Molina Clinical Policy
Video EEG Monitoring
Policy No. 133

Last Approval: 2/14/2024
Next Review Due By: February 2025

DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. Policies are not a supplementation or recommendation for treatment; Providers are solely responsible for the diagnosis, treatment, and clinical recommendations for the Member. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (e.g., will be paid for by Molina) for a particular Member. The Member's benefit plan determines coverage – each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their Providers will need to consult the Member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a Member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid Members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCP and provide the directive for all Medicare members. References included were accurate at the time of policy approval and publication.

OVERVIEW

Electroencephalography (EEG) is the recording of the brain's spontaneous electrical activity over a short period of time (20–40 minutes), as recorded from multiple electrodes placed on the scalp. A routine EEG is not always sufficient, particularly when it is necessary to record a patient while they are having a seizure.

Video electroencephalography (VEEG) monitoring is the synchronous recording and display of EEG patterns and video-recorded clinical behavior. Short recordings of several hours can be performed in an outpatient setting (an EEG laboratory) while recordings of 24-hours or more are generally done in an inpatient hospital setting. Since seizure medicine is often reduced or stopped in order to provoke a seizure, the hospital setting is preferable to ensure patient safety undergoing a seizure. The average hospital length of stay for VEEG monitoring ranges from three to four days. VEEG monitoring is conducted for two main reasons. First, it is useful for diagnostic monitoring when it is not clear from the clinical evaluation and routine EEG whether the patient has epileptic seizures or non-epileptic (psychiatric) events. Second, video EEG helps identify the area of the brain where seizures arise, especially for patients whose seizures are not controlled with antiepileptic medications and for whom surgery for epilepsy is being considered (Hayes 2021; Moeller et al. 2023).

Long-term VEEG monitoring in the outpatient or home setting may be used to differentiate between the presence of epileptic, non-epileptic and psychogenic seizure disorders. Documenting electrical seizure activity accompanied by physical manifestations aids in the diagnosis and treatment of seizure disorders. Occasionally VEEGs are offered to patients in their home; this allows for long-term monitoring in the patient's home environment which may be more conducive to seizure occurrence (Moeller et al. 2023).

Regulatory Status

Devices and components associated with EEG are class 1 or class 2 devices that have been granted exempt status from 510(k) Premarket Notification procedures.

COVERAGE POLICY

This policy addresses Attended Video EEG Monitoring in a Healthcare Facility. For Ambulatory EEG Monitoring not performed in a Healthcare Facility (with or without video), refer to MCG.

Attended video electroencephalography (VEEG) monitoring in a Healthcare Facility may be considered medically necessary when **ONE** of the following criteria are met:

1. Known seizure disorder as evidenced by **ALL** of the following:
    a. Recurrent refractory seizures despite treatment with ≥ 2 anticonvulsant medications.
    b. No current seizure provoking medications.

2. Differentiating epileptic vs. non-epileptic seizure when **ALL** of the following apply:
    a. Recurrent symptoms not classic for seizures.
    b. History or lab results are non-diagnostic for seizure etiology.
    c. Routine EEG non-specific.
    d. No sudden cessation of heavy alcohol use within 48 hours of seizure activity.
    e. No intoxication due to abuse of drugs within 48 hours of seizure activity.

3. Anti-epileptic medication withdrawal or adjustment during which an individual is at significant risk for requiring immediate medical attention.

4. Prior to epilepsy surgery or intracranial electrode implantation and surgery to localize the seizure focus in members with documented medically refractory seizures.

Video EEG Initial Setting (Inpatient vs. Outpatient)

1. If anticonvulsant medication withdrawal is deemed unsafe in the outpatient setting as evidenced by required documentation and ALL criteria above are met, then inpatient video EEG monitoring may be authorized.*

2. Outpatient video EEG length of stay is generally less than 48 hours and no longer than 72 hours for observation. If the event being monitored does not occur in this timeframe, then inpatient video EEG monitoring may be authorized.

*NOTE: For inpatient video electroencephalography (VEEG) monitoring please use appropriate criteria for inpatient reviews that may include but is not limited to MCG or other nationally recognized criteria.

