

Policy: MP346

Section: Medical Policy

Subject: Intraoperative Neurophysiologic Monitoring

Applicable line of business:

Commercial	x	Medicaid	x
Medicare	x	ACA	x
CHIP	x		

I. Policy: Intraoperative Neurophysiologic Monitoring

II. Purpose/Objective:

To provide a policy of coverage regarding Intraoperative Neurophysiologic Monitoring

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.

Commercial

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.

Medicare

Geisinger Gold Medicare Advantage HMO, PPO, and HMO D-SNP plans are offered by Geisinger Health Plan/Geisinger Indemnity Insurance Company, health plans with a Medicare contract. Continued enrollment in Geisinger Gold depends on contract renewal. Geisinger Health Plan/Geisinger Indemnity Insurance Company are part of Geisinger, an integrated health care delivery and coverage organization.

CHIP

Geisinger Health Plan Kids (GHP Kids) is a Children's Health Insurance Program (CHIP) offered by Geisinger Health Plan in conjunction with the Pennsylvania Department of Human Services (DHS). Geisinger Health Plan is part of Geisinger, an integrated health care delivery and coverage organization.

Medicaid

Geisinger Health Plan Family (GHP Family) is a Medical Assistance (Medicaid) insurance program offered by Geisinger Health Plan in conjunction with the Pennsylvania Department of Human Services (DHS). Geisinger Health Plan is part of Geisinger, an integrated health care delivery and coverage organization

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:

Intraoperative neurophysiologic monitoring (IONM) is a technique used to reduce the risk of neurological deficits after operations that involve the nervous system. IONM makes use of recordings of electrical potentials from the nervous system during surgical operations. The use of IONM offers a possibility to detect injuries before they become so severe, they cause permanent deficits after the operation and is normally performed by technologists supervised by a physiologist, or a neurologist acting within the scope of their license/certification. According to a guideline by the American Academy of Neurology (AAN) "it is expected that a specifically trained technologist preferably with credentials from the American Board of Neurophysiologic Monitoring (ABNM) or the American Board of Registration of Electrodiagnostic Technologists (ABRET), will be in continuous attendance in the operating room, with either the physical or electronic capacity for real-time communication with the supervising physician. Although credentialing varies among professional organizations, the American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) and AAN provide guidance that the monitoring technologist should be under the direct supervision of a clinical neurophysiologist." (AAN, 2008; AANEM, 2008).

INDICATIONS:

Intraoperative neurophysiological monitoring (IONM) with an FDA approved technique and device is considered medically necessary when:

- IONM is performed by either a physician trained in clinical neurophysiology or a trained technologist practicing within the scope of their license/certification and working under the direct supervision of a physician trained in neurophysiology; and
- IONM is interpreted by a physician trained in clinical neurophysiology (other than the operating surgeon or anesthesiologist) who is either physically in attendance in the operating room or present via a real-time remote mechanism for all electroneurodiagnostic (END) monitoring situations and is immediately available to interpret the recording and advise the surgeon; and
- IONM is conducted and interpreted real-time (either on-site or at a remote location) and continuously communicated to the surgical team; and
- There is significant risk of nerve or spinal cord injury during a surgical procedure

LIMITATIONS:

Train of four (TOF) monitoring is considered integral to intraoperative monitoring and/or administration of anesthesia and is primarily done to prevent or avoid permanent neurological injury. Therefore, **TOF monitoring or any type of neuromuscular blockade testing, is not separately reimbursed.**

Baseline electrodiagnostic studies prior to surgery is limited to once per operative session. Use of the following baseline testing modalities alone or in combination is dependent upon surgical procedure and/or surgical site:

- Sensory Evoked potentials (i.e., somatosensory [SSEP], auditory brainstem evoked responses [ABR], visual evoked potentials [VEP])
- Motor evoked potentials (MEP)
- Electromyography (EMG), free-running or stimulus-triggered
- Electroencephalogram (EEG)

EXCLUSIONS:

- Non-FDA approved techniques (e.g., intraoperative monitoring of motor-evoked potentials using transcranial magnetic stimulation)
- Outside of hospital/ASC settings
- Intraoperative monitoring of visual-evoked potentials

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:

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.

