

Policy: MP216

Section: Medical Benefit Policy

Subject: Quantitative EEG (QEEG)

Applicable Lines of Business

Commercial	X	CHIP	X
Medicare	X	ACA	X
Medicaid	X		

I. Policy: Quantitative EEG (QEEG)

II. Purpose/Objective:

To provide a policy of coverage regarding Quantitative EEG (QEEG)

III. Responsibility:

- A. Medical Directors
- B. Medical Management

IV. Required Definitions

1. Attachment – a supporting document that is developed and maintained by the policy writer or department requiring/authoring the policy.
2. Exhibit – a supporting document developed and maintained in a department other than the department requiring/authoring the policy.
3. Devised – the date the policy was implemented.
4. Revised – the date of every revision to the policy, including typographical and grammatical changes.
5. Reviewed – the date documenting the annual review if the policy has no revisions necessary.

V. Additional Definitions

Medical Necessity or Medically Necessary means Covered Services rendered by a Health Care Provider that the Plan determines are:

- a. appropriate for the symptoms and diagnosis or treatment of the Member's condition, illness, disease or injury;
- b. provided for the diagnosis, and the direct care and treatment of the Member's condition, illness disease or injury;
- c. in accordance with current standards of good medical treatment practiced by the general medical community.
- d. not primarily for the convenience of the Member, or the Member's Health Care Provider; and
- e. the most appropriate source or level of service that can safely be provided to the Member. When applied to hospitalization, this further means that the Member requires acute care as an inpatient due to the nature of the services rendered or the Member's condition, and the Member cannot receive safe or adequate care as an outpatient.

Medicaid Business Segment

Medically Necessary — A service, item, procedure, or level of care that is necessary for the proper treatment or management of an illness, injury, or disability is one that:

- Will, or is reasonably expected to, prevent the onset of an illness, condition, injury or disability.
- Will, or is reasonably expected to, reduce or ameliorate the physical, mental or developmental effects of an illness, condition, injury or disability.
- Will assist the Member to achieve or maintain maximum functional capacity in performing daily activities, taking

into account both the functional capacity of the Member and those functional capacities that are appropriate for Members of the same age

DESCRIPTION:

A quantitative electroencephalogram (QEEG) is a technique for topographic visual enhancement of traditional surface EEG electrophysiological data. The process transforms the surface EEG data into a topographic image of the brain activity. The activity data is algorithmically analyzed by amplitude, frequency and locality and placed onto a schematic map of the brain. The data is then compared to a database of normal patient brainwave activity to determine specific seizure types, location of seizure activity or abnormal discharges, or underlying medical conditions.

INDICATIONS:

Quantitative electroencephalography, when used by physicians highly skilled in clinical EEG, and only as an adjunct to and in conjunction with traditional EEG interpretation, may be considered medically necessary for the following indications:

- Topographical localization and amplitude analysis in pre-surgical evaluations of intractable epilepsy; **or**
- Continuous EEG frequency-trend monitoring for early detection of acute intracranial complications in the operating room during cerebrovascular surgery such as intracranial or carotid endarterectomy; **or**
- Detection of non-convulsive seizures in high-risk individuals in the intensive care setting; **or**
- As an adjunct to confirm diagnostic symptoms of cerebral vascular disease or encephalopathy when routine neurological imaging and routine EEG outcomes are inconclusive; **or**
- To aid in the detection of possible epileptogenic activity when routine surface EEG and long-term EEG monitoring is inconclusive and additional testing is needed to diagnose episodes of behavior suspicious for seizures.

EXCLUSIONS:

In accordance with the American Academy of Neurology / American Clinical Neurophysiology Society's report, and due to insufficient evidence in the peer reviewed, published, medical literature to support a definitive role outside of a research setting, quantitative EEG is considered to be **experimental, investigational or unproven** and is **NOT COVERED** for the diagnosis or treatment of conditions included but not limited to:

- Depression
- Schizophrenia
- Prediction of psychotropic medication response
- Alcoholism
- Drug abuse
- Learning disabilities
- Attention deficit disorders
- Mild to moderate head injury
- Post-concussive syndrome
- Tinnitus
- Asperger syndrome and other autism spectrum disorders
- Fibromyalgia
- Hypoxic ischemic encephalopathy
- Insomnia
- Panic disorder
- Parkinson's disease

Note: A complete description of the process by which a given technology or service is evaluated and determined to be experimental, investigational or unproven is outlined in MP 15 - Experimental Investigational or Unproven Services or Treatment.

