BlueCross BlueShield of Alabama

Name of Blue Advantage Policy:

Digital Electroencephalography (DEEG) Analysis

Policy #: 368
Latest Review Date: June 2022
Category: Administrative

BACKGROUND:

Blue Advantage *medical policy does not conflict with Local Coverage Determinations (LCDs), Local Medical Review Policies (LMRPs) or National Coverage Determinations (NCDs) or with coverage provisions in Medicare manuals, instructions or operational policy letters. In order to be covered by Blue Advantage the service shall be reasonable and necessary under Title XVIII of the Social Security Act, Section 1862(a)(1)(A). The service is considered reasonable and necessary if it is determined that the service is:*

1. *Safe and effective;*
2. *Not experimental or investigational*;*
3. *Appropriate, including duration and frequency that is considered appropriate for the service, in terms of whether it is:*
   - *Furnished in accordance with accepted standards of medical practice for the diagnosis or treatment of the patient's condition or to improve the function of a malformed body member;*
   - *Furnished in a setting appropriate to the patient's medical needs and condition;*
   - *Ordered and furnished by qualified personnel;*
   - *One that meets, but does not exceed, the patient's medical need; and*
   - *At least as beneficial as an existing and available medically appropriate alternative.*

Routine costs of qualifying clinical trial services with dates of service on or after September 19, 2000 which meet the requirements of the Clinical Trials NCD are considered reasonable and necessary by Medicare. Providers should bill* ***Original Medicare* *for covered services that are related to* ***clinical trials*** *that meet Medicare requirements (Refer to Medicare National Coverage Determinations Manual, Chapter 1, Section 310 and Medicare Claims Processing Manual Chapter 32, Sections 69.0-69.11).*

POLICY:

Blue Advantage will treat **digital electroencephalography analysis** as a covered benefit when **substantial digital analysis** is performed as evidence by documentation in the patient's medical record that an **extra hour's work by the technician** to process the data from the digital EEG, and an **extra 20-30 minutes of physician time** to review the technician's work and review the data produced was performed.

Blue Advantage will treat **digital electroencephalography analysis** as a **non-covered** benefit **simply when the EEG was recorded digitally**.

Blue Advantage does not approve or deny procedures, services, testing, or equipment for our members. Our decisions concern coverage only. The decision of whether or not to have a certain test, treatment or procedure is one made between the physician and his/her patient. Blue Advantage administers benefits based on the members' contract and medical policies. Physicians should always exercise their best medical judgment in providing the care they feel is most appropriate for their patients. Needed care should not be delayed or refused because of a coverage determination.

DESCRIPTION OF PROCEDURE OR SERVICE:

Digital electroencephalography (DEEG) is the paperless acquisition and recording of the electroencephalogram (EEG) via computer-based instrumentation, with waveform storage in a digital format on electronic media, and waveform display on an electronic monitor or other computer output device. The procedure for an EEG involves placing a series of electrodes, with at least four recording channels, on the patient. A very low electrical current is sent through the electrodes and the baseline brain energy is recorded on a diagnostic machine. Electrical activity is recorded and analyzed. Patients are then exposed to a variety of external stimuli, including bright or flashing light, noise or certain drugs, or asked to open and close their eyes, or to change breathing patterns. The electrodes transmit the resulting changes in brain wave patterns. Variations in wave characteristics correlate with neurological conditions and are used to diagnose specific medical conditions. Virtually all contemporary EEG recordings use digital recording methods, which involves the use of a digital EEG recorder (machine), but still involves visual analysis of the waveforms.

Digital analysis requires the use of quantitative analytical techniques. Ideally, DEEG creates a recording on a digital medium without loss of anything except the paper itself. In practice, there may be some loss of detail especially at the lower sensitivity settings. Digital EEG also allows for simple but extremely useful digital utilities such as post hoc changes in filters, horizontal and vertical display scale and montage reformatting that allow greater flexibility in reading the EEG. These tools allow for better visual reading of the record than can be achieved with an analog paper record.

