

# Ambulatory EEG Monitoring

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[➔ Instructions for Use](#)

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Related Policies
None

## Coverage Rationale

### Overview

An electroencephalogram (EEG) is a diagnostic test that measures the electrical activity of the brain (brainwaves) using highly sensitive recording equipment attached to the scalp by fine electrodes. It is used to diagnose neurological conditions.

EEGs can be recorded by ambulatory cassette. Ambulatory cassette-recorded EEGs offer the ability to record the EEG on a long-term, outpatient basis. Recorded electrical activity is analyzed by playback through an audio system and/or video monitors.

### CMS National Coverage Determinations (NCDs)

Medicare does not have an NCD for Ambulatory EEG Monitoring.

### CMS Local Coverage Determinations (LCDs) and Articles

Local Coverage Determinations (LCDs)/Local Coverage Articles (LCAs) exist and compliance with these policies is required where applicable. For specific LCDs/LCAs, refer to the table for [Ambulatory EEG Monitoring](#).

For coverage guidelines for states/territories with no LCDs/LCAs:

- Ambulatory EEG monitoring may facilitate the differential diagnosis between seizures and syncopal attacks, sleep apnea, cardiac arrhythmias, or hysterical episodes. The test may also allow the investigator to identify the epileptic nature of some episodic periods of disturbed consciousness, mild confusion, or peculiar behavior, where resting EEG is not conclusive. It may also allow an estimate of seizure frequency, which may at times help to evaluate the effectiveness of a drug and determine its appropriate dosage.
- Ambulatory monitoring is not necessary to evaluate most seizures which are usually readily diagnosed by routine EEG studies, patient examination and history.
- Ambulatory EEG monitoring is reasonable and necessary for the following indications:
  - Inconclusive EEGs.
  - Suspected epileptic seizures with nondiagnostic routine EEG.
  - Patients with confirmed epilepsy who are experiencing suspected non-epileptic events or for classification of seizure type (only ictal recordings can reliably be used to classify seizure type [or types] which is important in selecting appropriate anti-epileptic drug therapy).
  - Adjusting anti-epileptic medication levels.
  - Localizing seizure focus when needed to guide patient management.

- Seizures which are precipitated by naturally occurring cyclic events or environmental stimuli which are not reproducible in the hospital or clinic setting.
- For diagnostic testing, most individuals will have an event or demonstrate interictal activity within 72 hours. Monitoring beyond 72 hours must be supported by written documentation for each additional 24 hours of monitoring and be made available upon request.

## Applicable Codes

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service; however, language may be included in the listing below to indicate if a code is non-covered. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Guidelines may apply.

CPT Code	Description
95700	Electroencephalogram (EEG) continuous recording, with video when performed, setup, patient education, and takedown when performed, administered in person by EEG technologist, minimum of 8 channels
95705	Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, 2-12 hours; unmonitored
95706	Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, 2-12 hours; with intermittent monitoring and maintenance
95707	Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, 2-12 hours; with continuous, real-time monitoring and maintenance
95708	Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, each increment of 12-26 hours; unmonitored
95709	Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, each increment of 12-26 hours; with intermittent monitoring and maintenance
95710	Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, each increment of 12-26 hours; with continuous, real-time monitoring and maintenance
95711	Electroencephalogram with video (VEEG), review of data, technical description by EEG technologist, 2-12 hours; unmonitored
95712	Electroencephalogram with video (VEEG), review of data, technical description by EEG technologist, 2-12 hours; with intermittent monitoring and maintenance
95713	Electroencephalogram with video (VEEG), review of data, technical description by EEG technologist, 2-12 hours; with continuous, real-time monitoring and maintenance
95714	Electroencephalogram with video (VEEG), review of data, technical description by EEG technologist, each increment of 12-26 hours; unmonitored
95715	Electroencephalogram with video (VEEG), review of data, technical description by EEG technologist, each increment of 12-26 hours; with intermittent monitoring and maintenance
95716	Electroencephalogram with video (VEEG), review of data, technical description by EEG technologist, each increment of 12-26 hours; with continuous, real-time monitoring and maintenance
95717	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation and report, 2-12 hours of EEG recording; without video
95718	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation and report, 2-12 hours of EEG recording; with video (VEEG)
95719	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, each increment of greater than 12 hours, up to 26 hours of EEG recording, interpretation and report after each 24-hour period; without video

CPT Code	Description
95720	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, each increment of greater than 12 hours, up to 26 hours of EEG recording, interpretation and report after each 24-hour period; with video (VEEG)
95721	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study; greater than 36 hours, up to 60 hours of EEG recording, without video
95722	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study; greater than 36 hours, up to 60 hours of EEG recording, with video (VEEG)
95723	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study; greater than 60 hours, up to 84 hours of EEG recording, without video
95724	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study; greater than 60 hours, up to 84 hours of EEG recording, with video (VEEG)
95725	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study; greater than 84 hours of EEG recording, without video
95726	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study; greater than 84 hours of EEG recording, with video (VEEG)

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Diagnosis Code	Description
<b>For CPT Codes 95706, 95707, 95709, 95710, 95711, 95712, 95713, 95714, 95715, 95716, 95718, 95720, 95722, 95723, 95724, 95725, 95726</b>	
F44.4	Conversion disorder with motor symptom or deficit
F44.5	Conversion disorder with seizures or convulsions
F44.6	Conversion disorder with sensory symptom or deficit
F44.7	Conversion disorder with mixed symptom presentation
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
G40.011	Localization-related (focal) (partial) idiopathic epilepsy and epileptic syndromes with seizures of localized onset, intractable, with 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

Diagnosis Code	Description
<b>For CPT Codes 95706, 95707, 95709, 95710, 95711, 95712, 95713, 95714, 95715, 95716, 95718, 95720, 95722, 95723, 95724, 95725, 95726</b>	
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

Diagnosis Code	Description
<b>For CPT Codes 95706, 95707, 95709, 95710, 95711, 95712, 95713, 95714, 95715, 95716, 95718, 95720, 95722, 95723, 95724, 95725, 95726</b>	
G93.1	Anoxic brain damage, not elsewhere classified
G93.40	Encephalopathy, unspecified
G93.49	Other encephalopathy
I45.9	Conduction disorder, unspecified
I67.83	Posterior reversible encephalopathy syndrome
I67.9	Cerebrovascular disease, unspecified
R25.0	Abnormal head movements
R25.1	Tremor, unspecified
R25.2	Cramp and spasm
R25.3	Fasciculation
R25.8	Other abnormal involuntary movements
R25.9	Unspecified abnormal involuntary movements
R40.0	Somnolence
R40.1	Stupor
R40.20	Unspecified coma
R40.4	Transient alteration of awareness
R41.0	Disorientation, unspecified
R41.82	Altered mental status, unspecified
R55	Syncope and collapse
R56.1	Post traumatic seizures
R56.9	Unspecified convulsions
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
A17.82	Tuberculous meningoencephalitis
A39.81	Meningococcal encephalitis
A42.82	Actinomycotic encephalitis
A50.42	Late congenital syphilitic encephalitis
A52.14	Late syphilitic encephalitis
A83.0	Japanese encephalitis
A83.1	Western equine encephalitis
A83.2	Eastern equine encephalitis
A83.3	St Louis encephalitis
A83.4	Australian encephalitis
A83.5	California encephalitis
A83.8	Other mosquito-borne viral encephalitis
A83.9	Mosquito-borne viral encephalitis, unspecified
A84.0	Far Eastern tick-borne encephalitis [Russian spring-summer encephalitis]
A84.1	Central European tick-borne encephalitis
A84.89	Other tick-borne viral encephalitis
A84.9	Tick-borne viral encephalitis, unspecified
A85.0	Enteroviral encephalitis
A85.1	Adenoviral encephalitis
A85.2	Arthropod-borne viral encephalitis, unspecified
A85.8	Other specified viral encephalitis