Medicaid Business Segment:

Any requests for services, that do not meet criteria set in the PARP, may be evaluated on a case by case basis.

CODING ASSOCIATED WITH: Quantitative EEG (QEEG)

The following codes are included below for informational purposes and may not be all inclusive. Inclusion of a procedure or device code(s) does not constitute or imply coverage nor does it imply or guarantee provider reimbursement. Coverage is determined by the member specific benefit plan document and any applicable laws regarding coverage of specific services. Please note that per Medicare coverage rules, only specific CPT/HCPCS Codes may be covered for the Medicare Business Segment. Please consult the CMS website at www.cms.gov or

the local Medicare Administrative Carrier (MAC) for more information on Medicare coverage and coding requirements.

95955 – Electroencephalogram (EEG) during non-intracranial surgery (eg, carotid surgery)
95957 – Digital analysis of electroencephalogram
95961 – Functional cortical and subcortical mapping by stimulation and/or recording of electrodes on brain surface, or of depth electrodes, to provoke seizures or identify vital brain structures; initial hour of physician attendance
95962 - each additional hour of physician attendance
S8040 – Topographic brain mapping

Current Procedural Terminology (CPT®) © American Medical Association: Chicago, IL

LINE OF BUSINESS:

Eligibility and contract specific benefits, limitations and/or exclusions will apply. Coverage statements found in the line of business specific benefit document will supersede this policy. For Medicare, applicable LCD's and NCD's will supercede this policy. For PA Medicaid Business segment, this policy applies as written.

REFERENCES:

- Nuwer M. Assessment of digital EEG, quantitative EEG, and EEG brain mapping: Report of the American Academy of Neurology and the American Clinical Neurophysiology Society. *Neurology*. 1997;49(1):277-292.
- Chabot RJ, di Michele F, Prichep L, John ER. The clinical role of computerized EEG in the evaluation and treatment of learning and attention disorders in children and adolescents. *J Neuropsychiatry and Clinical Neuroscience* 2001;13(2):171-186.
- Hughes JR, John ER. Conventional and quantitative electroencephalography in psychiatry. *J Neuropsychiatr Clin Neurosci*. 1999 Spring;11(2):190-208.
- Nuwer MR, Hovda DA, Schrader LM, Vespa PM. Routine and quantitative EEG in mild traumatic brain injury. *Clin Neurophysiol*. 2005;116:2001-25.
- Snyder SM, Hall JR. A meta-analysis of quantitative EEG power associated with Attention-Deficit Hyperactivity Disorder. *J Clin Neurophysiol*. 2006;23:441-56.
- Shevell M, Ashwal S, Donley D, Flint J, Gingold M, Hirtz D, et al. Practice parameter: evaluation of the child with global developmental delay: report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. *Neurology*. 2003;60:367-80. Accessed July 2008. Available at URL address: <http://www.neurology.org/cgi/content/full/60/3/367>
- National Institutes of Health and Clinical Excellence (NICE). Clinical Guideline (20): The diagnosis and management of the epilepsies in adults and children in primary and secondary care. Updated Oct 2004. Accessed July 2008 <http://www.nice.org.uk/Guidance/CG20/Guidance/pdf/English>
- Duff J. The Usefulness of Quantitative EEG (QEEG) and Neurotherapy in the assessment and treatment of post-concussive syndrome. *Clinical EEG and Neuroscience* 2004;35(4):198-209.
- Barry RJ, Clarke AR, Johnstone SJ. A review of electrophysiology in attention-deficit/hyperactivity Disorder. I. Qualitative and quantitative electroencephalography. *Clin Neurophysiol*. 2003;114(2):171-183
- Pollock VE, Schneider LS, Lyness SA. Reliability of topographic quantitative EEG amplitude in healthy late-middle-aged and elderly subjects. *Electroencephalography and Clinical Neurophysiology* 1991;79(1):20-26.
- Gudmundsson S, Runarsson TP, Sigurdson S, Eiriksdottir G, Johnsen K. Reliability of quantitative EEG features. *Clinical Neurophysiology* 2007;118(10):2162-2171.
- Kutcher JS, McCrory P, Davis G, et al. What evidence exists for new strategies or technologies in the diagnosis of sports concussion and assessment of recovery? *Br J Sports Med*. 2013;47(5):299-303
- Sangal RB, Sangal JM. Use of EEG Beta-1 Power and Theta/Beta Ratio Over Broca's Area to confirm Diagnosis of Attention Deficit/Hyperactivity Disorder in Children. *Clin EEG Neurosci*. Jun 26 2014.

