AANEM American Association of Neuromuscular & Electrodiagnostic Medicine
Position Statement

Recommended Policy for Electrodiagnostic Medicine

Executive Summary
The electrodiagnostic (EDX) medicine evaluation is an important and useful extension of the clinical evaluation of patients with disorders of the peripheral and/or central nervous system. EDX tests are often crucial to evaluating symptoms, arriving at a proper diagnosis, and in following a disease process and its response to treatment in patients with neuromuscular (NM) disorders. Unfortunately, EDX studies are poorly understood by many in the medical and lay communities. Even more unfortunately, these studies have occasionally been abused by some providers, resulting in overutilization and inappropriate consumption of scarce health resources. The American Association of Neuromuscular & Electrodiagnostic Medicine (AANEM) has developed this recommended policy to improve the quality of patient care, to encourage appropriate utilization of the procedures involved, and to assist public and private insurance carriers in developing policy regarding EDX testing. This document contains recommendations which can be used in developing and revising current reimbursement guidelines.

This document is based on the AANEM's prior publications on appropriate EDX evaluations and was further refined by consensus at a conference of 43 experts in the field of EDX medicine. This consensus conference was held to produce guidelines that could be used to identify overutilization. Participants in the conference represented a diversity of practice types and were either neurologists or physiatrists and included the AANEM Board of Directors, committee chairs, Professional Practice Committee members, and other members of the association. Physicians from both academic medical centers and private practice were represented. With the help of the AANEM Professional Practice Committee, the guidelines have continuously been revised to produce this comprehensive policy regarding the optimal use of EDX procedures.

This document provides:
1. An introduction to the mission of the AANEM.
2. An overview of the scope of EDX medicine.
3. Indications for the performance of EDX testing.
4. A list of applicable American Medical Association Current Procedural Terminology (CPT™) codes.
5. A recommended source for a list of ICD-10-CM diagnosis codes that are acceptable indications for needle electromyography (EMG) and nerve conduction procedures.
6. An overview of nerve conduction studies (NCSs).
7. An overview of needle EMG.
8. An overview of late responses, including H-reflex and F-wave studies.
9. An overview of blink reflexes.
10. An overview of neuromuscular junction (NMJ) studies
11. An overview of somatosensory evoked potentials (SEPs).
12. An overview of autonomic nervous system function testing.
13. A recommended maximum number of EDX studies necessary for certain diagnostic categories in 90% of cases.
14. Information regarding the timing of EDX testing after an injury.
15. Recommended reasonable limits on the frequency of EDX testing in individual patients.
16. Recommended minimum standards for EDX testing that must be met under this policy.
17. A list of nerves to assist in coding for NCSs.

Recognizing the critical need for testing individualized to the patient's condition, it is necessary that physicians have flexibility to design and carry out the appropriate EDX studies. However, the peer-review mechanism should be triggered when patterns of EDX test utilization significantly and consistently deviate from established norms for quantity and variety of procedures. Individuals may obtain the names of American Board of Electrodiagnostic Medicine (ABEM) certified physicians from the ABEM directory found on the ABEM website at www.abemexam.org. These physicians can be contacted to review questionable cases, assist in the review process, and advise on claims that appear to be unusually excessive.

The American Association of Neuromuscular & Electrodiagnostic Medicine
Founded in 1953 and now with nearly 6,500 physicians and other healthcare professionals, primarily neurologists and physiatrists, the AANEM is the largest organization worldwide dedicated solely to the scientifically based advancement of NM medicine. The primary goal of the AANEM is to increase the quality of patient care, specifically for those patients with disorders of the peripheral nervous systems, the NM junction, and skeletal muscle by contributing to steady improvement in the methods of diagnosing and treating patients with disorders of muscle and nerve. This goal is accomplished through programs in education, research, and quality standards.

The AANEM publishes a wide range of educational material and sponsors annual didactic programs, symposia, courses, and workshops. The AANEM informs its members about both basic and clinical research activities in EDX medicine and NM diseases through its annual meeting sessions, the journal *Muscle & Nerve*, online learning, and a variety of educational material. In so doing, the AANEM fosters the conduct of and enhances the quality of this research. The AANEM also offers EDX and NM Training Program Self-Assessment Examinations annually. These examinations are educational tools which are often used by training programs for their residents, fellows, and faculty members. The examinations and other self-assessments offered by the AANEM create an opportunity for individuals to assess their knowledge of EDX or NM medicine and encourage lifelong learning.