Digital EEG is significantly more comprehensive than just a digital reading of the EEG. The analysis of the digital data may include data that expands more than 24 hours of continual monitoring. In general, this would entail an extra hour's work by the technician to process the

data from the EEG, and an extra 20-30 minutes of physician time to review the technician's work and review the data produced.

KEY POINTS:

Literature review through May 2022.

Summary of Evidence

Although DEEG has many benefits, it should not be considered a panacea. A skilled technologist is still required to obtain a high- quality recording. Furthermore, even a good technologist can have the misfortune of recording EEG activity, such as a seizure, at a sensitivity, filter setting, or montage that hampers accurate interpretation. This problem can easily be overcome using post hoc changes to the DEEG. However, basic concepts of polarity, principles of localization and montage design, and recording parameters still need to be understood for accurate interpretation. Because there are multiple ways of viewing the data with DEEG, the time required to read the record may exceed that for analog recordings.

Borusiak, et al (2010) reported on prospective analysis of DEEG performed in 382 healthy children (226 male, 156 female) ages 6–13 years, admitted to the hospital for minor head trauma. A digital EEG recording was carried out for a minimum of 20 minutes including hyperventilation and photic stimulation. Two board-certified clinical neurophysiologists carried out analysis.

Epileptiform EEG discharges were detected in 25 of 382 children (11 of 226 male, 14 of 156 female) corresponding to an overall prevalence of 6.5%. Of these 25 children, four had either generalized or bifrontal spikes, 12 showed constant localized focal discharges, and nine showed multifocal discharges. Compared to previous studies using non-DEEG recording, the prevalence of epileptiform EEG discharges in our population was significantly higher. No significant difference was found when comparing our data to prevalence's recently reported in children with behavioral disturbances using DEEG. The study further highlights the urgent need to reevaluate the prevalence of epileptiform EEG discharges in healthy children using DEEG recordings in a larger cohort.

The recording parameters and conduct of the test are governed by the applicable standards for the American Clinical Neurophysiology Society (ACNS).

Additionally, the ACNS gives specific directions for billing for digital EEG analysis:

"Code 95957 should not be used simply when the EEG was recorded digitally. There is no additional charge for turning on an automated spike and seizure detector on a routine EEG, ambulatory EEG, or video-EEG monitoring. Nor is there an additional code for performing EEG on a digital machine instead of an older generation analog machine. Some features of digital EEG make it easier and quicker to read, and other features slow it down by providing new optional tricks and tools. Overall, it is about the same amount of work as an analog EEG.

Code 95957 is used when substantial additional digital analysis was medically necessary and was performed, such as 3D dipole localization. In general, this would entail an extra hour's work by

the technician to process the data from the digital EEG, and an extra 20-30 minutes of physician time to review the technician's work and review the data produced. Most practitioners would not have the opportunity to do this advanced procedure. It would be more commonly used at specialty centers, e.g. epilepsy surgery programs. Note that the codes for "monitoring for identification and lateralization of cerebral seizure focus" already include epileptic spike analysis."

KEY WORDS:
Digital electroencephalography, DEEG, digital EEG, digital analysis of electroencephalogram

APPROVED BY GOVERNING BODIES:
Not applicable.

BENEFIT APPLICATION:
Coverage is subject to member's specific benefits. Group specific policy will supersede this policy when applicable.

CURRENT CODING:

95957	Digital analysis of electroencephalogram (EEG) (e.g., for epileptic spike analysis)

PREVIOUS CODING:

95950	Monitoring for identification and lateralization of cerebral seizure focus, electroencephalographic (eg, 8 channel EEG) recording and interpretation, each 24 hours (Code deleted 12/31/2019)
95951	Monitoring for localization of cerebral seizure focus by cable or radio, 16 or more channel telemetry, combined electroencephalographic (EEG) and video recording and interpretation (e.g., for presurgical localization), each 24 hours (Code deleted 12/31/2019)
95953	Monitoring for localization of cerebral seizure focus by computerized portable 16 or more channel EEG, electroencephalographic (EEG) recording and interpretation, each 24 hours, unattended (Code deleted 12/31/2019)
95956	Monitoring for localization of cerebral seizure focus by cable or radio, 16 or more channel

	telemetry, electroencephalographic (EEG) recording and interpretation, each 24 hours, attended by a technologist or nurse (Code deleted 12/31/2019)