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
A92.2	Venezuelan equine fever
A92.31	West Nile virus infection with encephalitis
A92.5	Zika virus disease
B01.11	Varicella encephalitis and encephalomyelitis
B02.0	Zoster encephalitis
B05.0	Measles complicated by encephalitis
B06.01	Rubella encephalitis
B10.01	Human herpesvirus 6 encephalitis
B10.09	Other human herpesvirus encephalitis
B26.2	Mumps encephalitis
B94.1	Sequelae of viral encephalitis
F44.4	Conversion disorder with motor symptom or deficit
F44.5	Conversion disorder with seizures or convulsions
F44.6	Conversion disorder with sensory symptom or deficit
F44.7	Conversion disorder with mixed symptom presentation
G04.00	Acute disseminated encephalitis and encephalomyelitis, unspecified
G04.01	Postinfectious acute disseminated encephalitis and encephalomyelitis (postinfectious ADEM)
G04.02	Postimmunization acute disseminated encephalitis, myelitis and encephalomyelitis
G04.30	Acute necrotizing hemorrhagic encephalopathy, unspecified
G04.31	Postinfectious acute necrotizing hemorrhagic encephalopathy
G04.81	Other encephalitis and encephalomyelitis
G04.90	Encephalitis and encephalomyelitis, unspecified
G05.3	Encephalitis and encephalomyelitis in diseases classified elsewhere
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
G40.011	Localization-related (focal) (partial) idiopathic epilepsy and epileptic syndromes with seizures of localized onset, intractable, with 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

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
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
G40.841	KCNQ2-related epilepsy, not intractable, with status epilepticus (Effective 10/01/2024)
G40.842	KCNQ2-related epilepsy, not intractable, without status epilepticus (Effective 10/01/2024)
G40.843	KCNQ2-related epilepsy, intractable, with status epilepticus (Effective 10/01/2024)
G40.844	KCNQ2-related epilepsy, intractable, without status epilepticus (Effective 10/01/2024)
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
G90.81	Serotonin syndrome (Effective 10/01/2024)
G90.89	Other disorders of autonomic nervous system (Effective 10/01/2024)

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
G93.1	Anoxic brain damage, not elsewhere classified
G93.40	Encephalopathy, unspecified
G93.45	Developmental and epileptic encephalopathy (Effective 10/01/2024)
G93.49	Other encephalopathy
G93.5	Compression of brain
G93.6	Cerebral edema
H55.00	Unspecified nystagmus
I45.9	Conduction disorder, unspecified
I60.01	Nontraumatic subarachnoid hemorrhage from right carotid siphon and bifurcation
I60.02	Nontraumatic subarachnoid hemorrhage from left carotid siphon and bifurcation
I60.11	Nontraumatic subarachnoid hemorrhage from right middle cerebral artery
I60.12	Nontraumatic subarachnoid hemorrhage from left middle cerebral artery
I60.2	Nontraumatic subarachnoid hemorrhage from anterior 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
I60.51	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
I60.8	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
I62.9	Nontraumatic intracranial hemorrhage, unspecified
I67.1	Cerebral aneurysm, nonruptured
I67.83	Posterior reversible encephalopathy syndrome
I67.9	Cerebrovascular disease, unspecified
R00.0	Tachycardia, unspecified
R06.81	Apnea, not elsewhere classified
R25.0	Abnormal head movements
R25.1	Tremor, unspecified
R25.2	Cramp and spasm
R25.3	Fasciculation
R25.8	Other abnormal involuntary movements
R25.9	Unspecified abnormal involuntary movements
R29.90	Unspecified symptoms and signs involving the nervous system
R40.0	Somnolence
R40.1	Stupor



Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
R40.20	Unspecified coma
R40.2110	Coma scale, eyes open, never, unspecified time
R40.2111	Coma scale, eyes open, never, in the field [EMT or ambulance]
R40.2112	Coma scale, eyes open, never, at arrival to emergency department
R40.2113	Coma scale, eyes open, never, at hospital admission
R40.2114	Coma scale, eyes open, never, 24 hours or more after hospital admission
R40.2120	Coma scale, eyes open, to pain, unspecified time
R40.2121	Coma scale, eyes open, to pain, in the field [EMT or ambulance]
R40.2122	Coma scale, eyes open, to pain, at arrival to emergency department
R40.2123	Coma scale, eyes open, to pain, at hospital admission
R40.2124	Coma scale, eyes open, to pain, 24 hours or more after hospital admission
R40.2210	Coma scale, best verbal response, none, unspecified time
R40.2211	Coma scale, best verbal response, none, in the field [EMT or ambulance]
R40.2212	Coma scale, best verbal response, none, at arrival to emergency department
R40.2213	Coma scale, best verbal response, none, at hospital admission
R40.2214	Coma scale, best verbal response, none, 24 hours or more after hospital admission
R40.2220	Coma scale, best verbal response, incomprehensible words, unspecified time
R40.2221	Coma scale, best verbal response, incomprehensible words, in the field [EMT or ambulance]
R40.2222	Coma scale, best verbal response, incomprehensible words, at arrival to emergency department
R40.2223	Coma scale, best verbal response, incomprehensible words, at hospital admission
R40.2224	Coma scale, best verbal response, incomprehensible words, 24 hours or more after hospital admission
R40.2310	Coma scale, best motor response, none, unspecified time
R40.2311	Coma scale, best motor response, none, in the field [EMT or ambulance]
R40.2312	Coma scale, best motor response, none, at arrival to emergency department
R40.2313	Coma scale, best motor response, none, at hospital admission
R40.2314	Coma scale, best motor response, none, 24 hours or more after hospital admission
R40.2320	Coma scale, best motor response, extension, unspecified time
R40.2321	Coma scale, best motor response, extension, in the field [EMT or ambulance]
R40.2322	Coma scale, best motor response, extension, at arrival to emergency department
R40.2323	Coma scale, best motor response, extension, at hospital admission
R40.2324	Coma scale, best motor response, extension, 24 hours or more after hospital admission
R40.2340	Coma scale, best motor response, flexion withdrawal, unspecified time
R40.2341	Coma scale, best motor response, flexion withdrawal, in the field [EMT or ambulance]
R40.2342	Coma scale, best motor response, flexion withdrawal, at arrival to emergency department
R40.2343	Coma scale, best motor response, flexion withdrawal, at hospital admission
R40.2344	Coma scale, best motor response, flexion withdrawal, 24 hours or more after hospital admission
R40.2350	Coma scale, best motor response, localizes pain, unspecified time
R40.2351	Coma scale, best motor response, localizes pain, in the field [EMT or ambulance]
R40.2352	Coma scale, best motor response, localizes pain, at arrival to emergency department
R40.2353	Coma scale, best motor response, localizes pain, at hospital admission
R40.2354	Coma scale, best motor response, localizes pain, 24 hours or more after hospital admission
R40.2361	Coma scale, best motor response, obeys commands, in the field [EMT or ambulance]
R40.2362	Coma scale, best motor response, obeys commands, at arrival to emergency department

