MASSACHUSETTS

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Medical Policy

Quantitative Electroencephalography as a Diagnostic Aid for Attention-Deficit/Hyperactivity Disorder

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Policy Number: 554

BCBSA Reference Number: 3.01.03 (For Plan internal use only)
NCD/LCD: NA

Related Policies

- Neurofeedback, #515

Policy

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

Quantitative electroencephalographic-based assessment of the theta/beta ratio is considered **INVESTIGATIONAL** as a diagnostic aid for attention-deficit/hyperactivity disorder.

Prior Authorization Information

Inpatient

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

Outpatient

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

	Outpatient
Commercial Managed Care (HMO and POS)	This is **not** a covered service.
Commercial PPO and Indemnity	This is **not** a covered service.
Medicare HMO Blue℠	This is **not** a covered service.
Medicare PPO Blue℠	This is **not** a covered service.

CPT Codes / HCPCS Codes / ICD Codes

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

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

CPT Codes

CPT codes:	Code Description
95957	Digital analysis of electroencephalogram (EEG) (eg, for epileptic spike analysis)
95812	Electroencephalogram (EEG) extended monitoring; 41-60 minutes
95813	Electroencephalogram (EEG) extended monitoring; greater than 1 hour

DESCRIPTION

Attention-Deficit/Hyperactivity Disorder

Attention-deficit/hyperactivity disorder (ADHD) is common in children, adolescents, and adults, and is defined by pervasive symptoms of inattention and/or hyperactivity-impulsivity, which lead to impairment in at least 2 domains of the work, school, or home environments. Stimulant medications reduce symptoms associated with ADHD, although there are concerns about the potential for overdiagnosis and overprescribing of medication.

Diagnosis

Presently, ADHD is diagnosed clinically by assessing behavioral symptoms and impairment via interviews and standard questionnaires. Diagnosis can be challenging because the core symptoms are nonspecific. They may be present in other psychiatric disorders (eg, learning disabilities, conduct disorders, affective disorders) or result from environmental influences such as a lack of discipline. Also, ADHD is a heterogeneous disorder with multiple subtypes and frequently coexists with other psychiatric disorders.

There has been substantial research conducted over the last several decades on whether electroencephalography (EEG)-derived brain wave patterns in patients with ADHD differ from those without ADHD. EEG patterns are typically categorized into 4 frequency ranges: delta (<4 Hz), theta (4-7 Hz), alpha (8-12 Hz), and beta (13-25 Hz). The largest focus of research on brain wave patterns in ADHD has been on whether there are increased theta wave activity and an increased theta/beta ratio in ADHD patients.

The Neuropsychiatric EEG-based ADHD Assessment Aid (NEBA®) system is a specific quantitative EEG system that measures the resting theta/beta ratio of the electroencephalogram with an electrode located at the central midline position (referred to as position CZ in the international 10-20 EEG system). Quantitative EEG uses computer analysis with the mathematical transformation from the time domain into the frequency domain (fast-Fourier transform) to determine the total power at each frequency. The relative power of the waveform can then be calculated in relation to the total power of the 4 frequency ranges. The NEBA system uses proprietary cutoffs to generate an estimate of the likelihood of ADHD based on the resting theta/beta ratio.

It is proposed that the NEBA system can be used to confirm a clinical diagnosis or support further testing in children and adolescents with ADHD. The system is not intended to evaluate patients for whom the clinician's diagnosis of ADHD is negative, and the system does not generate an interpretive report in this situation. It is also proposed that the clinician's diagnostic impression plus the results generated by the NEBA system may reduce the potential for overdiagnosis of ADHD, and thereby reduce the risks of administering unnecessary pharmacologic therapy in the intended-use population. Also, as a result of research on EEG brain waves in ADHD, neurofeedback has been developed as a potential treatment for ADHD (see policy #515). This treatment employs principles of biofeedback using EEG brain wave activity and attempts to alter the brainwave patterns in beneficial ways.

Summary

Patients with attention-deficit/hyperactivity disorder (ADHD) may have alterations in their brain wave patterns that can be measured by quantitative electroencephalography (EEG). A commercially available system, the Neuropsychiatric EEG-based ADHD Assessment Aid, measures the resting theta/beta ratio of the electroencephalogram. This technology is being evaluated to aid in the diagnosis of ADHD in adolescents and children for whom there is a clinical suspicion of ADHD.

For individuals suspected of having attention-deficit/hyperactivity disorder (ADHD) who received quantitative electroencephalography (EEG), the evidence includes a number of studies on brain wave patterns, particularly the theta/beta ratio. Relevant outcomes are symptoms, functional outcomes, and medication use. Numerous studies have evaluated brain wave patterns with standard EEG equipment, and a pivotal trial, submitted to the U.S. FDA, measured the theta/beta ratio with the Neuropsychiatric EEG-based ADHD Assessment Aid system. In the pivotal trial, both the specificity and positive predictive value of quantitative EEG were high. The reclassification analysis would suggest that a negative Neuropsychiatric EEG-based ADHD Assessment Aid might make ADHD less likely, although it is not clear from this study whether the consensus diagnosis was more accurate than the initial clinical diagnosis that included patient interview and parent rating scales. The larger body of evidence also raises questions about the utility of measuring the theta/beta ratio because it has not been a consistent finding across studies. Given the uncertainty of an increase in the theta/beta ratio in patients with ADHD, additional study is needed to determine whether a low theta/beta ratio can identify children and adolescents who are unlikely to have ADHD. Also, the effect of the test on patient outcomes would allow greater certainty regarding the usefulness of this test. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Policy History

Date	Action
12/2023	Annual policy review. No references added. Policy statements unchanged.
12/2022	Annual policy review. No references added. Policy statements unchanged.
12/2021	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
12/2020	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
11/2019	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
11/2018	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
11/2017	Annual policy review. New references added.
1/2016	Annual policy review. New references added.
12/2014	Annual policy review. Wording of policy statement changed to clarify the type of quantitative EEG and the diseases addressed in the policy. Effective 12/1/2014.
3/2014	New medical policy describing investigational indications. Effective 3/1/2014.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:
Medical Policy Terms of Use
Managed Care Guidelines
Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

References

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