



MASSACHUSETTS

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Medical Policy

Magnetoencephalography/ Magnetic Source Imaging

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Policy Number: 137

BCBSA Reference Number: 6.01.21

NCD/LCD: N/A

Related Policies

None

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO BlueSM and Medicare PPO BlueSM Members

Magnetoencephalography/magnetic source imaging may be **MEDICALLY NECESSARY** in the following conditions:

- Determining the laterality of language function, as a substitute for the Wada test, in patients being prepared for surgery for epilepsy, brain tumors, and other indications requiring brain resection, or
- As part of the preoperative evaluation of patients with intractable epilepsy (defined as seizures refractory to at least two first-line anticonvulsants) when standard techniques, such as MRI and EEG, do not provide satisfactory localization of epileptic lesion(s).

Magnetoencephalography/magnetic source imaging is **INVESTIGATIONAL** for all other conditions.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	Prior authorization is not required .
Commercial PPO and Indemnity	Prior authorization is not required .
Medicare HMO BlueSM	Prior authorization is not required .
Medicare PPO BlueSM	Prior authorization is not required .

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

The following codes are included below for informational purposes only; this is not an all-inclusive list.

The above medical necessity criteria MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT Codes

CPT codes:	Code Description
95965	Magnetoencephalography (MEG), recording and analysis; for spontaneous brain magnetic activity (e.g., epileptic cerebral cortex localization)
95966	Magnetoencephalography (MEG), recording and analysis; for evoked magnetic fields, single modality (e.g., sensory, motor, language, or visual cortex localization)
95967	Magnetoencephalography (MEG), recording and analysis; for evoked magnetic fields, each additional modality (e.g., sensory, motor, language, or visual cortex localization)

HCPCS Codes

HCPCS codes:	Code Description
S8035	Magnetic source imaging

The following ICD Diagnosis Codes are considered medically necessary when submitted with the CPT/HCPCS codes above if medical necessity criteria are met:

ICD-10 Diagnosis Codes

ICD-10-CM diagnosis code:	Code Description
C71.0	Malignant Neoplasm Of Cerebrum, Except Lobes And Ventricles
C71.1	Malignant Neoplasm Of Frontal Lobe
C71.2	Malignant Neoplasm Of Temporal Lobe
C71.3	Malignant Neoplasm Of Parietal Lobe
C71.4	Malignant Neoplasm Of Occipital Lobe
C71.5	Malignant Neoplasm Of Cerebral Ventricle
C71.6	Malignant Neoplasm Of Cerebellum
C71.7	Malignant Neoplasm Of Brain Stem
C71.8	Malignant Neoplasm Of Overlapping Sites Of Brain
C71.9	Malignant Neoplasm Of Brain, Unspecified
C79.31	Secondary Malignant Neoplasm Of Brain