- 95940 Continuous intraoperative neurophysiology monitoring in the operating room, one on one monitoring requiring personal attendance, each 15 minutes (List separately in addition to code for primary procedure)
- 95941 Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby) or for monitoring of more than one case while in the operating room, per hour (List separately in addition to code for primary procedure)
- 95999 Unlisted neurological or neuromuscular diagnostic procedure (train of four monitoring)
- G0453 Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby), per patient, (attention directed exclusively to one patient) each 15 minutes (list in addition to primary procedure)
- 92652 Auditory evoked potentials; for threshold estimation at multiple frequencies, with interpretation and report
- 92653 Auditory evoked potentials; neurodiagnostic, with interpretation and report
- 95885 Needle electromyography, each extremity, with related paraspinal areas, when performed, done with nerve conduction, amplitude and latency/velocity study; complete, five or more muscles studied, innervated by three or more nerves or four or more spinal levels (List separately in addition to code for primary procedure)
- 95886 Needle electromyography, each extremity, with related paraspinal areas, when performed, done with nerve conduction, amplitude and latency/velocity study; limited (List separately in addition to code for primary procedure)
- 95887 Needle electromyography, non-extremity (cranial nerve supplied or axial) muscle(s) done with nerve conduction, amplitude and latency/velocity study (List separately in addition to code for primary procedure)
- 95907 Nerve conduction studies; 1-2 studies
- 95908 Nerve conduction studies; 3-4 studies
- 95909 Nerve conduction studies; 5-6 studies
- 95910 Nerve conduction studies; 7-8 studies
- 95911 Nerve conduction studies; 9-10 studies
- 95912 Nerve conduction studies; 11-12 studies
- 95913 Nerve conduction studies; 13 or more studies
- 95867 Needle electromyography; cranial nerve supplied muscle(s), unilateral
- 95868 Needle electromyography; cranial nerve supplied muscles, bilateral
- 95933 Orbicularis oculi (blink) reflex, by electrodiagnostic testing
- 51785 Needle electromyography studies (EMG) of anal or urethral sphincter, any technique
- 95860 Needle electromyography; 1 extremity with or without related paraspinal areas
- 95861 Needle electromyography; 2 extremities with or without related paraspinal areas
- 95863 Needle electromyography; 3 extremities with or without related paraspinal areas
- 95864 Needle electromyography; 4 extremities with or without related paraspinal areas

- 95870 Needle electromyography; limited study of muscles in 1 extremity or non-limb (axial) muscles (unilateral or bilateral), other than thoracic paraspinal, cranial nerve supplied muscles, or sphincters
- 95707 Electroencephalogram (EEG), without video, review of data, technical description by EEG technologist, 2-12 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
- 95812 Electroencephalogram (EEG) extended monitoring; 41-60 minutes
- 95813 Electroencephalogram (EEG) extended monitoring; 61-119 minutes
- 95822 Electroencephalogram (EEG); recording in coma or sleep only
- 95829 Electrocorticogram at surgery
- 95955 Electroencephalogram (EEG) during nonintracranial surgery (eg, carotid surgery)
- 95957 Digital analysis of electroencephalogram (EEG) (eg, for epileptic spike analysis)
- 95925 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in upper limbs
- 95926 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in lower limbs
- 95927 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in the trunk or head
- 95938 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in upper and lower limbs
- 95928 Central motor evoked potential study (transcranial motor stimulation); upper limbs
- 95929 Central motor evoked potential study (transcranial motor stimulation); lower limbs
- 95939 Central motor evoked potential study (transcranial motor stimulation); in upper and lower limbs
- 95867 Needle electromyography; cranial nerve supplied muscle(s), unilateral
- 95868 Needle electromyography; cranial nerve supplied muscles, bilateral
- 95933 Orbicularis oculi (blink) reflex, by electrodiagnostic testing
- G0453 Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby), per patient, (attention directed exclusively to one patient) each 15 minutes

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:

Neuromonitoring in surgery and anesthesia. UpToDate. Accessed: May 22, 2020

American Association of Electrodiagnostic Medicine (AAEM). Position Statements.
<http://www.aanem.org/Advocacy/Position-Statements>.

American Academy of Neurology; Assessment: intraoperative neurophysiology. Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology. 1990;40(11):1644-6.

American Society of Electroneurodiagnostic Technologists (ASET). Simultaneous intraoperative monitoring. Performance Standards and Best Practices.
<https://www.aset.org/i4a/pages/index.cfm?pageid=3613>

American Association of Neurological Surgeons (AANS)/Congress of Neurological Surgeons (CNS).Position statement regarding electrophysiological monitoring during routine spinal surgery. 2012, 2014, 2018.

Nuwer MR, Emerson RG, Galloway G, et al. Evidence-based guideline update: Intraoperative spinal monitoring with somatosensory and transcranial electrical motor evoked potentials: Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and the American Clinical Neurophysiology Society. Neurology 2012;78;585-589

Ney JP, van der Goes DN. Evidence-based guideline update: Intraoperative spinal monitoring with somatosensory and transcranial electrical motor evoked potentials. Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and the American Clinical Neurophysiology Society. Neurology. 2012 Jul 17;79(3):292;

Thirumala PD, Melachuri SR, Kaur J, Ninaci D, Melachuri MK, Habeych ME, Crammond DJ, Balzer JR. Diagnostic Accuracy of Somatosensory Evoked Potentials in Evaluating New Neurological Deficits After Posterior Cervical Fusions. *Spine* 2017;;42(7):490-496.