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
R40.2363	Coma scale, best motor response, obeys commands, at hospital admission
R40.2364	Coma scale, best motor response, obeys commands, 24 hours or more after hospital admission
R40.2A	Nontraumatic coma due to underlying condition (Effective 10/01/2023)
R40.4	Transient alteration of awareness
R41.0	Disorientation, unspecified
R41.3	Other amnesia (Effective 08/17/2023)
R41.82	Altered mental status, unspecified
R41.85	Anosognosia (Effective 10/01/2024)
R45.1	Restlessness and agitation
R47.01	Aphasia
R55	Syncope and collapse
R56.1	Post traumatic seizures
R56.9	Unspecified convulsions
S06.0XAA	Concussion with loss of consciousness status unknown, initial encounter
S06.0XAD	Concussion with loss of consciousness status unknown, subsequent encounter
S06.0XAS	Concussion with loss of consciousness status unknown, sequela
S06.1X0S	Traumatic cerebral edema without loss of consciousness, sequela
S06.1X1S	Traumatic cerebral edema with loss of consciousness of 30 minutes or less, sequela
S06.1X2S	Traumatic cerebral edema with loss of consciousness of 31 minutes to 59 minutes, sequela
S06.1X3S	Traumatic cerebral edema with loss of consciousness of 1 hour to 5 hours 59 minutes, sequela
S06.1X4S	Traumatic cerebral edema with loss of consciousness of 6 hours to 24 hours, sequela
S06.1X5S	Traumatic cerebral edema with loss of consciousness greater than 24 hours with return to pre-existing conscious level, sequela
S06.1X6S	Traumatic cerebral edema with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, sequela
S06.1X9S	Traumatic cerebral edema with loss of consciousness of unspecified duration, sequela
S06.1XAA	Traumatic cerebral edema with loss of consciousness status unknown, initial encounter
S06.1XAD	Traumatic cerebral edema with loss of consciousness status unknown, subsequent encounter
S06.1XAS	Traumatic cerebral edema with loss of consciousness status unknown, sequela
S06.2XAA	Diffuse traumatic brain injury with loss of consciousness status unknown, initial encounter
S06.2XAD	Diffuse traumatic brain injury with loss of consciousness status unknown, subsequent encounter
S06.2XAS	Diffuse traumatic brain injury with loss of consciousness status unknown, sequela
S06.30AA	Unspecified focal traumatic brain injury with loss of consciousness status unknown, initial encounter
S06.30AD	Unspecified focal traumatic brain injury with loss of consciousness status unknown, subsequent encounter
S06.30AS	Unspecified focal traumatic brain injury with loss of consciousness status unknown, sequela
S06.31AA	Contusion and laceration of right cerebrum with loss of consciousness status unknown, initial encounter
S06.31AD	Contusion and laceration of right cerebrum with loss of consciousness status unknown, subsequent encounter
S06.31AS	Contusion and laceration of right cerebrum with loss of consciousness status unknown, sequela
S06.32AA	Contusion and laceration of left cerebrum with loss of consciousness status unknown, initial encounter
S06.32AD	Contusion and laceration of left cerebrum with loss of consciousness status unknown, subsequent encounter
S06.32AS	Contusion and laceration of left cerebrum with loss of consciousness status unknown, sequela

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
S06.33AA	Contusion and laceration of cerebrum, unspecified, with loss of consciousness status unknown, initial encounter
S06.33AD	Contusion and laceration of cerebrum, unspecified, with loss of consciousness status unknown, subsequent encounter
S06.33AS	Contusion and laceration of cerebrum, unspecified, with loss of consciousness status unknown, sequela
S06.34AA	Traumatic hemorrhage of right cerebrum with loss of consciousness status unknown, initial encounter
S06.34AD	Traumatic hemorrhage of right cerebrum with loss of consciousness status unknown, subsequent encounter
S06.34AS	Traumatic hemorrhage of right cerebrum with loss of consciousness status unknown, sequela
S06.35AA	Traumatic hemorrhage of left cerebrum with loss of consciousness status unknown, initial encounter
S06.35AD	Traumatic hemorrhage of left cerebrum with loss of consciousness status unknown, subsequent encounter
S06.35AS	Traumatic hemorrhage of left cerebrum with loss of consciousness status unknown, sequela
S06.36AA	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness status unknown, initial encounter
S06.36AD	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness status unknown, subsequent encounter
S06.36AS	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness status unknown, sequela
S06.37AA	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness status unknown, initial encounter
S06.37AD	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness status unknown, subsequent encounter
S06.37AS	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness status unknown, sequela
S06.38AA	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness status unknown, initial encounter
S06.38AD	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness status unknown, subsequent encounter
S06.38AS	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness status unknown, sequela
S06.4XAA	Epidural hemorrhage with loss of consciousness status unknown, initial encounter
S06.4XAD	Epidural hemorrhage with loss of consciousness status unknown, subsequent encounter
S06.4XAS	Epidural hemorrhage with loss of consciousness status unknown, sequela
S06.5XAA	Traumatic subdural hemorrhage with loss of consciousness status unknown, initial encounter
S06.5XAD	Traumatic subdural hemorrhage with loss of consciousness status unknown, subsequent encounter
S06.5XAS	Traumatic subdural hemorrhage with loss of consciousness status unknown, sequela
S06.6XAA	Traumatic subarachnoid hemorrhage with loss of consciousness status unknown, initial encounter
S06.6XAD	Traumatic subarachnoid hemorrhage with loss of consciousness status unknown, subsequent encounter
S06.6XAS	Traumatic subarachnoid hemorrhage with loss of consciousness status unknown, sequela
S06.81AA	Injury of right internal carotid artery, intracranial portion, not elsewhere classified with loss of consciousness status unknown, initial encounter
S06.81AD	Injury of right internal carotid artery, intracranial portion, not elsewhere classified with loss of consciousness status unknown, subsequent encounter
S06.81AS	Injury of right internal carotid artery, intracranial portion, not elsewhere classified with loss of consciousness status unknown, sequela