The ABEM is the only credentialing body that focuses exclusively on EDX medicine. The ABEM's goal is to enhance the quality of patient care through a voluntary certification process and thereby serve the public interest. The ABEM holds an annual examination through which candidates are able to assess their level of competence.

The ABEM operates a Continuous Certification program to provide a mechanism for ABEM diplomates to demonstrate their continuing education in EDX medicine as they keep up-to-date with this medical specialty. Diplomates are expected to demonstrate current medical knowledge and clinical problem-solving skills via participation in the Continuous Certification program. The first time-limited certificates were issued in 1994.

The AANEM is committed to the development of medically sound and clinically relevant guidelines for EDX medicine. This is accomplished through literature review, expert opinion, and consensus of AANEM leaders and committee members, as well as input from the general membership and other experts in the field. Practice guidelines, technology reviews, consensus statements, and position statements are available free of charge at www.aanem.org.

The AANEM established a laboratory accreditation process as a voluntary, peer review process that reviews the laboratory's personnel, facility, and reports to assure quality standards are met or exceeded. Accreditation provides laboratories specializing in electrodiagnostic medicine with a structured mechanism to assess, evaluate, and improve the quality of care provided to their patients. A list of accredited laboratories can be found at www.aanem.org.

Through the American Neuromuscular Foundation, the AANEM funds research and encourages the researchers of the future.

Scope of Electrodiagnostic Medicine
Patients are referred for EDX studies by neurologists and physiatrists trained in NM diagnosis, as well as by internists, primary care physicians, neurological and orthopedic surgeons, and other healthcare providers. The AANEM has published *Common Referral Indications for Electrodiagnostic Medicine Evaluation* to assist primary care physicians in determining if referral for an EDX evaluation could be useful for their patients. Some patients are referred for EDX testing with a provisional diagnosis; others are not. Many patients are referred with merely symptoms and/or clinical findings and there is an expectation that the EDX physician will be able to arrive at the correct diagnosis only after the completion of the EDX evaluation.

After taking a history and examining the patient, the physician develops a working diagnosis that may modify the referral diagnosis. The physician's working diagnosis may also be modified as the study proceeds. A number of tests may be needed to address the referral and working diagnoses, and to arrive at the correct final diagnosis. A final diagnosis does not reflect either the decision-making process or the work performed that led to the diagnosis being established.

Furthermore, EDX testing does not always establish an etiologic diagnosis. When "rule-out" diagnoses are not accepted, only a symptomatic diagnosis (e.g., ICD-10-CM codes M79.601-M79.676 "pain in limb" or R20.0-R20.9 "disturbance in skin sensation") can be coded regardless of the work involved in performing the EDX evaluation.

EDX studies are performed by physicians, almost exclusively neurologist and physiatrists, as part of an EDX evaluation. The AANEM believes that nonphysician providers, including physical therapists, chiropractors, physician assistants, and others, lack the appropriate training and knowledge to perform and interpret EMG studies and interpret NCSs. The AANEM believes that these providers, along with NCS technologists, may perform NCS with direct physician supervision. EDX evaluations include history-taking, appropriate physical examination, and the design, performance, and interpretation of EDX studies. These evaluations usually take a minimum of 30 minutes to perform and can take up to 2 hours or more in particularly complicated clinical situations.

EDX medicine includes a variety of EDX studies, including NCSs (CPT codes 95905, 95907-95913, EMG (CPT codes 95860-95872, 95885-95887), NMJ testing (CPT code 95937), and other specialized studies. EDX studies are an important means of diagnosing motor neuron diseases, myopathies, radiculopathies, plexopathies, neuropathies, and NMJ disorders (e.g., myasthenia gravis) and other neuromuscular disorders.

Although a common problem such as tingling and numbness in the hand and arm (which could be due to lesions in the brain, spinal cord, cervical roots, brachial plexus, or nerves in the upper extremities) may be studied in a similar way by many EDX physicians, there is no single universally accepted specific protocol or set of procedures employed for each diagnostic category. Instead, the EDX physician must continually reassess the findings encountered during the performance of the EDX testing; this new information may require modification of the initial study design to include other unplanned procedures and may require consideration of different alternative diagnostic possibilities. The EDX evaluation is not just a standard "test" like an electrocardiogram (EKG). EKG testing involves only recording techniques performed by a set protocol and is routinely delegated to nonphysician technical personnel for later interpretation by the physician. The EDX physician does not "read" needle EMGs; he or she is integrally involved in performing a detailed study. EDX studies must be interpreted in real time. If there is not face-face patient interaction by the interpreting physician and control over the process, substandard care is being provided. In addition, the performance of NCSs without needle EMG has the potential of compromising patient care. It is the AANEM's opinion that it is in the best interest of patients, in the majority of situations, for the needle EMG and the NCS examination to be conducted and interpreted on site in real time. AANEM's position statement, "What Does 'On Site' and 'Real Time' Mean?" provides definitions for the terms "on site" and "in real time," which can be found on AANEM's website at: https://www.aanem.org/Advocacy/Position-Statements.