D09.8	Carcinoma in situ of other specified sites
D33.0	Benign Neoplasm Of Brain, Supratentorial
D33.1	Benign Neoplasm Of Brain, Infratentorial
D33.2	Benign Neoplasm Of Brain, Unspecified
D43.0	Neoplasm Of Uncertain Behavior Of Brain, Supratentorial
D43.1	Neoplasm Of Uncertain Behavior Of Brain, Infratentorial
D43.2	Neoplasm Of Uncertain Behavior Of Brain, Unspecified
D49.6	Neoplasm Of Unspecified Behavior Of Brain
G40.001	Localization-Related (Focal) (Partial) Idiopathic Epilepsy And Epileptic Syndromes With Seizures Of Localized Onset, Not Intractable, With Status Epilepticus
G40.009	Localization-Related (Focal) (Partial) Idiopathic Epilepsy And Epileptic Syndromes With Seizures Of Localized Onset, Not Intractable, Without Status Epilepticus
G40.019	Localization-Related (Focal) (Partial) Idiopathic Epilepsy And Epileptic Syndromes With Seizures Of Localized Onset, Intractable, Without Status Epilepticus
G40.101	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Simple Partial Seizures, Not Intractable, With Status Epilepticus
G40.109	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Simple Partial Seizures, Not Intractable, Without Status Epilepticus
G40.111	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Simple Partial Seizures, Intractable, With Status Epilepticus
G40.119	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Simple Partial Seizures, Intractable, Without Status Epilepticus
G40.201	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Complex Partial Seizures, Not Intractable, With Status Epilepticus
G40.209	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Complex Partial Seizures, Not Intractable, Without Status Epilepticus
G40.211	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Complex Partial Seizures, Intractable, With Status Epilepticus
G40.219	Localization-Related (Focal) (Partial) Symptomatic Epilepsy And Epileptic Syndromes With Complex Partial Seizures, Intractable, Without Status Epilepticus
G40.301	Generalized Idiopathic Epilepsy And Epileptic Syndromes, Not Intractable, With Status Epilepticus
G40.309	Generalized Idiopathic Epilepsy And Epileptic Syndromes, Not Intractable, Without Status Epilepticus
G40.311	Generalized Idiopathic Epilepsy And Epileptic Syndromes, Intractable, With Status Epilepticus
G40.319	Generalized Idiopathic Epilepsy And Epileptic Syndromes, Intractable, Without Status Epilepticus
G40.401	Other Generalized Epilepsy And Epileptic Syndromes, Not Intractable, With Status Epilepticus
G40.409	Other Generalized Epilepsy And Epileptic Syndromes, Not Intractable, Without Status Epilepticus
G40.411	Other Generalized Epilepsy And Epileptic Syndromes, Intractable, With Status Epilepticus
G40.419	Other Generalized Epilepsy And Epileptic Syndromes, Intractable, Without Status Epilepticus
G40.42	Cyclin-Dependent Kinase-Like 5 Deficiency Disorder
G40.501	Epileptic Seizures Related To External Causes, Not Intractable, With Status Epilepticus
G40.509	Epileptic Seizures Related To External Causes, Not Intractable, Without Status Epilepticus
G40.801	Other Epilepsy, Not Intractable, With Status Epilepticus
G40.802	Other Epilepsy, Not Intractable, Without Status Epilepticus
G40.803	Other Epilepsy, Intractable, With Status Epilepticus
G40.804	Other Epilepsy, Intractable, Without Status Epilepticus