DOCUMENTATION REQUIREMENTS. Molina Healthcare reserves the right to require that additional documentation be made available as part of its coverage determination; quality improvement; and fraud; waste and abuse prevention processes. Documentation required may include, but is not limited to, patient records, test results and credentials of the provider ordering or performing a drug or service. Molina Healthcare may deny reimbursement or take additional appropriate action if the documentation provided does not support the initial determination that the drugs or services were medically necessary, not investigational, or experimental, and otherwise within the scope of benefits afforded to the member, and/or the documentation demonstrates a pattern of billing or other practice that is inappropriate or excessive.

SUMMARY OF MEDICAL EVIDENCE

Klein et al. (2021) performed a retrospective review using an anonymized database of a national in-home EEG provider with ambulatory video EEG recordings (performed from March through September 2020). A total of 3644 unique, completed assessments that included analysis by neurologists of raw data. Studies were categorized into three age cohorts: pediatrics (n = 941), adult (n = 2020), and geriatric (n = 683). Additional characterization of the cohorts was broken down by assessment yield and time to first typical clinical event; subsequent typical events over the duration of recording were also included. Over 97% of first events were observed in 72 hours among all age cohorts; over 95% of the mean number of subsequent events were also observed. Among children, the time to first event was significantly earlier than those in the adult and geriatric cohorts – 98% of first events and 93% of the mean number of subsequent events were observed in 48 hours. The review demonstrated that among all age cohorts, extended recordings may increase the capturing of events. Ideal duration to capture events among children is 48 hours versus between 48-72 hours among adult and geriatric patients.

The International Federation of Clinical Neurophysiology (IFCN) developed a guideline to address gaps in assessment. In addition, the guideline summarizes the medical literature regarding the use of EEG for the diagnosis and monitoring of adults with epilepsy. Among patients with a first, unprovoked seizure, evidence suggests that an EEG with unequivocal interictal epileptiform discharges can determine an epilepsy diagnosis. Recordings should be a minimum of minutes; activation methods can increase the diagnostic yield. Additional types of EEG recordings can be used when standard EEG recordings are ambiguous in order to aid in determining a patient's diagnosis. Sleep EEG is recommended to increase the likelihood of recording an abnormality (Tatum et al. 2018).

Long-term VEEG can document the association between the paroxysmal semiology and the EEG; this includes synchronized signals from multiple generators (e.g., EEG, electrocardiogram, and electromyography). VEEG is

beneficial to explain the differential diagnosis in patients with spells, to classify types of seizure and quantify frequency, and to characterize the electroclinical manifestations during a presurgical evaluation. Summary statements from the IFCN guideline include the following (Tatum et al. 2018):

- High risk of recurrence after initial seizure is evidenced by the presence of interictal epileptiform discharges in a standard EEG. In addition, there is a high risk of seizure relapse following anti-seizure drugs taper in patients with controlled epilepsy.
- When interictal epileptiform discharges are present in a recording, EEG can help classify the seizure type (focal or generalized).
- A definitive diagnosis is provided with video-EEG monitoring when a seizure is recorded. VEEG is also beneficial for epilepsy surgery evaluation.
- Continuous EEG monitoring can be used in addition to diagnosing and quantifying seizures, particularly in patients who are critically ill.

Primiani et al. (2020) evaluated the yield of ambulatory EEG-video for the diagnosis of epilepsy. A retrospective review of the ambulatory EEG-video monitoring data from 200 consecutive and unselected patients aged 12 years and older was performed by a single company between January 2018 and May 2018. Studies were processed by two senior certified long-term monitoring EEG technologists and interpreted by neurologists. The review included 200 patients – 130 (65%) women with a mean age of 45 years. Mean duration of studies were 76.6 hours (range 23-175 hours). In addition, 110 studies (55%) included recorded events and 101 (92%) events were captured on video. Epileptic events accounted for 18 of 101 (18%) of the events captured and 18 (9%) of the total cohort of 200. Nonepileptic diagnosis accounted for 76 (38%) of the 200 patients in the study. In summary, the use of ambulatory EEG / video monitoring may be an alternative for admission to an inpatient epilepsy monitoring unit especially for cases of highly suspected non-epileptic events.

