Description:
Intraoperative neurophysiologic monitoring includes a number of procedures performed to monitor the integrity of the nerve function during high-risk neurosurgical, orthopedic, or vascular surgeries.

For intraoperative monitoring during carotid endarterectomy, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. (RG A2) A retrospective study of 600 patients who underwent carotid endarterectomy utilizing intraoperative transcranial electrical stimulation and median nerve somatosensory evoked potentials to determine the need for intra-arterial shunt during cross clamping found that of the 29 patients who had shunt placement, 2 showed motor deficits after surgery that disappeared after 2 hours, and one suffered permanent hemiplegia. Overall failure rates were 1.0% for transcranial electrical stimulation and 1.2% for median nerve somatosensory evoked potentials.

For intraoperative monitoring during central nervous system tumor surgery, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. (RG A2) Evoked potentials are used for intraoperative monitoring of resection of supratentorial brain tumors, brainstem tumors, skull base tumors, cervicomedullary junction tumors, and spinal tumors.

For intraoperative monitoring during intracranial aneurysm surgery, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. (RG A2) An observational study of 47 patients who underwent somatosensory and motor evoked potentials during intracranial aneurysm surgery found that all intracerebral ischemia could be detected by one of the monitoring techniques. Of the entire cohort, 8 patients developed postoperative new infarctions or motor impairment deficits, with ischemic event risk being related to increased time for the resumption of blood flow. There was no postoperative motor paresis in those patients who had normal evoked potentials.

For intraoperative monitoring during spinal surgery, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. (RG A2) Somatosensory evoked potentials and motor evoked potentials are typically used intraoperative to monitor the integrity of the sensory and motor pathways. However, a systematic review determined that for routine surgical treatment of cervical spondylotic myelopathy or cervical
radiculopathy, although intraoperative evoked potentials may serve as a sensitive means of diagnosing potential neurologic injury, evoked potential worsening is not specific and may not represent clinical worsening; also, its recognition does not necessarily prevent neurologic injury, and it has not been shown to date to result in improved outcomes.

Criteria:
I. Intraoperative neurophysiologic monitoring is considered medically necessary and eligible for separate reimbursement for ALL of the following:
   A. Intraoperative neurophysiologic monitoring is medically necessary for One or more of the following modalities:
      1. Intraoperative neurophysiologic monitoring using somatosensory evoked potential (SSEP) and/or motor evoked potential (MEP) for One or more of the following indications.
         a. Aortic or thoracic aneurysm repair
         b. Aortic cross-clamping
         c. Brachial plexus surgery
      d. Cerebral vascular surgery including One or more of the following:
         i. Carotid Endarterectomy
         ii. Cerebral Aneurysm
         iii. Intracranial arteriovenous malformation
         iv. Hypothermic coronary bypass procedure
      e. Central nervous system tumor surgery
      f. Intracranial aneurysm clipping
      g. Intracranial surgeries
      h. Spinal surgery for One or more of the following indications:
         i. Arteriovenous malformation of the spinal cord
         ii. Resection of spinal cord tumors or cysts
         iii. Scoliosis correction
         iv. Surgical stabilization of spine fracture or traumatic spine injury with or without spinal cord decompression
         v. Decompression of the spinal cord where function of the spinal cord is at risk.
      i. Stereotactic surgery of the brain or brainstem, thalamus, or cerebral cortex
      j. Thalamus tumor resection/thalamotomy
      k. Thyroid surgery
   2. Intraoperative neurophysiologic monitoring using brainstem auditory evoked potential (BAEP) is medically necessary for One or more of the following:
      a. Acoustic neuroma
      b. Vestibular nerve section
      c. Vascular loop decompression
      d. Glomus tumor
      e. Auditory brainstem implant
      f. Posterior fossa procedures
      g. Functional localization of the cortex with direct cortical stimulation
      h. Assess auditory pathways within the brainstem
1. Possible ischemia at the cochlea and eighth nerve
3. Visual evoked potentials or response (VEP, VER) (CPT 95930) are medically necessary for monitoring the visual system during optic nerve (or related) surgery.
4. Intra-operative electromyography (EMG) monitoring is medically necessary for One or more of the following indications:
   a. Microvascular decompression of the facial nerve for hemifacial spasm
   b. Surgery for acoustic neuroma, congenital auricular lesions, or cranial base lesions
   c. Surgical excision of neuromas of the facial nerve
   d. Vestibular neurectomy for Meniere’s disease.
   e. Surgical excision of neuromas for One or more of the following cranial nerves:
      i. Abducens nerve
      ii. Glossopharyngeal nerve
      iii. Oculomotor nerve
      iv. Recurrent laryngeal nerve
      v. Spinal accessory
      vi. Superior laryngeal nerve
      vii. Trochlear nerve

B. Intraoperative neurophysiologic monitoring is performed by either a licensed physician trained in neurophysiology or a trained technologist who is practicing within the scope of his/her license/certification as defined by state law or appropriate authorities and is working under direct supervision of a physician trained in neurophysiology.

