or blood channels that drains venous blood circulating from the cranial cavity. It collectively returns deoxygenated blood from the head to the heart to maintain systemic circulation.
Dysarthria describes difficulty in articulating words due to disease of the central nervous system.
Dysphagia is difficulty with swallowing or the sensation of food getting stuck in the esophagus.
Dysphonia is difficulty in speaking due to a physical disorder of the mouth, tongue, throat, or vocal cords
Dysosmia is a change in the sense of smell.
Dystonia is a movement disorder that causes the muscles to contract involuntarily. This can cause repetitive or twisting movements. The condition can affect one part of your body (focal dystonia), two or more adjacent parts (segmental dystonia), or all parts of your body (general dystonia).
Electronystagmography is a test that looks at eye movements to see how well nerves in the brain are working. These nerves are: Vestibular nerve (eighth cranial nerve), which runs from the brain to the ears and oculomotor nerve, which controls eye movement.
Embolism is an obstruction of an artery, typically by a clot of blood or an air bubble.
Encephalitis is inflammation of the brain.
Endocarditis is inflammation of the inside lining of the heart chambers and heart valves (endocardium). It is caused by a bacterial or rarely, a fungal infection.
Epilepsy is a brain disorder that causes repeated seizures. A seizure is a sudden change in behavior caused by a temporary change in the brain's electrical activity.
Erdheim-Chester Disease (ECD) is a rare blood disorder that causes the body to produce too many white blood cells. These cells, called histiocytes, are large phagocytic cells that normally respond to injury and infection. ECD is characterized by the accumulation of histiocytes in multiple tissues and organs.

Essential tremor (also known as benign essential tremor and familial tremor) is a common movement disorder that involves a tremor (unwanted and uncontrolled shaking) in both hands and arms during action and when standing still.

Fistula-in-ano, also known as an anal fistula, is a tunnel that connects the anal canal to the skin around the anus. It's an abnormal passageway that usually develops in the upper part of the anus.

Glioma is a type of tumor that occurs in the brain and spinal cord.

Global developmental delay (GDD) is term used for children under 5 years of age. It is defined as a significant delay in two or more domains of development, including activities of daily living as well as motor, cognitive, speech/language, and personal/social skills.

Glomus tumor is a type of neuroendocrine tumor that forms near certain blood vessels and nerves outside of the adrenal glands.

Head impulse nystagmus test of skew (HINTS) exam is a cluster of three bedside clinical tests that aim to assess individuals presenting with acute-onset dizziness, vertigo, nystagmus, head motion intolerance, and nausea/vomiting, also known as acute vestibular syndrome (AVS).

Head Thrust Test is used to identify individuals with hypofunction of the vestibulo-ocular reflex unilaterally and bilaterally.

Hematoma is a mass of usually clotted blood that forms in a tissue, organ or body space as a result of a broken blood vessel.

Hemicrania continua is a chronic and persistent form of headache marked by continuous pain that varies in severity and always occurs on the same side of the face and head.

Hemifacial describes symptoms involving or affecting one lateral half of the face.

Hemoglobin SS (HbSS) sickle cell disease also known as sickle cell anemia, is a genetic disorder that occurs when a person inherits two genes for hemoglobin S (HbS) from their parents. HbS is an abnormal form of hemoglobin that causes red blood cells to become rigid and sickle-shaped. This can lead to chronic anemia, as sickle cells only live for about 10 to 20 days, compared to up to 120 days for normal red blood cells. The sickle cells can also get stuck in the spleen's blood filter and die, damaging the spleen in the process.

Hemorrhage is a copious or heavy discharge of blood from the blood vessels.

Horner's syndrome is a syndrome marked by sinking in of the eyeball, constriction of the pupil (miosis), drooping of the upper eyelid (ptosis), face vasodilation and anhidrosis (abnormal deficiency or absence of sweating) caused by paralysis of the cervical sympathetic nerve fibers on the affected side.

Huntington's disease is a hereditary brain disorder that is a progressive, neurodegenerative condition marked especially by impairments in thinking and reasoning, disturbances of emotion and behavior and the involuntary spasmodic movements of chorea that is associated with the loss or atrophy of nerve cells in the basal ganglia especially of the caudate nucleus and putamen.

Hydrocephalus is an abnormal increase in the amount of cerebrospinal fluid within the cranial cavity (as from obstructed flow, excess production, or defective absorption) that is

accompanied by expansion of the cerebral ventricles and often increased intracranial pressure, skull enlargement, and cognitive decline.