Chen et al. (2020) note that ambulatory video-EEG monitoring is a cost-effective alternative to inpatient video-EEG monitoring for diagnostic evaluation (non-surgical) when symptoms suggest epileptic seizures. A retrospective cohort study included seizure symptoms of 9,221 consecutive ambulatory video-EEG studies. This included patients in 35 states in one calendar year. Assessment was conducted of the incidence of epileptiform discharges for each symptom; this included symptoms that could be categorized (even if not included in the ILAE 2017 symptom list). Data were analyzed using Fisher's exact test and univariate logistic regression. Overall, the study supports the use of ILAE 2017 symptom categories to guide ambulatory video-EEG studies.

Nagyova et al. (2019) conducted a retrospective review of data that included 199 consecutive referrals for a pediatric ambulatory EEG. Data included features of the referral process, characteristics of the patient and referral reason. Overall, ambulatory EEG was beneficial in 65% of cases. Half of the cases were referred for an EEG to record events however, the EEG was useful in only 43% of cases. The highest reason for unsuccessful investigation was the inability to capture events (56%). Suspected encephalopathy with status epilepticus during sleep also yielded a significant percentage of cases (39%); the study was beneficial 98% of cases. Less than 10% of unsuccessful studies were attributed to technical issues.

Syed et al. (2019) performed a retrospective cohort study on the outcome of in-home diagnostic ambulatory video-EEG monitoring. Patients included a nationwide cohort that were studied during one calendar year. Results were compared with outcomes of inpatient adult and pediatric video-EEG monitoring performed at two academic epilepsy centers during the same timeframe. Ambulatory EEG-video monitoring outcome data was obtained from an independent ambulatory-EEG testing facility; inpatient video-EEG monitoring data also included (a 4-bed adult epilepsy center and an 8-bed pediatric epilepsy center). Of the 9221 ambulatory video-EEG monitoring recordings in 28 states, 63% achieved primary outcome. In half of the recordings (54% for adults, 56% for children), one patient-activated pushbutton event was captured on video of ambulatory video-EEG monitoring recordings. Epileptiform activity was noted in 18% ambulatory video-EEG monitoring recordings; 89% only interictal, 0.5% only ictal, 11% both interictal and ictal). When equated to ambulatory video-EEG monitoring, inpatient video-EEG monitoring captured more confirmed representative events in both adult and pediatric samples. Overall, ambulatory video-EEG monitoring is beneficial for non-urgent diagnostic evaluation of events as well as for evaluating nonepileptic events.

Carlson et al. (2018) performed a prospective study to compare home video telemetry to inpatient video telemetry. Study participants included in 62 children ages 1-17 and had video telemetry with a duration of 24-72 hours; participants were excluded if anti-epileptic drug withdrawal was indicated. Participants were put in either the inpatient

video telemetry group (n=29) or in the home video group (n=33). During the inpatient video telemetry, 62% of studies captured ictal events compared to 64% of studies that captured ictal events during the home video telemetry recordings. Half reported equipment difficulties that included camera placement and activation of the infrared camera capability. This resulted in a loss of diagnostic video information in 15% of the home video telemetry studies. Another limitation included a lack of randomization of study participants. In conclusion similarity in the quality and use of home video telemetry and inpatient video telemetry was noted, and high-quality diagnostic information can be useful. Overall, home video telemetry can be a good alternative to inpatient recordings.

National and Specialty Organizations

The **American Academy of Neurology (AAN)** and the **Child Neurology Society (CNS)** reaffirmed the 2006 guideline on the *Diagnostic Assessment of the Child with Status Epilepticus (SE)* in 2022. Evidence is weak regarding the consideration of an EEG in children presenting with new onset status epilepticus to determine if abnormalities are focal or generalized which can impact diagnosis and treatment. In addition, evidence is weak if the diagnosis of pseudo status epilepticus is assumed. Evidence was insufficient to support use of EEG to determine diagnosis for children presenting with possible non-conclusive status epilepticus. (Rivello et al. 2006).

Further recommendations include the need for additional studies to define what factors may indicate status epilepticus in children. This includes controlled prospective blinded studies to determine the setting and timing for EEG when evaluating children with status epilepticus. In addition, studies should determine if postictal and unexpected ictal EEG results yield prognosis and treatment implications. Studies are also needed regarding the occurrence of non-conclusive status epilepticus following the control of convulsive status epilepticus in children as well as any etiology and prognostic significance.