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
S06.82AA	Injury of left internal carotid artery, intracranial portion, not elsewhere classified with loss of consciousness status unknown, initial encounter
S06.82AD	Injury of left internal carotid artery, intracranial portion, not elsewhere classified with loss of consciousness status unknown, subsequent encounter
S06.82AS	Injury of left internal carotid artery, intracranial portion, not elsewhere classified with loss of consciousness status unknown, sequela
S06.890S	Other specified intracranial injury without loss of consciousness, sequela
S06.891S	Other specified intracranial injury with loss of consciousness of 30 minutes or less, sequela
S06.892S	Other specified intracranial injury with loss of consciousness of 31 minutes to 59 minutes, sequela
S06.893S	Other specified intracranial injury with loss of consciousness of 1 hour to 5 hours 59 minutes, sequela
S06.894S	Other specified intracranial injury with loss of consciousness of 6 hours to 24 hours, sequela
S06.895S	Other specified intracranial injury with loss of consciousness greater than 24 hours with return to pre-existing conscious level, sequela
S06.896S	Other specified intracranial injury with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, sequela
S06.89AA	Other specified intracranial injury with loss of consciousness status unknown, initial encounter
S06.89AD	Other specified intracranial injury with loss of consciousness status unknown, subsequent encounter
S06.89AS	Other specified intracranial injury with loss of consciousness status unknown, sequela
S06.8A0A	Primary blast injury of brain, not elsewhere classified without loss of consciousness, initial encounter
S06.8A0D	Primary blast injury of brain, not elsewhere classified without loss of consciousness, subsequent encounter
S06.8A0S	Primary blast injury of brain, not elsewhere classified without loss of consciousness, sequela
S06.8A1A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 30 minutes or less, initial encounter
S06.8A1D	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 30 minutes or less, subsequent encounter
S06.8A1S	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 30 minutes or less, sequela
S06.8A2A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 31 minutes to 59 minutes, initial encounter
S06.8A2D	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 31 minutes to 59 minutes, subsequent encounter
S06.8A2S	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 31 minutes to 59 minutes, sequela
S06.8A3A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 1 hour to 5 hours 59 minutes, initial encounter
S06.8A3D	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 1 hour to 5 hours 59 minutes, subsequent encounter
S06.8A3S	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 1 hour to 5 hours 59 minutes, sequela
S06.8A4A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 6 hours to 24 hours, initial encounter
S06.8A4D	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 6 hours to 24 hours, subsequent encounter
S06.8A4S	Primary blast injury of brain, not elsewhere classified with loss of consciousness of 6 hours to 24 hours, sequela

Diagnosis Code	Description
<b>For CPT Codes 95700, 95705, 95708, 95717, 95719, 95721</b>	
S06.8A5A	Primary blast injury of brain, not elsewhere classified with loss of consciousness greater than 24 hours with return to pre-existing conscious level, initial encounter
S06.8A5D	Primary blast injury of brain, not elsewhere classified with loss of consciousness greater than 24 hours with return to pre-existing conscious level, subsequent encounter
S06.8A5S	Primary blast injury of brain, not elsewhere classified with loss of consciousness greater than 24 hours with return to pre-existing conscious level, sequela
S06.8A6A	Primary blast injury of brain, not elsewhere classified with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, initial encounter
S06.8A6D	Primary blast injury of brain, not elsewhere classified with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, subsequent encounter
S06.8A6S	Primary blast injury of brain, not elsewhere classified with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, sequela
S06.8A7A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of any duration with death due to brain injury prior to regaining consciousness, initial encounter
S06.8A8A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of any duration with death due to other cause prior to regaining consciousness, initial encounter
S06.8A9A	Primary blast injury of brain, not elsewhere classified with loss of consciousness of unspecified duration, initial encounter
S06.8A9D	Primary blast injury of brain, not elsewhere classified with loss of consciousness of unspecified duration, subsequent encounter
S06.8A9S	Primary blast injury of brain, not elsewhere classified with loss of consciousness of unspecified duration, sequela
S06.8AAA	Primary blast injury of brain, not elsewhere classified with loss of consciousness status unknown, initial encounter
S06.8AAD	Primary blast injury of brain, not elsewhere classified with loss of consciousness status unknown, subsequent encounter
S06.8AAS	Primary blast injury of brain, not elsewhere classified with loss of consciousness status unknown, sequela
S06.9XAA	Unspecified intracranial injury with loss of consciousness status unknown, initial encounter
S06.9XAD	Unspecified intracranial injury with loss of consciousness status unknown, subsequent encounter
S06.9XAS	Unspecified intracranial injury with loss of consciousness status unknown, sequela

## Centers for Medicare and Medicaid Services (CMS) Related Documents

After checking the table below and searching the [Medicare Coverage Database](#), if no NCD, LCD, or LCA is found, refer to the criteria as noted in the [Coverage Rationale](#) section above.

NCD	LCD	Article	Contractor Type	Contractor Name
<b>Ambulatory EEG Monitoring</b>				
NCD 160.22 Ambulatory EEG Monitoring <b>Retired 04/10/2023</b>	<a href="#">L33399 EEG – Ambulatory Monitoring</a>	<a href="#">A57030 Billing and Coding: EEG – Ambulatory Monitoring</a>	Part A and B MAC	NGS
	<a href="#">L34521 Special EEG Tests</a>	<a href="#">A57667 Billing and Coding: Special EEG Tests</a>	Part A and B MAC	First Coast
	<a href="#">L33447 Special Electroencephalography</a>	<a href="#">A56771 Billing and Coding: Special Electroencephalography</a>	Part B MAC	Palmetto

## Medicare Administrative Contractor (MAC) With Corresponding States/Territories

MAC Name (Abbreviation)	States/Territories
CGS Administrators, LLC (CGS)	KY, OH
First Coast Service Options, Inc. (First Coast)	FL, PR, VI
National Government Services, Inc. (NGS)	CT, IL, ME, MA, MN, NH, NY, RI, VT, WI
Noridian Healthcare Solutions, LLC (Noridian)	AS, AK, AZ, CA, GU, HI, ID, MT, NV, ND, Northern Mariana Islands, OR, SD, UT, WA, WY
Novitas Solutions, Inc. (Novitas)	AR, CO, DC, DE, LA, MD, MS, NJ, NM, OK, PA, TX, VA**
Palmetto GBA (Palmetto)	AL, GA, NC, SC, TN, VA**, WV
Wisconsin Physicians Service Insurance Corporation (WPS)*	IA, IN, KS, MI, MO, NE

### Notes

\*Wisconsin Physicians Service Insurance Corporation: Contract Number 05901 applies only to WPS Legacy Mutual of Omaha MAC A Providers.

\*\*For the state of Virginia: Part B services for the city of Alexandria and the counties of Arlington and Fairfax are excluded for the Palmetto GBA jurisdiction and included within the Novitas Solutions, Inc. jurisdiction.

## CMS Transmittals

[Transmittal 11865, Change Request 13017, Dated 02/16/2023, \(An Omnibus CR to Implement Policy Updates in the CY 2023 PFS Final Rule, Including \(1\) Removal of Selected NCDs \(NCD 160.22 Ambulatory EEG Monitoring\), and, \(2\) Expanding Coverage of Colorectal Cancer Screening - Full Agile Pilot CR\)](#)

## MLN Matters

[Article MM13017 Revised, Removal of a National Coverage Determination & Expansion of Coverage of Colorectal Cancer Screening](#)

## Clinical Evidence

Hernandez-Ronquillo et al. (2023) conducted a prospective cohort study to determine the diagnostic accuracy of ambulatory EEG (aEEG) at detecting interictal epileptiform discharges (IEDs)/seizures compared with routine EEG (rEEG) and repetitive/ second rEEG in those with a first single unprovoked seizure (FSUS). The relationship between IED/seizures on aEEG and seizure recurrence within one year of follow-up was also assessed. All one hundred participants with FSUS underwent a set of three sequential EEGs (first rEEG, second rEEG, and aEEG) which were interpreted by an EEG-certified epileptologist/ neurologist. The patients had 52 weeks of follow-up until they either had a second unprovoked seizure or maintained the single seizure status. Ambulatory EEG captured IED/seizures with a sensitivity of 72%, compared with 11% for the first rEEG and 22% for the second rEEG. The diagnostic performance of the aEEG was statistically better (AUC: 0.85) compared with the first rEEG (AUC: 0.56) and second rEEG (AUC: 0.60). There were no statistically significant differences between the three EEG modalities regarding specificity and positive predictive value. Finally, IED/seizure on the aEEG was associated with more than three times the hazard of seizure recurrence. According to the authors, aEEGs overall diagnostic accuracy at capturing IED/seizures in those presenting with FSUS was higher than the first and second rEEGs. Additionally, IED/seizures on the aEEG were associated with an increased risk of seizure recurrence. The authors recommend future studies to evaluate the accuracy of aEEG.