Immunosuppression refers to stopping the bodily response to an antigen that occurs when lymphocytes identify the antigenic molecule as foreign, then induce the formation of antibodies and lymphocytes capable of reacting, rendering it harmless.

Ischemic stroke occurs when the blood supply to part of the brain is interrupted or reduced, preventing brain tissue from getting oxygen and nutrients. Brain cells begin to die in minutes.

Langerhans cell histiocytosis (LCH) is a rare, cancer-like condition that occurs when the body produces too many immature Langerhans cells.

Leptomeningeal carcinomatosis is cancer involving the pia mater and arachnoid mater. It occurs when cancer cells spread to the leptomeninges, which are the thin tissue layers that cover the brain and spinal cord.

Leukoria occurs when light reflected in the pupil appears white, gray, yellow, or silvery instead of red. This is different from the normal red reflex that occurs when light bounces off the retina at the back of the eye.

Lewy body dementia (LBD) is a disease associated with abnormal deposits of a protein called alpha-synuclein in the brain. These deposits, called Lewy bodies, affect chemicals in the brain whose changes, in turn, can lead to problems with thinking, movement, behavior, and mood.

Liver function tests (LFT) are blood tests that measure different enzymes, proteins and other substances (eg, alanine transaminase [ALT], aspartate transaminase [AST], serum bilirubin) made by the liver.

Macroadenoma is an adenoma of the pituitary gland that is greater than ten millimeters in diameter.

Macrocephaly is the condition in which the head circumference of an infant is above 2 standard deviations, which is above the 97th percentile.

Magnetic resonance angiogram (MRA) is a test that uses a magnetic field and pulses of radio wave energy to provide images of blood vessels inside the body, allowing for evaluation of blood flow and blood vessel wall condition. MRA is used to look for aneurysms, clots, tears in the aorta, arteriovenous malformations and stenosis caused by plaque in the carotid arteries (neck) or blood vessels leading to the lungs, kidneys or legs.

Magnetic resonance imaging (MRI) is a non-invasive diagnostic technique that produces computerized images of internal body tissues and is based on nuclear magnetic resonance of atoms within the body induced by the application of radio waves.

Meningioma is a slow-growing, encapsulated, typically benign tumor arising from the meninges and often causes damage by pressing upon the brain and adjacent parts.

Meningitis is an inflammation (swelling) of the protective membranes covering the brain and spinal cord. A bacterial or viral infection of the fluid surrounding the brain and spinal cord usually causes the swelling.

Metastases is the spread of a disease-producing agency (such as cancer cells) from the initial or primary site of disease to another part of the body.
Microadenoma is a very small, noncancerous tumor (less than 10 mm) that typically develops in the pituitary gland.
Microcephaly is a condition of abnormal smallness of the circumference of the head that is present at birth or develops within the first few years of life and is often associated with developmental delays, impaired cognitive development, poor coordination and balance, deficits in hearing and vision, and seizures.
A **Migraine (typical)** is a headache that can cause severe throbbing pain or a pulsing sensation, usually on one side of the head. It's often accompanied by nausea, vomiting, and extreme sensitivity to light and sound.
Mini-Mental State Examination is a set of 11 questions that doctors and other healthcare professionals commonly use to check for cognitive impairment (problems with thinking, communication, understanding and memory).
Miosis is the excessive constriction of the pupil of the eye.
Montreal Cognitive Assessment (MoCA) is a brief test of cognitive function, taking 10 minutes to administer. It assesses short-term memory, visuospatial function, executive function, attention, concentration and working memory, language, and orientation.
Multiple sclerosis (MS) is a demyelinating disease marked by patches of hardened tissue in the brain or the spinal cord and associated especially with partial or complete paralysis and jerking muscle tremor.
Natalizumab is a prescription medicine used to treat relapsing forms of multiple sclerosis (MS).
Neuralgia is acute paroxysmal pain radiating along the course of one or more nerves usually without demonstrable changes in the nerve structure
Neurocutaneous disorders are disorders that affect the brain, spinal cord, organs, skin, and bones. The diseases are lifelong conditions that can cause tumors to grow in these areas.
Neurofibromatosis is a rare genetic disorder that causes benign tumors to grow on nerves and other parts of the body. There are three types of neurofibromatosis: neurofibromatosis 1 (NF1), neurofibromatosis 2 (NF2) and schwannomatosis.
Neuromyelitis optica spectrum disorder (NMOSD) is an inflammatory disorder of the central nervous system characterized by severe, immune-mediated demyelination and axonal damage predominantly targeting optic nerves and the spinal cord.
Neuropathy is damage, disease or dysfunction of one or more nerves, especially of the peripheral nervous system, that is typically marked by burning or shooting pain, numbness, tingling, muscle weakness or atrophy It is often degenerative and is usually caused by injury, infection, disease, drugs, toxins or vitamin deficiency.
Nystagmus is a visual condition in which the eyes make repetitive, uncontrolled movements. These movements often result in reduced vision and depth perception and can affect balance and coordination; and can occur from side to side, up and down, or in a circular pattern.