The Quality Standards Subcommittee of the **American Academy of Neurology, the Child Neurology Society, and the American Epilepsy Society** (Hirtz et al. 2000) published the *Practice Parameter: Evaluating a First Nonfebrile Seizure in Children*. The Practice Parameter recommends EEG testing as part of the neurodiagnostic evaluation of a child with a likely first unprovoked seizure.

The **National Institute for Healthcare and Clinical Excellence (NICE)** (2022) published the guideline Epilepsies in children, young people and adults which noted that “if routine and sleep-deprived EEGs are normal and diagnostic uncertainty persists, consider ambulatory EEG (for up to 48 hours).” Further assessment such as video EEG may be indicated.

CODING & BILLING INFORMATION

CPT (Current Procedural Terminology) Codes

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
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
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
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)
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)
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)
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)
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)

CODING DISCLAIMER. Codes listed in this policy are for reference purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement. Listing of a service or device code in this policy does not guarantee coverage. Coverage is determined by the benefit document. Molina adheres to Current Procedural Terminology (CPT®), a registered trademark of the American Medical Association (AMA). All CPT codes and descriptions are copyrighted by the AMA; this information is included for informational purposes only. Providers and facilities are expected to utilize industry standard coding practices for all submissions. When improper billing and coding is not followed, Molina has the right to reject/deny the claim and recover claim payment(s). Due to changing industry practices, Molina reserves the right to revise this policy as needed.

APPROVAL HISTORY

02/14/2024 Policy reviewed. Title changed to Video EEG Monitoring. Removed coverage criteria for ambulatory EEG, deferred to MCG. Clarified criteria for use of VEEG for differentiating between epileptic vs non-epileptic seizure, added criteria for anti-epileptic medication withdrawal or adjustment. Updated references. IRO Peer Reviewed on February 7, 2024, by a practicing physician board certified in Epilepsy.
02/08/2023 Policy reviewed, no changes to criteria.
02/09/2022 Policy reviewed, added 8 indications from CMS LCD (2020) and Continuation of Therapy items (MCG, 2021); updated Summary of Medical Evidence section and references.
02/08/2021 Policy reviewed, criteria changed to allow video EEG as necessary in the home setting, updated guidelines, and references.
09/16/2020 Policy reviewed, no changes to clinical criteria, updated references.
09/18/2019 Policy reviewed, no changes to clinical criteria, updated references.
07/10/2018 Policy reviewed, clinical criteria changed according to AMR review – under Ambulatory EEG criteria, removed item for outpatient sleep study with EEG monitoring; defined “non-epileptic events”.
03/08/2018 Policy reviewed, no changes to clinical criteria.
06/22/2017 Policy reviewed, no changes to clinical criteria.
09/19/2016 Policy reviewed, changed video EEG criteria to require treatment with > 2 anticonvulsant medications (vs. requiring therapeutic levels of anticonvulsant medications) and changed outpatient video EEG length of stay to up to 72 hours (vs. 48 hours).
05/03/2016 Policy reviewed, added statement under Exclusions section regarding outpatient video EEG monitoring (NOT medically necessary in the home setting due to insufficient evidence).
03/01/2016 Policy reviewed, updated criteria for ambulatory and video EEG – routine EEG, history and physical exam, and outpatient sleep study with EEG monitoring are inconclusive or non-diagnostic (see criteria for ambulatory EEG criteria) and MRI for video EEG required in cases of a suspected non-epileptic seizure when history and lab results are either normal or non-diagnostic for etiology of symptoms or findings (MRI not required prior to epilepsy surgery or in a case of known seizure disorder).