Cho et al. (2019) evaluated the diagnostic yield and clinical utility of vEEG performed in a comprehensive epilepsy center. The authors retrospectively reviewed all cases of vEEG performed from May 2003 to April 2018 and analyzed the data to determine its clinical utility and diagnostic yield. A total of 1025 cases of vEEG were included. The mean duration of vEEG was 2.3 ±1.6 days. A total of 763 vEEGs documented epileptic seizures or interictal epileptiform discharges (IEDs) to confirm the diagnosis of epilepsy. There were 99 psychogenic non-epileptic seizure, 36 status epilepticus, and 34 vEEGs which revealed generalized or focal slow activities without any clinical seizures or IEDs. Video EEG was normal in 170 cases. The diagnostic yield of vEEG varied from 83.4 to 88.4% depending on its definition. The proportion of epilepsy in total cases of vEEG continued to decrease from 77.2 to 61.4%. In contrast, the proportion of normal vEEG steadily increased from 4.1 to 24.1% during the same time period. According to the authors, this study shows the utility of vEEG in clinical circumstances beyond epilepsy. Video EEG can play a pivotal role in the diagnostic approach to epilepsy and its differential diagnoses.

Syed et al. (2019) conducted a retrospective cohort study designed to evaluate the outcome of diagnostic ambulatory video-EEG monitoring (AVEM) performed nationwide on patients over one year and compared the findings with the outcome of inpatient adult and pediatric video-EEG monitoring (VEM) performed at two academic epilepsy centers during that same year. The composite percentage of VEM records with epileptiform activity on EEG tracings or at least one video-recorded pushbutton event was the primary outcome measured. Patient-reported symptoms documented in AVEM event diaries were also evaluated. Of 9221 AVEM recordings performed across 28 states, 62.5% attained the primary outcome. At least one patient-activated pushbutton event was captured on video in 54% of AVEM recordings (53.6% in adults, 56.1% in children). Epileptiform activity was reported in 1657 (18.0%) AVEM recordings (1473 [88.9%] only interictal, 9 [0.5%] only ictal, 175 [10.6%] both interictal and ictal). Most common patient-reported symptomatology during AVEM pushbutton events was behavioral/autonomic/emotional in adults and children. Compared to AVEM, inpatient VEM captured more confirmed representative events in adult and pediatric samples. According to the authors, AVEM may be a useful modality for non-urgent and non-surgical evaluation of paroxysmal events, which could be considered when inpatient level-of-care is not medically necessary. Additionally, AVEM may be beneficial to patients who report seizures or events resembling epilepsy that occur in certain environments or with specific triggers that may not be replicated in the hospital setting. Limitations include the retrospective nature of the study.

Carlson et al. (2018) conducted a study designed to compare home video telemetry (HVT) and inpatient video telemetry (iVT) in children to determine diagnostic efficacy, recording quality, and acceptability to caregivers. HVT was defined as a study using aEEG with synchronized video. Between 2014 and 2017, 33 consecutive patients referred for HVT were included in the study. Over the same period, 29 iVT patients were used as a comparative group. Patients were between 1 - 17 years old. 62% of iVT patients and 64% of HVT patients had typical attacks during the recording. 59% of iVT and 70% of HVT recordings were considered to have answered the referral question. Study quality was similar in both groups. In HVT studies the rate of equipment difficulties was 52%; problems included camera positioning and failure to turn on the infrared button at night. Diagnostic information was lost in 15% of patients. 76% of parents/carers of HVT patients would choose this investigation again. The authors concluded that HVT is able to provide results of similar technical and diagnostic quality to iVT in a pediatric setting and may potentially increase the capacity for long term EEG monitoring. User error was problematic in a minority of cases but did not affect the diagnostic utility. Additionally, HVT was acceptable to most parents and caregivers. Limitations include the small sample size and lack of randomization.

Kandler et al. (2017) compared video ambulatory electroencephalography (V-aEEG) with inpatient video telemetry (IPVT) to determine diagnostic efficiency, quality of video EEG recording, patient acceptability, and the amount of extra technologist time required for home studies. Between 1/11/2013 to 1/1/2016, 41 adult individuals underwent a 48-hour recording of V-aEEG and a comparison group (n = 64) underwent IPVT for diagnostic purposes. Inpatients admitted for longer than 48 hours were excluded. Of patients investigated for diagnosis of attacks, 74% V-aEEG patients and 62% IPVT had typical attacks during the investigation. All PSGs were useful in interpreting the MSLTs. Diagnostic questions were answered by 73% V-aEEGs and 73% IPVTs. Quality of EEG and video recording was similar using V-aEEG and IPVT. Four patients had difficulty using V-aEEG equipment, but diagnostic information was lost in only one. 5% of V-aEEG patients would have preferred hospital investigation but 45% of IPVT patients would have preferred home investigation. Extra technologist time for home visits (mean 2 h) was required only for the first seven patients. The authors concluded V-aEEG provided recordings of similar quality and efficacy as inpatient studies, required no extra technologist time, was acceptable to patients, and could potentially provide long-term EEG monitoring without the need for hospital admissions. Limitations include lack of randomization and small study size.

Lawley et al. (2015) conducted a systematic review of the literature on the use of aEEG for the diagnosis and clinical management of adult patients with epileptic or nonepileptic attack disorder. Nine studies were included in the analysis. Inclusion criteria included the impact of aEEG on diagnosis, syndromic classification, management decision or clinical outcomes; comparative investigations with routine EEG; EEG with activation techniques or inpatient video-telemetry (iVT); outpatient settings; adult patients (18 years or older); and a minimum of 16 EEG recording channels. The authors concluded that in patients with equivocal findings on routine EEGs, aEEG is a useful diagnostic tool and influences management decisions. Additionally, aEEG may be more likely to capture events when compared to sleep-deprived EEG. Limitations include the lack of large, prospective studies comparing aEEG with iVT and small sample sizes of some of the included studies.

Faulkner et al. (2012a) conducted a retrospective study designed to determine the utility of outpatient aEEG in the investigation of paroxysmal events. Three hundred and twenty-four patients who underwent 72-96 hours of outpatient EEG between 2007 and 2010 were included in the study. No patients underwent drug tapering or withdrawal, and no home video was recorded. Two EEG trained neurologists examined the EEGs for the presence of interictal EEG abnormalities and EEG changes during events. Additionally, the patients' record was analyzed for pretest and posttest diagnosis, indication for test, change of management, age, sex, and age at first seizure, antiepileptic drug use, magnetic resonance imaging (MRI) results, and seizure frequency. Of 324 studies: 219 (68%) studies gave positive data, 116 (36%)

showed interictal epileptiform discharges (IEDs), 167 (52%) had events. 105 (32%) studies were normal. Overall, 51% of studies changed management of which 22% of studies changed the diagnosis and 29% of studies refined the diagnosis by classifying epilepsy into focal or generalized. The authors concluded the study confirmed the diagnostic utility of aEEG and represents a useful initial investigation of paroxysmal neurological occurrences. Limitations include the retrospective nature of the study and lack of comparison group.