EDX studies are individually designed by the EDX physician for each patient. The examination design is dynamic and often changes during the course of the study in response to new information obtained. The accuracy of needle EMG testing is dependent on the skill of the examiner. The diagnostic interpretation of the needle EMG examination takes place during the performance of the test. Thus, this evaluation constitutes the practice of medicine. For these reasons, it is the position of the AANEM, along with the American Medical Association, the American Academy of Neurology, the American Academy of Physical Medicine and Rehabilitation, and the Department of Veterans Affairs (Veteran's Administration), the state legislatures of New Jersey and Michigan, as well as many state medical boards, that only physicians (MD or DO) should perform needle EMG examinations.

EDX physicians receive training during residency and/or in special EDX fellowships after residency devoted to the performance of these studies and their interpretation. Knowledge of EDX medicine is necessary to pass the board examinations given by the American Board of Physical Medicine and Rehabilitation and the American Board of Psychiatry and Neurology. Further certification is offered by the American Board of Electrodiagnostic Medicine (ABEM) In addition, the American Board of Psychiatry and Neurology (ABPN) offer certification in clinical neurophysiology and American Board of Physical Medicine and Rehabilitation (ABPMR), along with the ABPN, offers certification in neuromuscular medicine. The ABEM focuses exclusively on EDX testing while the other certifications include EDX testing as a component of the overall examination.

For these reasons, it is AANEM's position that the only person who can responsibly determine the appropriate tests to investigate a particular patient's clinical symptoms is the physician performing the EDX evaluation. The AANEM

recognizes, however, that there is potential for overuse of some EDX procedures by individual providers and that judgments and decisions must be made regarding reimbursement policies for EDX testing. The approach of establishing limits on the number of procedures reimbursed per diagnostic category is fraught with difficulty.

A large number of limits are needed since there are many diagnostic categories. There is little relevant scientific literature on such limits; therefore, alternative approaches are preferable. For example, the peer-review mechanism can be triggered when patterns of EDX test utilization significantly and consistently exceed norms (for example, utilization of EDX testing above the 90% level).

This latter approach effectively limits abuse while still permitting the physician the latitude to use his or her best clinical judgment in evaluating the patient in order to provide the best, most cost-efficient patient care. It is the AANEM's desire that this model policy will be given serious consideration when revisions are made to reimbursement policies, so that policies recognize the high standards of practice currently existing in the medical community.

Indications
EDX testing is used to evaluate the integrity and function of the peripheral nervous system (most cranial nerves, spinal roots, plexi, and nerves), NMJ, muscles, and the central nervous system (brain and spinal cord). EDX testing is performed as part of an EDX evaluation for diagnosis or as follow-up of an existing condition. EDX studies can provide information to:

1. Identify normal and abnormal nerve, muscle, motor or sensory neuron, and NMJ functioning.
2. Localize region(s) of pathology.
3. Characterize the pathology.
4. Determine the distribution of abnormalities.
5. Determine the severity of abnormalities.
6. Estimate the chronology of the disease.
7. Determine the progression and/or recovery from abnormal function.
8. Aid in diagnosis and prognosis of disease.
9. Aid in selecting treatment options.
10. Aid in following response to treatment by providing objective evidence of change in NM function.
11. Localize correct locations for injection of intramuscular agents (e.g., botulinum toxin).

Current Procedural Terminology Codes in Electrodiagnostic Medicine
This document applies to the following CPT codes:[1]*

Code: Descriptor
51785: Needle electromyography (EMG) studies of anal or urethral sphincter, any technique
51792: Stimulus evoked response (e.g., measurement of bulbocavernosus reflex latency time)
95860: Needle electromyography; one extremity, with or without related paraspinal areas
95861: Needle electromyography; two extremities, with or without related paraspinal areas
95863: Needle electromyography; three extremities, with or without related paraspinal areas
95864: Needle electromyography; four extremities, with or without related paraspinal areas
95865: Needle electromyography; larynx
95866: Needle electromyography; hemidiaphragm
95867: Needle electromyography; cranial nerve supplied muscle(s), unilateral
95868: Needle electromyography; cranial nerve supplied muscles, bilateral
95869: Needle electromyography; thoracic paraspinal muscles (excluding T1 or T12)
95870: Needle electromyography; limited study of muscles in one extremity or non-limb (axial) muscles (unilateral or bilateral), other than thoracic paraspinal, cranial nerve supplied muscles, or sphincters
95872: Needle electromyography using single fiber electrode, with quantitative measurement of jitter, blocking and/or fiber density, any/all sites of each muscle studied

*Some states' worker's compensation carriers use earlier versions of CPT codes, in which case those older codes should be used and reimbursed.