Optic chiasm is the part of the brain where the optic nerves from each eye meet. It's located at the base of the brain, below the hypothalamus, and above the pituitary gland. The optic chiasm is X-shaped.
Optic neuritis is inflammation of the optic nerve.
Orthostatic headache is a headache while upright, that is relieved by lying down.
Otorrhea is drainage of liquid from the ear.
Papilledema is a disease that causes swelling of the optic discs in both eyes. This swelling is caused by increased intracranial pressure (ICP).
Parkinson's disease is a chronic progressive neurological disease chiefly of later life that is linked to decreased dopamine production in the substantia nigra and is marked especially by tremor of resting muscles, rigidity, slowness of movement, impaired balance and a shuffling gait.
Paroxysmal hemicrania is a rare form of headache that brings on severe throbbing and claw-like pain usually on one side of the face near the eye and occasionally around the back of the neck. The pain may be accompanied by red and tearing eyes.
Pediatric approximate ages are defined by the US Department of Health (USDH), the Food and Drug Administration (FDA), and the American Academy of Pediatrics (AAP) as the following:

- Infancy, between birth and 2 years of age
- Childhood, from 2 to 12 years of age
- Adolescence, from 12 to 21 years of age, further defined by the AAP into:
    1. Early (ages 11–14 years)
    2. Middle (ages 15–17 years),
    3. Late (ages 18–21 years)
    4. Older ages may be appropriate for children with special healthcare needs.

Polyangiitis is the inflammation of multiple types of vessels, such as small arteries and veins.
Polysomnogram (PSG) is a sleep study that records physiological variables while you sleep. The test is used to diagnose sleep disorders.
Pontine angle tumor, also known as a cerebellopontine angle (CPA) tumor, is a tumor that develops in the cerebellopontine angle. The cerebellopontine angle is the area between the lower brain and the brain stem, and the part of the brain that connects to the spinal cord.
Post-concussive syndrome (PCS) occurs when symptoms of a mild traumatic brain injury last longer than expected after an injury. These symptoms may include headaches, dizziness, and problems with concentration and memory. They can last weeks to months.
Progressive multifocal leukoencephalopathy (PML) is a disease of the white matter of the brain, caused by a virus infection (polyomavirus JC) that targets cells that make myelin—the material that insulates nerve cells (neurons).

Prolactin (also known as lactotropin and PRL) is a hormone that's responsible for lactation, certain breast tissue development and contributes to hundreds of other bodily processes. Prolactin levels are normally low in people assigned male at birth (AMAB) and non-lactating and non-pregnant people.

Pseudobulbar affect (PBA) is a condition that's characterized by episodes of sudden uncontrollable and inappropriate laughing or crying. Pseudobulbar affect typically occurs in people with certain neurological conditions or injuries, which might affect the way the brain controls emotion.

Ptosis is the drooping of the upper eyelid.

Puerperium is the period of about six weeks after childbirth during which the mother's reproductive organs return to their original nonpregnant condition.

Pulsatile tinnitus is a rhythmic pulsing noise in one or both ears that occurs in the absence of external sound and tends to be synced with the heartbeat.

Refractory is resistance to treatment or cure.

Rosai-Dorfman disease is an uncommon histiocytic disorder most frequently presenting as bilateral cervical lymphadenopathy in children and young adults.

Recurrence is a new occurrence of something that happened or appeared before.

Rhinorrhea is excessive mucous drainage from the nose.

Rhinosinusitis is inflammation of the mucous membranes of the nose and one or more paranasal sinuses that includes the following symptoms: mucopurulent discharge, nasal obstruction, congestion, facial pain, pressure, fullness and/or decreased sense of smell.

Sarcoidosis is a chronic disease of unknown cause, that is characterized by the formation of nodules, especially in the lymph nodes, lungs, bones and skin.

Screening does not diagnose the illness. The goal is early detection and lifestyle changes or surveillance, to reduce the risk of disease, or to detect it early enough to treat it most effectively.

Schwannomas are noncancerous, usually slow growing tumors that form along the branches of the eighth cranial nerve (also called the vestibulocochlear nerve). This nerve leads from the brain to the inner ear and branches into divisions that play important roles in both hearing and balance.