Faulkner et al. (2012b) conducted a retrospective study of 180 individuals with epilepsy to determine the optimal and practical duration of aEEG monitoring in otherwise unselected patients. The patients underwent 96 hours of aEEG without drug withdrawal or sleep-deprivation where IEDs were recorded. Latency to, and the factors related to the first IED were assessed. Median latency to first IED was 316 min, (interquartile range 70–772 min, n = 180). IEDs were recorded in 44% of patients within four hours, 58% within eight hours, 85% within 24 hours and 95% within 48 hours. Recording for the full 96-hour period revealed only 5% further IEDs. Multivariate analysis showed the latencies to IEDs with generalized epilepsies were shorter than with focal epilepsies ( $p < 0.0001$ ). The authors concluded a 48 hour recording was sufficient for the classification of the majority of patients who showed IEDs on surface EEG during a 96 hour recording; 5% required more prolonged recording for electro-clinical classification. Limitations include the retrospective nature of the study and lack of a comparison group.

Wang et al. (2012) conducted a retrospective study to determine the characteristics of aEEG before drug withdrawal was initiated, to identify influencing factors for EEG abnormalities, and establish therapeutic principles. Two hundred and fourteen patients with epilepsy (83 women and 131 men, ages 7 – 38 years old) who were candidates for anti-epileptic drug (AED) withdrawal were included in the study. The patients had two or more unprovoked seizures that occurred at least 24 hours apart and were seizure free for three to five consecutive years during AED therapy. Before the decision was made to discontinue AEDs, a 24 hour aEEG was completed. Patient clinical records and demographics were used to analyze the EEG results for influencing factors. Ambulatory EEGs showed abnormalities in 41.1% of the patients (88/214). Of 88 patients with abnormal EEGs, 43 had unequivocal epileptic discharges; and 45 only had nonspecific EEG abnormalities. In the analysis, the potential factors for abnormal EEGs included female, delayed therapy, longer duration of intractability/treatment response time and medications failed. The authors concluded there were several factors identified that influenced the characteristics of the EEGs and the aEEGs remained abnormal for many patients even after three to five years of no seizure activity. The authors recommend larger studies to confirm their findings. Limitations include the retrospective nature of the study and small study size.

Friedman and Hirsch (2009) reported on patients requiring prolonged monitoring with video-electroencephalography to make an accurate diagnosis and quantified how often this occurs. The authors performed a retrospective review of 248 consecutive adult patients admitted to the epilepsy monitoring unit during 12 months for event characterization or presurgical evaluation. For the diagnosis of definite epilepsy, at least one epileptic seizure must have been recorded with video-electroencephalography. The median time to first diagnostic event, whether epileptic seizure or nonepileptic event, was 2 days; 35% required 3 or more days and 7% > 1 week. Twelve percent of those with definite epilepsy never had interictal epileptiform discharges and 17% of those with nonepileptic events had interictal epileptiform discharges. Six percent of patients with definite epilepsy had neither epileptic seizures nor interictal epileptiform discharges until day 3 or after. Based on these results, the authors indicated that it is common to require 3 or more days in an epilepsy monitoring unit to record and diagnose the nature of paroxysmal episodes and not rare to require more than a week.

Noe and Dratzkowski (2009) determined the rate of medical complications from long-term video-electroencephalographic (EEG) monitoring for epilepsy. The authors reviewed the medical records of 428 consecutive adult patients with epilepsy who were admitted for diagnostic scalp video-EEG monitoring; 149 met inclusion criteria for the study. Seizure number and type as well as timing and presence of seizure-related adverse outcomes were noted. Of the 149 adult patients included in the study, seizure clusters occurred in 35 (23%); 752 seizures were recorded. The mean time to first seizure was 2 days, with a mean length of stay of 5 days. Among these patients, there was 1 episode of status epilepticus, 3 potentially serious electrocardiographic abnormalities, 2 cases of postictal psychosis, and 4 vertebral compression fractures during a generalized convulsion, representing 11% of patients with a recorded generalized tonic-clonic seizure. No deaths, transfers to the intensive care unit, falls, dental injuries, or pulmonary complications were recorded. An adverse event requiring intervention or interfering with normal activity occurred in 21% of these patients. Length of stay was not affected by occurrence of adverse events. The authors concluded that prolonged video-EEG monitoring is an acceptably safe procedure. According to the authors, procedures that increase the likelihood of recording seizures include sleep deprivation and medication withdrawal. Although good outcomes were observed in this series, the frequency of noted adverse events underscores the importance of appropriate close monitoring for seizures and potential injury.

Alving and Beniczky (2009) assessed the diagnostic usefulness and the necessary duration of inpatient long-term video-EEG monitoring (LTM) for the referral groups, in patients extensively investigated before the monitoring. The main referral categories are diagnosis (epileptic versus non-epileptic disorder), seizure classification and presurgical evaluation. An



LTM was considered diagnostically useful when it provided previously not reported, clinically relevant information on the paroxysmal event. For the presurgical group, reaching a decision concerning surgery was an additional requirement. The authors reviewed data from 234 consecutive LTM-sessions (221 patients) over a 2-year period. In 44% of the cases the LTM was diagnostically useful. There were no significant differences concerning diagnostic usefulness among the main referral groups: diagnostic (41%), classification (41%) and presurgical (55%). Diagnostic usefulness did not differ among the age groups. The duration of the successful LTM-sessions was significantly longer in the presurgical group (mean: 3.5 days) than in the diagnostic and classification groups (2.4 and 2.3 days, respectively). The authors concluded that LTM is a valuable diagnostic tool even in patients extensively investigated before the monitoring and is equally effective in the referral and age groups.

Yogarajah et al. (2009) evaluated guideline recommendations that long term EEG monitoring (LTM) be done in patients for whom seizure or syndrome type is unclear, and in patients for whom it is proving difficult to differentiate between epilepsy and non-epileptic attack disorder (NEAD). The study reviewed the case notes of all admissions to the Sir William Gowers Unit at the National Society for Epilepsy in the years 2004 and 2005. A record was made of the type, duration and result of all LTM performed both prior to and during the admission. Pre- and post-admission diagnoses were compared, and patients were divided according to whether LTM had resulted in a change in diagnosis, refinement in diagnosis or no change in diagnosis. The distinction between change and a refinement in the diagnosis was made on the basis of whether or not this alteration resulted in a change in management. A total of 612 patients were admitted during 2004 and 2005, 230 of whom were referred for diagnostic clarification. Of these, LTM was primarily responsible for a change in diagnosis in 133 (58%) and a refinement of diagnosis in 29 (13%). In 65 (29%) patients the diagnosis remained the same after LTM. In those patients in whom there was a change in diagnosis, the most common change was in distinguishing epilepsy from NEAD in 73 (55%) and in distinguishing between focal and generalized epilepsy in 47 (35%). LTM was particularly helpful in differentiating frontal lobe seizures from generalized seizures and non-epileptic attacks. Inpatient ambulatory EEG proved as effective as video telemetry in helping to distinguish between NEAD, focal and generalized epilepsy. According to the authors, this study showed that LTM led to an alteration in the diagnosis of 71% of patients referred to a tertiary center for diagnostic clarification of possible epilepsy. The authors concluded that this service evaluation supports the use of performing LTM (either video or ambulatory) in a specialist setting in patients who present diagnostic difficulty.