REFERENCES:

1. American Academy of Neurology. 2019. Billing and Coding FAQ's. Accessed September 26, 2019. Available at URL address: https://www.aan.com/tools-and-resources/practicing-neurologistsadministrators/billing-and-coding/coding-faqs/
2. American Clinical Neurophysiology Society. Guideline Twelve: Guidelines for long term monitoring for epilepsy. 2008.
3. Borusiak, P., Zilbauer, M, Jenke, A. et al. Prevalence of epileptiform discharges in healthy children—New data from a prospective study using digital EEG. Epilepsia: Official Journal of the International League Against Epilepsy, 2010: Vol 51, Issue 7: 1185-1188.
4. Dobrin S. (author). Seizures and Epilepsy in Adolescents and Adults. In: Kellerman, RD, Bope, ET (editors). Conn's Current Therapy 2018. Philadelphia: PA: Elsevier, 2018.
5. Faulkner H et al. The utility of prolonged outpatient ambulatory EEG. Seizure 2012; 21(7):491-5.
6. Keezer MR, Simard-Tremblay E, Veilleux M. The Diagnostic Accuracy of Prolonged Ambulatory Versus Routine EEG. Clin EEG Neurosci. 2016 Apr;47(2):157-61.
7. Long Term Monitoring for Epilepsy. Electroencephalography and Clinical Neurophysiology 1993; 87: 437-58.
8. Mesraoua B, Deleu D, Wieser HG. Stevanovic D (Ed.). Long-Term Monitoring: An Overview, Epilepsy - Histological, Electroencephalographic and Psychological Aspects, ISBN: 978-953-51-0082-9, InTech, 2012. Available from: https://www.intechopen.com/books/epilepsy-histological-electroencephalographicand-psychological-aspects/long-term-monitoring-an-overview
9. 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; 49:277-292.
10. Nayak DS, Sajeesh P. Technical standards for digital electroencephalogram recording in epilepsy practice. Ann Indian Accad Neurol 2007:10:121-7.
11. Schachter, SC. Evaluation and management of the first seizure in adults. In: UpToDate. Garcia P (Ed). Apr 29, 2022. UpToDate, Waltham, MA. Accessed June 27, 2022.
12. Seneviratne U, Mohamed A, Cook M, D'Souza W. The utility of ambulatory electroencephalography in routine clinical practice: a critical review. Epilepsy Res. 2013 Jul; 105(1-2):1-12.
13. Sirven, JI. Evaluation and management of drug-resistant epilepsy. In: UpToDate. Garcia P (Ed). December 2018. UpToDate, Waltham, MA. (Accessed on September 26, 2019).
14. Smith SJ. EEG in the diagnosis, classification, and management of patients with epilepsy. J Neurol Neurosurg Psychiatry. 2005 Jun; 76 Suppl 2:ii2-7.

15. St Louis EK, Foldvary-Schaefer, N. Sleep-related epilepsy syndromes. In: UpToDate. Avidan AY, Garcia P (Ed). January 2018. UpToDate, Waltham, MA. (Accessed on September 26, 2019).
16. Tatum WO, Rubboli G, Kaplan PW, Mirsatari SM, Radhakrishnan K, Gloss D, et al. Clinical utility of EEG in diagnosing and monitoring epilepsy in adults. Clin Neurophysiol. 2018 May; 129(5):1056-1082.
17. Van Cott A, Brenner RP. Technical advantages of digital EEG. J Clin Neurophys 1998; 15(6):464-75.

POLICY HISTORY:

Adopted for Blue Advantage, August 2009
Available for comment August 5-September 18, 2009
Medical Policy Group, January 2015
Medical Policy Group, August 2021
Medical Policy Group, June 2022