Pease M, Gandhoke GS, Kaur J, Thirumala P, Balzer J, Crammond D, Okonkwo DO, Kanter AS. Predictive Value of Intraoperative Neurophysiological Monitoring During Spine Surgery: A Prospective Analysis of 4489 Consecutive Patients. *Neurosurgery*. 2016 Aug;63 Suppl 1:192-3.

Hadley MN, Shank CD, Rozzelle CJ, Walters BC. Guidelines for the Use of Electrophysiological Monitoring for Surgery of the Human Spinal Column and Spinal Cord. *Neurosurgery*. 2017;81(5):713-732.

Daniel JW, Botelho RV, Milano JB, et al., Intraoperative Neurophysiological Monitoring in Spine Surgery: A Systematic Review and Meta-Analysis. *Spine* 2018;43(16):1154-1160.

Hayes, Inc. Medical Technology Directory Report. Multimodal intraoperative monitoring (MIOM) during cervical spinal surgery. March 2016, reviewed March 23, 2017; March 23, 2018.,Jan 29, 2019, April 15, 2020.

Hayes, Inc. Medical Technology Directory Report. Multimodal intraoperative monitoring (MIOM) during surgery for scoliosis and spinal deformities. February 18, 2016, reviewed January 20, 2017b,2018, 2019, 2020.

Charalampidis A, Jiang F, Wilson JRF, et al. The use of intraoperative neurophysiological monitoring in spine surgery. *Global Spine J*. 2020; 10 (1 Suppl):104S-114S

Jashek-Ahmed F, Cabrilo I, Bal J et al. Intraoperative monitoring of visual evoked potentials in patients undergoing transsphenoidal surgery for pituitary adenoma: a systematic review. *BMC Neurol*. 2021;21(1):287

Reddy RP, Chang R, Rosario BP et al. What is the predictive value of intraoperative somatosensory evoked potential monitoring for postoperative neurological deficit in cervical spine surgery?-a meta-analysis. *Spine J*. 2021;21(4):555-570

Centers for Medicare & Medicaid Services. Novitas Solutions, Inc. Intraoperative Neurophysiological Testing L35003

Huang CL, Chen CM, Hung WH, et al. Clinical Outcome of Intraoperative Recurrent Laryngeal Nerve Monitoring during Thoracoscopic Esophagectomy and Mediastinal Lymph Node Dissection for Esophageal Cancer. *J Clin Med*. Aug 23 2022; 11(17).

Yuda M, Nishikawa K, Ishikawa Y, et al. Intraoperative nerve monitoring during esophagectomy reduces the risk of recurrent laryngeal nerve palsy. *Surg Endosc*. Jun 2022; 36(6): 3957-3964.

Reddy RP, Chang R, Coutinho DV, et al. Triggered Electromyography is a Useful Intraoperative Adjunct to Predict Postoperative Neurological Deficit Following Lumbar Pedicle Screw Instrumentation. *Global Spine J*. Jun 2022; 12(5): 1003-1011.

Ruas JJ, Rodrigues J, Ribeiro M, Moura CP. Facial nerve dysfunction following parotidectomy: Role of intraoperative facial nerve monitoring. *Eur Arch Otorhinolaryngol*. 2023;280(3):1479-1484.

Chang R, Reddy RP, Coutinho DV, et al. Diagnostic Accuracy of SSEP Changes During Lumbar Spine Surgery for Predicting Postoperative Neurological Deficit: A Systematic Review and Meta-Analysis. *Spine* 2021;46(24):E1343-E1352

Chen B, Yang T, Wang W, et al. Application of Intraoperative Neuromonitoring (IONM) of the Recurrent Laryngeal Nerve during Esophagectomy: A Systematic Review and Meta-Analysis. *J Clin Med*. Jan 10 2023; 12(2).

Reddy RP, Singh-Varma A, Chang R et al. Transcranial motor evoked potentials as a predictive modality for postoperative deficit in cervical spine decompression surgery - A systematic review and meta-analysis. *Global Spine J*. 2023 Dec 4.

Warsi NM, Mohammad AH, Zhang F et al. Electrocorticography Guided resection enhances postoperative seizure freedom in low-grade tumor-associated epilepsy: A systematic review and meta-analysis. *Neurosurgery*. 2023 1;92(1):18-26.

Wojtczak B, Marciniak D, Kaliszewski K, et al. Proving the superiority of intraoperative recurrent laryngeal nerve monitoring over visualization alone during thyroidectomy. *Biomedicines*. 2023;11(3):880

Reddy RP, Singh-Varma A, Chang R, et al. Transcranial motor evoked potentials as a predictive modality for postoperative deficit in cervical spine decompression surgery - A systematic review and meta-analysis. Global Spine J. 2024; 14(5):1609-1628.

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

Devised: 6/21

Revised: 6/23 (address Train of four testing); 6/25 (add exclusions)

Reviewed: 6/22, 6/24

CMS UM Oversight Committee Approval: 12/23, 7/24, 8/25

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.