Gloss D, Varma JK, Pringsheim T, Nuwer MR. Practice advisory: The utility of EEG theta/beta power ratio in ADHD diagnosis: Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology. *Neurology*. 2016;87(22):2375-2379.

Sangal RB, Sangal JM. Use of EEG Beta-1 Power and Theta/Beta Ratio Over Broca's Area to confirm Diagnosis of Attention Deficit/Hyperactivity Disorder in Children. *Clin EEG Neurosci*. Jul 2015;46(3):177-182.

Franko E, Wehner T, Joly O, et al. Quantitative EEG parameters correlate with the progression of human prion diseases. *J Neurol Neurosurg Psychiatry*. 2016;87(10):1061-1067.

Geraedts VJ, Boon LI, Marinus J, et al. Clinical correlates of quantitative EEG in Parkinson disease: A systematic review. *Neurology*. 2018;91(19):871-883.

Byeon J, Choi TY, Won GH, et al. A novel quantitative electroencephalography subtype with high alpha power in ADHD: ADHD or misdiagnosed ADHD? *PLoS One*. 2020;15(11):e0242566.

Kopanska M, Banas-Ząbczyk A, Lagowska A, et al. Changes in EEG recordings in COVID-19 patients as a basis for more accurate QEEG diagnostics and EEG neurofeedback therapy: A systematic review. *J Clin Med*. 2021;10(6):1300

van 't Westende C, Geraedts VJ, van Ramesdonk T, et al. Neonatal quantitative electroencephalography and long-term outcomes: A systematic review. *Dev Med Child Neurol*. 2021 Dec 21

Ji Y, Choi TY, Lee J, et al. Characteristics of attention-deficit/hyperactivity disorder subtypes in children classified using quantitative electroencephalography. *Neuropsychiatr Dis Treat*. 2022 Nov 21;18:2725-2736.

de Carvalho Costa TD, Junior CG, Silva RAE, et al. The effects of non-invasive brain stimulation on quantitative EEG in patients with Parkinson's disease: A systematic scoping review. *Front Neurol*. 2022;13:758452.

This policy will be revised as necessary and reviewed no less than annually.

Devised: 7/08

Revised: 6/12 (Added Exclusions)

Reviewed: 7/09, 7/10, 6/11, 6/13, 6/14; 5/15, 5/16, 5/17, 5/18, 5/19, 5/20, 5/21, 5/22, 5/23, 5/24

CMS UM Oversight Committee Approval: 12/23, 7/24

Geisinger Health Plan may refer collectively to health care coverage sponsors Geisinger Health Plan, Geisinger Quality Options, Inc., and Geisinger Indemnity Insurance Company, unless otherwise noted. Geisinger Health Plan is part of Geisinger, an integrated health care delivery and coverage organization.

Coverage for experimental or investigational treatments, services and procedures is specifically excluded under the member's certificate with Geisinger Health Plan. Unproven services outside of an approved clinical trial are also specifically excluded under the member's certificate with Geisinger Health Plan. This policy does not expand coverage to services or items specifically excluded from coverage in the member's certificate with Geisinger Health Plan. Additional information can be found in MP015 Experimental, Investigational or Unproven Services.

Prior authorization and/or pre-certification requirements for services or items may apply. Pre-certification lists may be found in the member's contract specific benefit document. Prior authorization requirements can be found at <https://www.geisinger.org/health-plan/providers/ghp-clinical-policies>

Please be advised that the use of the logos, service marks or names of Geisinger Health Plan, Geisinger Quality Options, Inc. and Geisinger Indemnity Insurance Company on a marketing, press releases or any communication piece regarding the contents of this medical policy is strictly prohibited without the prior written consent of Geisinger Health Plan. Additionally, the above medical policy does not confer any endorsement by Geisinger Health Plan, Geisinger Quality Options, Inc. and Geisinger Indemnity Insurance Company regarding the medical service, medical device or medical lab test described under this medical policy.