Seizure is a sudden, uncontrolled electrical disturbance in the brain. It can cause changes in behavior, movements or feelings, and in levels of consciousness.

Sentinel headache is headache characterized by sudden, severe head pain, often described as "the worst headache of my life." It is sometimes called a "thunderclap" headache. The pain usually peaks within five minutes, persists for at least one hour and may be accompanied by nausea or vomiting.

Short-lasting unilateral neuralgiform headache is a rare primary headache disorder that comes with infrequent attacks that last seconds. The pain can be severe stabbing on one side of the face.

Shunt is a hollow tube surgically placed in the brain (or occasionally in the spine) to help drain cerebrospinal fluid and redirect it to another location in the body where it can be reabsorbed.

Sickle cell disease is a chronic anemia that occurs in individuals who are homozygous for the gene controlling hemoglobin S (eg, African or Mediterranean descent). It is characterized by destruction of red blood cells and by episodic blocking of blood vessels by the adherence of sickle cells to the vascular endothelium. This causes the serious complications of the disease (such as organ failure).

Skew deviation can be clinically assessed at the bedside using the cross-cover or alternating-cover test (aka as test of skew).

Spontaneous intracranial hypotension (SIH) is a condition in which the fluid pressure inside the skull is lower than normal.

Staging in cancer is the process of determining how much cancer is within the body (tumor size) and if it has metastasized (spread).

Strabismus is a disorder in which both eyes do not line up in the same direction, therefore, they do not look at the same object at the same time and is caused by an imbalance of the muscles of the eyeball.

Stroke, sometimes called a brain attack, occurs when something blocks blood supply to part of the brain or when a blood vessel in the brain bursts. In either case, parts of the brain become damaged or die. A stroke can cause lasting brain damage, long-term disability, or even death.

Sturge-Weber syndrome is a rare congenital condition that is characterized by a port-wine stain affecting the facial skin on one side in the area innervated by the first branch of the trigeminal nerve and by malformed blood vessels in the brain that may cause progressive intellectual disability, epilepsy and glaucoma in the eye on the affected side.

Subarachnoid hemorrhage (SAH) is bleeding in the space that surrounds the brain.

Surveillance in cancer is the ongoing, timely and systematic collection and analysis of information on new cancer cases, extent of disease, screening tests, treatment, survival and cancer deaths.

Syncope is loss of consciousness resulting from insufficient blood flow to the brain.

Syringomyelia is a chronic progressive disease of the spinal cord associated with sensory disturbances, muscle atrophy and spasticity.

Syrinx is a cerebrospinal fluid-filled cyst which collects inside of the spinal cord or brain stem. A syrinx in the spinal cord is called syringomyelia, and a syrinx in the brain stem is called syringobulbia.

Thrombosis is the formation of a blood clot (partial or complete blockage) within blood vessels, whether venous or arterial, limiting the natural flow of blood and resulting in clinical sequela.

Thunderclap headache is an uncommon type of headache that strikes suddenly, the pain peaks within 60 seconds and can warn of potentially life-threatening conditions (usually having to do with bleeding in and around the brain).

Tinnitus is a sensation of noise (such as a ringing or roaring) that is typically caused by a bodily condition (such as a disturbance of the auditory nerve or wax in the ear) and usually is of the subjective form which can only be heard by the one affected.