C. Intraoperative neurophysiologic monitoring is interpreted by a licensed physician trained in clinical neurophysiology, other than the operating surgeon, who is either in attendance in the operating suite or present by means of a real-time remote mechanism for neurophysiologic monitoring situations and is immediately available.

D. Monitoring is conducted and interpreted real-time (either on-site or at a remote location) and continuously communicated to the surgical team.

E. Intraoperative neurophysiologic monitoring does includes ALL of the following:
   1. Intraoperative neurophysiologic monitoring using EMG for an indication NOT included in section I.A. 4. a-e, is not requested as it is considered experimental and investigational.
   2. Intraoperative neurophysiologic monitoring using EMG combined with Somatosensory Evoked Potential (SEP) is not requested as it is considered Not medically necessary.
   3. Intraoperative neurophysiologic monitoring using EMG for routine spinal surgery is not requested as it is considered experimental and investigational due to insufficient evidence that it improves outcomes.
   4. Intraoperative monitoring is NOT being billed separately for routine lumbar or cervical laminectomies and fusions
      a. Neurophysiologic monitoring for lumbar surgeries have no proven value below the end of the spinal cord as the spinal cord ends at L1-L2.
      b. Evidence-based literature does not show improved outcomes for cervical spine surgeries does not prevent nerve injury and does not improve outcomes.
II. If one or more of the above criteria are not met, the intraoperative neurophysiologic monitoring is not considered medically necessary. Professional charges will not be covered and the associated facility charges are not considered eligible for separate reimbursement

**Information to be Submitted with Pre-Authorization Request:**
- Chart notes and imaging studies with documentation of patient’s diagnosis
- Operative Report
- Intraoperative Monitoring records

**Applicable CPT Codes:**

<table>
<thead>
<tr>
<th>CPT/HCPC Codes</th>
<th>Description</th>
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<tbody>
<tr>
<td>92585</td>
<td>Auditory evoked potentials for evoked response audiometry and/or testing of the central nervous system; comprehensive</td>
</tr>
<tr>
<td>92586</td>
<td>Auditory evoked potentials for evoked response audiometry and/or testing of the central nervous system; limited</td>
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<tr>
<td>95867</td>
<td>Needle electromyography; cranial nerve supplied muscle(s), unilateral</td>
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<tr>
<td>95868</td>
<td>Needle electromyography; cranial nerve supplied muscles, bilateral</td>
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<tr>
<td>95878</td>
<td>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)</td>
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<tr>
<td>95925</td>
<td>Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in upper limbs</td>
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<tr>
<td>95926</td>
<td>Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in lower limbs</td>
</tr>
<tr>
<td>95927</td>
<td>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</td>
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<tr>
<td>95930</td>
<td>Visual evoked potential (VEP) testing central nervous system, checkerboard or flash short-latency somatosensory evoked potential study, stimulation of any/all peripheral</td>
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<td>95938</td>
<td>Nerves or skin sites, recording from the central nervous system; in upper and lower limbs</td>
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<tr>
<td>95939</td>
<td>Central motor evoked potential study (Transcranial motor stimulation ); in upper and lower limbs</td>
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<tr>
<td>95940</td>
<td>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)</td>
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<tr>
<td>95941</td>
<td>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)</td>
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</table>
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)

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<thead>
<tr>
<th>Review Date</th>
<th>Revisions</th>
<th>Effective Date</th>
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<tbody>
<tr>
<td>04/2015</td>
<td>New Criteria</td>
<td>08/2015</td>
</tr>
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</table>

**References:**
- Noridian Local Coverage Determination: Sensory Evoked Potentials and Intraoperative Neurophysiology Monitoring (L24359) Accessed on: 05/01/2015
- McDonald DB, Skinner S, Shils J, Yingling C, Intraoperative motor evoked potential monitoring – A position statement by the American Society of Neurophysiologic Monitoring
- Physician Advisors