Liporace et al. (1998) compared a sleep-deprived EEG with a computer-assisted 16-channel aEEG in 46 patients with a suspected diagnosis of epilepsy based on historical information and had either a normal or equivocal routine EEG. The participants underwent both a 24-hour aEEG and a 30–60-minute sleep-deprived EEG which were reviewed for the presence of interictal epileptiform discharges and seizure by two board certified electroencephalographers. Both the sleep-deprived EEG and ambulatory EEG improved detection of epileptiform discharges by a similar amount (24% versus 33%); however, the ambulatory EEG detected seizures in 7:46 (15%) patients, and in three patients the seizures were solely detected by the computer. The authors concluded there was a greater benefit offered by the aEEG than the sleep-deprived study as aEEG may also capture seizures as well as detect interictal epileptiform discharges. The authors note that identifying unsuspected seizures can impact clinical management significantly. Limitations include small study size and lack of randomization.

## **Clinical Practice Guidelines**

### ***American Clinical Neurophysiology Society (ACNS)***

The ACNS released “Guidelines for Long-Term Monitoring for Epilepsy” in 2008. In the guidelines, long-term monitoring was defined as the simultaneous recording of EEG and clinical behavior over extended periods of time to evaluate patients with paroxysmal disturbances of cerebral function. Long-term monitoring may or may not include video recordings for the documentation of clinical behavior (observational techniques could also be used). The guidelines noted that vEEG was the most effective means of behavior monitoring in an in-patient setting. Advantages for vEEG were noted to include: (1) an objective record of behavior, available for replay and associated direct EEG correlation; (2) temporal correlations accurate when synchronization is achieved with time code generators or same tape recording; (3) usefulness in seizures of all types, even if minimal behavioral manifestations are initially unrecognized since the permanent record allows subsequent review of behavior associated with EEG changes. The interaction between monitoring personnel and the patient, when properly structured, defines the events more explicitly than other mechanisms. Disadvantages included the need for specialized equipment, the time commitment, and the limitation of movement due to the requirement for the patient to stay in view of the camera. According to the authors, a push button event marker, activated by a family member or friend can provide temporal correlations of clinical episodes on aEEG recordings and is a major form of behavior monitoring, particularly in young children or in patients who cannot reliably self-report. The guideline notes clinical indications for ambulatory continuous EEG recording include documentation and quantification of ictal (clinical and subclinical) and interictal EEG features and assessment of their relationship to reported behavior; computer assisted aEEG has an additional clinical indication for detection of seizures without an obvious behavioral change (ACNS, 2008).

## ***Canadian Society of Clinical Neurophysiologists***

Dash et al. (2017) developed an updated version of the minimal standards for EEG guideline which was designed to serve as a benchmark for further development, standardization, and quality care in Canada. The guideline notes that aEEG may be considered as an alternative to inpatient continuous electroencephalogram or long-term monitoring for epilepsy and aEEG is most beneficial in capturing IEDs, subclinical seizures, sleep/wake differentiation, or activity that does not require simultaneous video recording for diagnosis.

## ***International Federation of Clinical Neurophysiology (IFCN)***

Tatum et al. (2018) developed an IFCN guideline to evaluate the clinical utility for EEG in adults with epilepsy. The guideline notes that EEG remains an essential diagnostic tool for people with epilepsy and overall, there is good evidence that aEEG is feasible and provides similar diagnostic information to inpatient EEG. According to the guideline, 95% of IEDs are recorded within a two-day period. The authors note aEEG is less restrictive to patients and allows evaluation in their natural environments with exposure to daily natural seizure triggers. The IFCN summary statements/recommendations include that video-EEG monitoring can provide a definitive diagnosis in most individuals with epilepsy when seizures are recorded.

## ***International League Against Epilepsy (ILAE)***

A 2007 position paper from the ILAE (Velis et al., 2007) contains recommendations regarding the requirements and applications for long-term recordings in epilepsy. Specifically, the paper's purpose was to update the state of knowledge based on existing national and international guidelines on the application of long-term monitoring (LTM) (approximately 5.5 to 7.6 days) and to provide a selective review of the literature on controversies and issues such as techniques to increase the yield of clinically relevant seizures such as vEEG. The ILAE recommends the use of hospital-based LTM in epilepsy for assessing seizure type and frequency, evaluating status epilepticus, in noninvasive and invasive video/EEG investigations for epilepsy surgery, and for the differential diagnosis between epilepsy and paroxysmally occurring nonepileptic conditions, in children and in adults. The paper notes that ambulatory outpatient LTM may be used as an alternative for inpatient LTM in cases where the latter is not feasible or when activation procedures aimed at increasing seizure yield are not indicated; however, outpatient ambulatory monitoring may be less informative than inpatient in some cases. For pediatric populations, aEEG monitoring is only recommended in the first approach of differential diagnosis or in children with continuous spike and wave during sleep, without any clinical seizure. The ILAE recommends the use of LTM in epilepsy for the following indications:

- Detection, characterization, and quantification on video/EEG of ictal events, including the appropriate activation procedures to elicit them in individual patients in whom the diagnosis of an underlying epilepsy has already been made, and when the type of seizure or syndrome is not clear.
- Differential diagnosis between epileptic and non-epileptic conditions, characterized by frequently and intermittently occurring behavioral changes including psychogenic nonepileptic events and sleep disorders, particularly those involving paroxysmal movement disorders.
- Documentation of diurnal or circadian variation in occurrence of epileptiform paroxysms, in conjunction with pharmacological interventions and/or of the effect of these interventions on diurnal or circadian behavioral changes.
- Documentation of specific patterns in the occurrence of epileptiform paroxysms during sleep and/or of disruption of sleep architecture in so-called "cognitive epilepsy" cases in the pediatric population.

In 2022, The Working Group of the International Federation of Clinical Neurophysiology (IFCN) and ILAE reviewed the published evidence to develop indications (and minimum standards) for conducting inpatient long term video-electroencephalographic monitoring (LTVEM). The following were recommended:

- To differentiate between epileptic and non-epileptic events, in patients where the diagnosis is in question (strong recommendation).
- To classify patients with epilepsy in whom the seizure type or epilepsy syndrome is undetermined (strong recommendation).

## ***National Institute for Health and Care Excellence (NICE)***

In a 2022 guideline regarding epilepsy, NICE states that if the person's history and examination suggests an epileptic seizure, and a diagnosis of epilepsy is suspected, a routine EEG should be considered and carried out while awake to support diagnosis and provide information about seizure type or epilepsy syndrome. However, if routine and sleep-deprived EEG results are normal and diagnostic uncertainty persists, longer-term monitoring with ambulatory EEG (for up to 48 hours) could be considered.