G40.811	Lennox-Gastaut Syndrome, Not Intractable, With Status Epilepticus
G40.812	Lennox-Gastaut Syndrome, Not Intractable, Without Status Epilepticus
G40.813	Lennox-Gastaut Syndrome, Intractable, With Status Epilepticus
G40.814	Lennox-Gastaut Syndrome, Intractable, Without Status Epilepticus
G40.821	Epileptic Spasms, Not Intractable, With Status Epilepticus
G40.822	Epileptic Spasms, Not Intractable, Without Status Epilepticus
G40.823	Epileptic Spasms, Intractable, With Status Epilepticus
G40.824	Epileptic Spasms, Intractable, Without Status Epilepticus
G40.833	Dravet syndrome, intractable, with status epilepticus
G40.834	Dravet syndrome, intractable, without status epilepticus
G40.89	Other Seizures
G40.901	Epilepsy, Unspecified, Not Intractable, With Status Epilepticus
G40.909	Epilepsy, Unspecified, Not Intractable, Without Status Epilepticus
G40.911	Epilepsy, Unspecified, Intractable, With Status Epilepticus
G40.919	Epilepsy, Unspecified, Intractable, Without Status Epilepticus
G40.A01	Absence Epileptic Syndrome, Not Intractable, With Status Epilepticus
G40.A09	Absence Epileptic Syndrome, Not Intractable, Without Status Epilepticus
G40.A11	Absence Epileptic Syndrome, Intractable, With Status Epilepticus
G40.A19	Absence Epileptic Syndrome, Intractable, Without Status Epilepticus
G40.B01	Juvenile Myoclonic Epilepsy, Not Intractable, With Status Epilepticus
G40.B09	Juvenile Myoclonic Epilepsy, Not Intractable, Without Status Epilepticus
G40.B11	Juvenile Myoclonic Epilepsy, Intractable, With Status Epilepticus
G40.B19	Juvenile Myoclonic Epilepsy, Intractable, Without Status Epilepticus
I60.00	Nontraumatic Subarachnoid Hemorrhage From Unspecified Carotid Siphon And Bifurcation
I60.01	Nontraumatic Subarachnoid Hemorrhage From Right Carotid Siphon And Bifurcation
I60.02	Nontraumatic Subarachnoid Hemorrhage From Left Carotid Siphon And Bifurcation
I60.10	Nontraumatic Subarachnoid Hemorrhage From Unspecified Middle Cerebral Artery
I60.11	Nontraumatic Subarachnoid Hemorrhage From Right Middle Cerebral Artery
I60.12	Nontraumatic Subarachnoid Hemorrhage From Left Middle Cerebral Artery
I60.30	Nontraumatic Subarachnoid Hemorrhage From Unspecified Posterior Communicating Artery
I60.31	Nontraumatic Subarachnoid Hemorrhage From Right Posterior Communicating Artery
I60.32	Nontraumatic Subarachnoid Hemorrhage From Left Posterior Communicating Artery
I60.4	Nontraumatic Subarachnoid Hemorrhage From Basilar Artery
I60.50	Nontraumatic Subarachnoid Hemorrhage From Unspecified Vertebral Artery
I60.51	Nontraumatic Subarachnoid Hemorrhage From Right Vertebral Artery
I60.52	Nontraumatic Subarachnoid Hemorrhage From Left Vertebral Artery
I60.6	Nontraumatic Subarachnoid Hemorrhage From Other Intracranial Arteries
I60.7	Nontraumatic Subarachnoid Hemorrhage From Unspecified Intracranial Artery
I60.8	Other Nontraumatic Subarachnoid Hemorrhage
I60.9	Nontraumatic Subarachnoid Hemorrhage, Unspecified
I61.0	Nontraumatic Intracerebral Hemorrhage In Hemisphere, Subcortical
I61.1	Nontraumatic Intracerebral Hemorrhage In Hemisphere, Cortical
I61.2	Nontraumatic Intracerebral Hemorrhage In Hemisphere, Unspecified
I61.3	Nontraumatic Intracerebral Hemorrhage In Brain Stem
I61.4	Nontraumatic Intracerebral Hemorrhage In Cerebellum
I61.5	Nontraumatic Intracerebral Hemorrhage, Intraventricular
I61.6	Nontraumatic Intracerebral Hemorrhage, Multiple Localized
I61.8	Other Nontraumatic Intracerebral Hemorrhage
I61.9	Nontraumatic Intracerebral Hemorrhage, Unspecified
I62.00	Nontraumatic Subdural Hemorrhage, Unspecified
I62.01	Nontraumatic Acute Subdural Hemorrhage

I62.02	Nontraumatic Subacute Subdural Hemorrhage
I62.03	Nontraumatic Chronic Subdural Hemorrhage
I62.1	Nontraumatic extradural hemorrhage
I62.9	Nontraumatic Intracranial Hemorrhage, Unspecified
I67.1	Cerebral Aneurysm, Nonruptured
Q28.2	Arteriovenous Malformation Of Cerebral Vessels
Q28.3	Other Malformations Of Cerebral Vessels

Description

Magnetoencephalography

MEG is a noninvasive functional imaging technique that records weak magnetic forces associated with brain electrical activity. Using mathematical modeling, recorded data are then analyzed to provide an estimated location of electrical activity. This information can be superimposed on an anatomic image of the brain, typically a magnetic resonance imaging (MRI) scan, to produce a functional/anatomic image of the brain, referred to as magnetic source imaging (MSI). The primary advantage of MSI is that, while conductivity and thus a measurement of electrical activity as recorded by electroencephalogram is altered by the surrounding brain structures, magnetic fields are not. Therefore, MSI permits a high-resolution image.

Detection of weak magnetic fields requires gradiometer detection coils coupled to a superconducting quantum interference device, which requires a specialized room shielded from other magnetic sources. Mathematical modeling programs based on idealized assumptions are then used to translate detected signals into functional images. In its early evolution, clinical applications were limited by the use of only one detection coil requiring lengthy imaging times, which, because of body movement, also were difficult to match with the MRI. However, more recently, the technique has evolved to multiple detection coils in an array that can provide data more efficiently over a wide extracranial region.