REFERENCES

1. Carlson S, Kandler RH, Moorhouse D, et al. Home video telemetry in children: A comparison to inpatient video telemetry. Seizure. 2018 Oct;61:209-213. doi: 10.1016/j.seizure.2018.08.028. Epub 2018 Sep 8. PMID: 30218807.
2. Centers for Medicare and Medicaid Services (CMS). Medicare coverage database. Local coverage determination (LCD) – EEG – Ambulatory monitoring. Effective October 1, 2015. Updated January 1, 2020. Accessed January 23, 2024. https://www.cms.gov/medicare-coverage-database/search.aspx.
3. Chen H, Koubeissi M, Aziz S, et al. Seizure symptoms and ambulatory EEG findings: incidence of epileptiform discharges. Epileptic Disord. 2020 Dec 1;22(6):752-758. doi: 10.1684/epd.2020.1220. PMID: 33331277.
4. Hayes. Evolving Evidence Review Home Video Electroencephalogram (VEEG) for Diagnosis and Management of Epilepsy and Seizures in Adults. Published May 5, 2021. Accessed January 18, 2024. https://evidence.hayesinc.com
5. Hirtz D, Ashwal S, Berg A, et al. Practice parameter: Evaluating a first nonfebrile seizure in children: Report of the quality standards subcommittee of the American Academy of Neurology, The Child Neurology Society, and The American Epilepsy Society. Neurology. 2000 Sep 12;55(5):616-23. doi: 10.1212/wnl.55.5.616. PMID: 10980722.
6. Klein H, Pang T, Slater J, et al. How much time is enough? Establishing an optimal duration of recording for ambulatory video EEG. Epilepsia Open. 2021 Sep;6(3):569-578. doi: 10.1002/epi4.12517. Epub 2021 Jul 16. PMID: 34197695; PMCID: PMC8408602.
7. Moeller J, Haider H, Hirsch L. Electroencephalography (EEG) in the diagnosis of seizures and epilepsy. Updated January 31, 2023. Accessed

January 30, 2024. http://www.uptodate.com
8. Moeller J, Haider HA, Hirsch LJ. Video and ambulatory EEG monitoring in the diagnosis of seizures and epilepsy. Updated March 7, 2023. Accessed January 30, 2024. http://www.uptodate.com
9. Nagyova R, Horsburgh G, Robertson A, et al. The clinical utility of ambulatory EEG in childhood. Seizure. 2019 Jan;64:45-49. doi: 10.1016/j.seizure.2018.11.020. Epub 2018 Nov 29. PMID: 30554130
10. National Institute for Health and Care Excellence (NICE). Epilepsies in children, young people and adults [NG 217]. Published April 27, 2022. Accessed December 19, 2023. https://www. https://www.nice.org.uk/guidance/ng217. This guidance replaced NICE guideline Epilepsies: Diagnosis and management [CG137].
11. National Clinical Guideline Centre (UK). The Epilepsies: The Diagnosis and Management of the Epilepsies in Adults and Children in Primary and Secondary Care: Pharmacological Update of Clinical Guideline 20. London: Royal College of Physicians (UK); 2012 Jan. PMID: 25340221.
12. Primiani CT, Rivera-Cruz A, Trudeau P, et al. The Yield of Ambulatory EEG-Video Monitoring. Clin EEG Neurosci. 2021 Jul;52(4):274-279. doi: 10.1177/1550059420949768. Epub 2020 Aug 18. PMID: 32808544.
13. Riviello JJ Jr, Ashwal S, Hirtz D, et al. American Academy of Neurology Subcommittee; Practice Committee of the Child Neurology Society. Practice parameter: Diagnostic assessment of the child with status epilepticus (an evidence-based review): Report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. Neurology. 2006 Nov 14;67(9):1542-50. doi: 10.1212/01.wnl.0000243197.05519.3d. PMID: 17101884.
14. Syed TU, LaFrance WC Jr, Loddenkemper T, et al. Outcome of ambulatory video-EEG monitoring in a ˜10,000 patient nationwide cohort. Seizure. 2019 Mar;66:104-111. doi: 10.1016/j.seizure.2019.01.018. PMID: 30910235.
15. Tatum WO, Rubboli G, Kaplan PW, et al. Clinical utility of EEG in diagnosing and monitoring epilepsy in adults. Clin Neurophysiol. 2018 May;129(5):1056-1082. doi: 10.1016/j.clinph.2018.01.019. Epub 2018 Feb 1. Erratum in: Clin Neurophysiol. 2022 Sep;141:160. PMID: 29483017