Tourette syndrome is a disorder that involves repetitive movements or unwanted sounds (tics) that cannot be easily controlled.
Transient ischemic attack (TIA) is a brief interruption of the blood supply to the brain that causes a temporary impairment of vision, speech or movement. The episode usually lasts for just a few moments but may be a warning sign of a full scale stroke.
Transverse myelitis is a neurological disorder that causes inflammation on both sides of a section of the spinal cord. It can damage the myelin, the insulating material that covers nerve cell fibers. This prevents the spinal cord nerves from sending messages throughout the body.
Trigeminal autonomic cephalalgia (TAC) is a type of primary headache characterized by intense pain on one side of the head in the area where the trigeminal nerve is located, that may cause autonomic symptoms (watering eye, red eye, drooping eyelid, and leaking nose) on the same side of the head where the pain occurs.
Trigeminal neuralgia is an intense paroxysmal neuralgia (pain radiating along the course of one or more nerves usually without demonstrable changes in the nerve structure) involving one or more branches of the trigeminal nerve.
Tuberous sclerosis is a genetic disorder of the skin and nervous system that is characterized by the formation of small benign tumors in various organs (such as the brain, kidney, eye and heart), is accompanied by variable symptoms including seizures, developmental delay or intellectual disability, skin lesions (as hypopigmented macules of the trunk and limbs or telangiectatic facial papules), and is inherited as an autosomal dominant trait or results from spontaneous mutation.
Valsalva maneuver is the action of attempting to exhale with the nostrils and mouth or the glottis, closed. This increases pressure in the middle ear and the chest, as when bracing to lift heavy objects and is used as a means of equalizing pressure in the ears.
Vasculitis involves inflammation of the blood vessels. The inflammation can cause the walls of the blood vessels to thicken, which reduces the width of the passageway through the vessel. If blood flow is restricted, it can result in organ and tissue damage.
Vertigo is a sensation of motion or spinning that is often described as dizziness. People with vertigo feel as though they are actually spinning or moving, or that the world is spinning around them.
Videonystagmography is a test that measures a type of involuntary eye movement called nystagmus using special goggles with cameras.
Von Hippel-Lindau disease is a rare genetic disease that is characterized by hemangiomas of the retina and cerebellum, cysts or tumors of the central nervous system, pancreas, kidneys, adrenals and reproductive organs that is typically inherited as an autosomal dominant trait.
Wegener's Granulomatosis is an uncommon disease of unknown cause characterized by inflammation of small blood vessels and granuloma formation, especially in the upper and lower respiratory tracts and kidneys, that typically has an onset during the ages of 40 to 65 years old.
X-linked adrenoleukodystrophy (X-ALD) is a genetic disease that affects the nervous system and the adrenal glands (small glands located on top of each kidney). People with this disease

often have progressive loss of the fatty covering (myelin) that surrounds the nerves in the brain and spinal cord.

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Disclaimer section

Purpose

The purpose of the HealthHelp's clinical guidelines is to assist healthcare professionals in selecting the medical service that may be appropriate and supported by evidence to safely improve outcomes. Medical information is constantly evolving, and HealthHelp reserves the right to review and update these clinical guidelines periodically. HealthHelp reserves the right to include in these guidelines the clinical indications as appropriate for the organization's program objectives. Therefore the guidelines are not a list of all the clinical indications for a stated procedure, and associated Procedure Code Tables may not represent all codes available for that state procedure or that are managed by a specific client-organization.

Clinician Review

These clinical guidelines neither preempt clinical judgment of trained professionals nor advise anyone on how to practice medicine. Healthcare professionals using these clinical guidelines are responsible for all clinical decisions based on their assessment. All Clinical Reviewers are instructed to apply clinical indications based on individual patient assessment and documentation, within the scope of their clinical license.

Payment

The use of these clinical guidelines does not provide authorization, certification, explanation of benefits, or guarantee of payment; nor do the guidelines substitute for, or constitute, medical advice. Federal and State law, as well as member benefit contract language (including definitions and specific contract provisions/exclusions) take precedence over clinical guidelines and must be considered first when determining eligibility for coverage. All final determinations on coverage and payment are the responsibility of the health plan. Nothing contained within this document can be interpreted to mean otherwise.

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National and Local Coverage Determination (NCD and LCD)

NOTICE
To ensure appropriate review occurs to the most current NCD and/or LCD, always defer to https://www.cms.gov/medicare-coverage-database/search.aspx.

Background

National Coverage Determinations (NCD) and Local Coverage Determinations (LCD) are payment policy documents outlined by the Centers for Medicare and Medicaid Services (CMS) and the government's delegated Medicare Audit Contractors (MACs) that operate regionally in jurisdictions.
CMS introduced variation between different jurisdictions/Medicare Audit Contractors (MACs) and their associated covered code lists with the transition to ICD 10. The variation resulted in jurisdictions independently defining how codes are applied for exclusions, limitations, groupings, ranges, etc. for the medical necessity indications outlined in the NCD and LCD. Due to this variation, there is an inconsistent use/application of codes and coverage determinations across the United States between the different MACs.
In addition, **WITHOUT** notice, CMS can change the codes that indicate medical necessity and the format of the coverage determinations/associated documents (eg, Articles). This is an additional challenge for organizations to keep up with ongoing, unplanned changes in covered codes and medical necessity indications.

Medical Necessity Codes

Due to the variation in code application between jurisdictions/MACs and that updates can happen without notification, HealthHelp is not able to guarantee full accuracy of the codes listed for any Coverage Determination, and advises that prior to use, the associated Coverage Determination Articles are reviewed to ensure applicability to HealthHelp's programs and any associated NCDs and LCDs.

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