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## Policy History/Revision Information

Date	Summary of Changes
11/01/2024	<b>Template Update</b> <ul style="list-style-type: none"><li>Reformatted and reorganized policy; transferred content to new template</li><li>Changed policy type classification from "Policy Guideline" to "Medical Policy"</li><li>Added <i>Clinical Evidence</i> and <i>References</i> sections</li><li>Updated <i>Instructions for Use</i></li></ul>

Date	Summary of Changes
	<p><b>Related Policies</b></p> <ul style="list-style-type: none"> <li>Removed reference link to the UnitedHealthcare Medicare Advantage Coverage Summary titled <i>Neurologic Services and Procedures</i></li> </ul> <p><b>Coverage Rationale</b></p> <ul style="list-style-type: none"> <li>Removed content/language addressing coverage limitations</li> </ul> <p><b>CMS National Coverage Determinations (NCDs)</b></p> <ul style="list-style-type: none"> <li>Added language to indicate Medicare does not have a National Coverage Determination (NCD) for ambulatory EEG monitoring</li> </ul> <p><b>CMS Local Coverage Determinations (LCDs) and Articles</b></p> <ul style="list-style-type: none"> <li>Added language to indicate: <ul style="list-style-type: none"> <li>Local Coverage Determinations (LCDs)/Local Coverage Articles (LCAs) exist and compliance with these policies is required where applicable; for specific LCDs/LCAs, refer to the table [in the <i>Centers for Medicare &amp; Medicaid (CMS) Related Documents</i> section of the policy]</li> <li>For coverage guidelines for states/territories with no LCDs/LCAs, refer to the coverage guidelines [listed in the policy]</li> <li>For diagnostic testing, most individuals will have an event or demonstrate interictal activity within 72 hours; monitoring beyond 72 hours must be supported by written documentation for each additional 24 hours of monitoring and be made available upon request</li> <li>Ambulatory EEG monitoring is reasonable and necessary for the indications [listed in the policy]</li> </ul> </li> <li>Revised list of reasonable and necessary indications: <ul style="list-style-type: none"> <li>Added “suspected epileptic seizures with nondiagnostic routine EEG”</li> <li>Replaced “localizing seizure focus <i>for enhanced</i> patient management” with “localizing seizure focus <i>when needed to guide</i> patient management”</li> <li>Removed: <ul style="list-style-type: none"> <li>Experiencing episodic events where you suspect epilepsy, but the history, examination, and routine EEG do not resolve the diagnosis uncertainties</li> <li>Differentiating between neurological and cardiac related problems</li> <li>Identifying and medicating absence seizures</li> <li>For suspected seizures of sleep disturbances</li> </ul> </li> </ul> </li> </ul> <p><b>Applicable Codes</b></p> <p><b>Diagnosis Codes</b></p> <p>For CPT Codes 95700, 95705, 95708, 95717, 95719, and 95721</p> <ul style="list-style-type: none"> <li>Added G40.841, G40.842, G40.843, G40.844, G90.81, G90.89, G93.45, and R41.85</li> </ul> <p><b>Centers for Medicare &amp; Medicaid (CMS) Related Documents</b></p> <ul style="list-style-type: none"> <li>Updated list of documents available in the <i>Medicare Coverage Database</i> to reflect the most current information</li> <li>Added list of applicable <i>Medicare Administrative Contractors (MACs) With Corresponding States/Territories</i></li> <li>Added notation to indicate: <ul style="list-style-type: none"> <li>The Wisconsin Physicians Service Insurance Company (WPS) Contract Number 05901 applies only to WPS Legacy Mutual of Omaha MAC A Providers</li> <li>For the state of Virginia: Part B services for the city of Alexandria and the counties of Arlington and Fairfax are excluded for the Palmetto GBA jurisdiction and included within the Novitas Solutions, Inc. jurisdiction</li> </ul> </li> </ul> <p><b>Supporting Information</b></p> <ul style="list-style-type: none"> <li>Archived previous policy version MPG379.09</li> </ul>

## Instructions for Use

The Medicare Advantage Policy documents are generally used to support UnitedHealthcare coverage decisions. It is expected providers retain or have access to appropriate documentation when requested to support coverage. This document may be used as a guide to help determine applicable:

- Medical necessity coverage guidelines; including documentation requirements, and/or
- Medicare coding or billing requirements.

Medicare Advantage Policies are applicable to UnitedHealthcare Medicare Advantage Plans offered by UnitedHealthcare and its affiliates. This Policy is provided for informational purposes and does not constitute medical advice. It is intended to serve only as a general reference and is not intended to address every aspect of a clinical situation. Physicians and patients should not rely on this information in making health care decisions. Physicians and patients must exercise their independent clinical discretion and judgment in determining care. Treating physicians and healthcare providers are solely responsible for determining what care to provide to their patients. Members should always consult their physician before making any decisions about medical care.

Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The member specific benefit plan document identifies which services are covered, which are excluded, and which are subject to limitations. In the event of a conflict, the member specific benefit plan document supersedes this policy. For more information on a specific member's benefit coverage, please call the customer service number on the back of the member ID card or refer to the [Administrative Guide](#).

Medicare Advantage Policies are developed as needed, are regularly reviewed, and updated, and are subject to change. They represent a portion of the resources used to support UnitedHealthcare coverage decision making. UnitedHealthcare may modify these Policies at any time by publishing a new version on this website. Medicare source materials used to develop these policies may include, but are not limited to, CMS statutes, regulations, National Coverage Determinations (NCDs), Local Coverage Determinations (LCDs), and manuals. This document is not a replacement for the Medicare source materials that outline Medicare coverage requirements. The information presented in this Policy is believed to be accurate and current as of the date of publication. Where there is a conflict between this document and Medicare source materials, the Medicare source materials apply. Medicare Advantage Policies are the property of UnitedHealthcare. Unauthorized copying, use, and distribution of this information are strictly prohibited.

UnitedHealthcare follows Medicare coverage guidelines found in statutes, regulations, NCDs, and LCDs to determine coverage. The clinical coverage criteria governing certain items or services referenced in this Medical Policy have not been fully established in applicable Medicare guidelines because there is an absence of any applicable Medicare statutes, regulations, NCDs, or LCDs setting forth coverage criteria and/or the applicable NCDs or LCDs include flexibility that explicitly allows for coverage in circumstances beyond the specific indications that are listed in an NCD or LCD. As a result, in these circumstances, UnitedHealthcare applies internal coverage criteria as referenced in this Medical Policy. The internal coverage criteria in this Medical Policy was developed through an evaluation of the current relevant clinical evidence in acceptable clinical literature and/or widely used treatment guidelines. UnitedHealthcare evaluated the evidence to determine whether it was of sufficient quality to support a finding that the items or services discussed in the policy might, under certain circumstances, be reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member.

Providers are responsible for submission of accurate claims. Medicare Advantage Policies are intended to ensure that coverage decisions are made accurately. UnitedHealthcare Medicare Advantage Policies use Current Procedural Terminology (CPT®), Centers for Medicare and Medicaid Services (CMS), or other coding guidelines. References to CPT® or other sources are for definitional purposes only and do not imply any right to reimbursement or guarantee claims payment.

For members in UnitedHealthcare Medicare Advantage plans where a delegate manages utilization management and prior authorization requirements, the delegate's requirements need to be followed.