Applications

One clinical application is the localization of epileptic foci, particularly for the screening of surgical candidates and surgical planning. Alternative techniques include MRI, positron emission tomography, or single-photon emission computed tomography scanning. Anatomic imaging (ie, MRI) is effective when epilepsy is associated with a mass lesion, such as a tumor, vascular malformation, or hippocampal atrophy. If an anatomic abnormality is not detected, patients may undergo a positron emission tomography scan. In a small subset of patients, extended electrocorticography or stereotactic magnetoencephalography with implanted electrodes is considered the criterion standard for localizing epileptogenic foci. MEG/MSI have principally been investigated as a supplement to or an alternative to invasive monitoring.

Another clinical application is the localization of the pre- and postcentral gyri as a guide to surgical planning in patients scheduled to undergo neurosurgery for epilepsy, brain neoplasms, arteriovenous malformations, or other brain lesions. These gyri contain the "eloquent" sensorimotor areas of the brain, the preservation of which is considered critical during any type of brain surgery. In normal situations, these areas can be identified anatomically by MRI, but frequently, anatomy is distorted by underlying disease processes. In addition, the location of eloquent functions varies, even among healthy people. Therefore, localization of the eloquent cortex often requires such intraoperative invasive functional techniques as cortical stimulation with the patient under local anesthesia or somatosensory-evoked responses on extended electrocorticography. Although these techniques can be done at the same time as the planned resection, they are cumbersome and can add up to 45 minutes of anesthesia time. Furthermore, these techniques can sometimes be limited by the small surgical field. A preoperative test, which is often used to localize the eloquent hemisphere, is the Wada test. MEG/MSI has been proposed as a substitute for the Wada test.

Summary

Description

Magnetoencephalography (MEG) is a noninvasive functional imaging technique that records weak magnetic forces. When this information is superimposed on an anatomic image of the brain, typically a magnetic resonance imaging scan, the image is referred to as magnetic source imaging (MSI). MSI has been used to localize epileptic foci and to identify "eloquent" areas of the brain for neurosurgical planning.

Summary of Evidence

For individuals who have drug-resistant epilepsy and are being evaluated for possible resective surgery who receive MEG/MSI, the evidence for MEG/MSI as an adjunct to standard clinical workup includes various types of case series. Relevant outcomes are test accuracy and clinical utility. Published evidence on MEG is suboptimal, with no clinical trials demonstrating clinical utility. The literature on diagnostic accuracy has methodologic limitations, primarily selection, and ascertainment bias. Studies of functional outcomes do not fully account for the effects of MEG, because subjects who received MEG were not fully accounted for in the studies. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have a planned brain resection who require localization of eloquent function areas who receive MEG/MSI, the evidence includes comparative studies. Relevant outcomes include test accuracy and clinical utility. Available studies have reported that this test has high concordance with the Wada test, which is currently the main alternative to localize eloquent functions. While management is changed in some patients based on MEG testing, it has not been demonstrated that these changes lead to improved outcomes. The evidence is insufficient to determine the effects of the technology on health outcomes.

Policy History

Date	Action
11/2020	BCBSA National medical policy review. Description, summary, and references updated. Policy statements unchanged.
10/2020	Clarified coding information
10/2019	BCBSA National medical policy review. Description, summary, and references updated. Policy statements unchanged.
10/2018	BCBSA National medical policy review. Description, summary and references updated. Policy statements unchanged.
2/2018	Clarified coding information.
10/2017	New references added from BCBSA National medical policy.
10/2016	Clarified coding information.
2/2016	Clarified coding information.
1/2016	New references added from BCBSA National medical policy.
9/2015	Clarified coding information.
8/2015	Clarified coding information.
12/2014	New references added from BCBSA National medical policy.
1/2014	New references added from BCBSA National medical policy. Clarified coding information.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
1/2012	Medically necessary (covered) criteria updated based on BCBSA policy 6.01.21. Effective 1/1/2012.
2/2011	Updated - Medical Policy Group - Neurology and Neurosurgery. No changes to policy statements.
1/2010	Reviewed - Medical Policy Group - Neurology and Neurosurgery. No changes to policy statements.
9/1/09	Medical Policy 137 effective 9/1/09 describing covered and non-covered indications.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

[Medical Policy Terms of Use](#)
[Managed Care Guidelines](#)
[Indemnity/PPO Guidelines](#)
[Clinical Exception Process](#)
[Medical Technology Assessment Guidelines](#)

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