95885: 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)
95886: 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)
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)
95873: Electrical stimulation for guidance in conjunction with chemodenervation (List separately in addition to code for primary procedure)
95874: Needle electromyography for guidance in conjunction with chemodenervation (List separately in addition to code for primary procedure)
95905: Motor and/or sensory nerve conduction, using preconfigured electrode array(s), amplitude and latency/velocity study, each limb, includes F-wave study when performed, with interpretation and report
95907: Nerve conduction studies; one-two studies
95908: Nerve conduction studies; three-four studies
95909: Nerve conduction studies; five-six studies
95910: Nerve conduction studies; seven-eight studies
95911: Nerve conduction studies; nine-ten studies
95912: Nerve conduction studies; eleven-twelve studies
95913: Nerve conduction studies; thirteen or more studies
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)
95921: Testing of autonomic nervous system function; cardiovagal innervation, (parasympathetic function), including two or more of the following: heart rate response to deep breathing with recorded R-R interval, Valsalva ratio, and 30:15 ratio
95922: Testing of autonomic nervous system function; vasomotor adrenergic innervation, (sympathetic adrenergic function), including beat-to-beat blood pressure and R-R interval changes during Valsalva maneuver and at least 5 minutes of passive tilt
95923: Testing of autonomic nervous system function; sudomotor, including one or more of the following: quantitative sudomotor axon reflex test (QSART), silastic sweat imprint, thermoregulatory sweat test, and changes in sympathetic skin potential.
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
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
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
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
95930: Visual evoked potential (VEP) testing central nervous system, checkerboard or flash
95933: Orbicularis oculi (blink) reflex, by electrodiagnostic testing
95937: Neuromuscular junction testing (repetitive stimulation, paired stimuli), each nerve, any one method

Acceptable Diagnostic Codes

The AANEM publishes a coding guide that contains ICD-10-CM codes of relevance to EDX medicine. Because EDX testing in some patients does not establish an etiologic diagnosis, any list of ICD-10-CM codes for EDX testing must include symptom codes (such as weakness, pain, or altered sensation), as well as codes for defined diseases.

CPT Codes 95907-95913: Nerve Conduction Studies Overview

1. NCSs (CPT codes 95907-95913) are performed to assess the integrity and diagnose diseases of the peripheral nervous system. Specifically, they assess the speed (conduction velocity, and/or latency), size (amplitude), and shape of the response. Pathological findings include conduction slowing, conduction block, no response, and/or low amplitude response. NCS results can assess the degree of demyelination and axon loss in the segments of the nerve studied. This portion of the EDX evaluation is performed by the physician alone or by a trained allied health professional under direct supervision of a physician trained in EDX medicine.
2. A typical NCS examination includes the following:
   a. Development of a differential diagnosis by the EDX physician, based upon appropriate history and physical examination.
   b. NCS of a number of nerves by recording and studying the electrical responses from peripheral nerves or the muscles they innervate, following electrical stimulation of the nerve. Usually surface electrodes are used for both stimulation and recording, though needle electrodes may be required in special cases.
   c. Measurement of the distance between stimulation and recording sites, the conduction velocity, latency values, and amplitude.
   d. Completion of indicated needle EMG studies (see below) to evaluate the differential diagnosis and to complement the NCSs.
3. Motor, sensory, and mixed NCSs and late responses (F-wave and H-reflex studies) are frequently complementary and performed during the same patient evaluation.
4. Although the stimulation of nerves is similar across all NCSs, the characteristics of motor, sensory, and mixed NCSs are different and are discussed separately below. In each case, an appropriate nerve is stimulated and recording is made either from the appropriate nerves or from muscle supplied by the motor nerve.
   a. Motor NCSs are performed by applying electrical stimulation at various points along the course of a motor nerve while recording the electrical response from an appropriate muscle. Response parameters include amplitude, latency, configuration, and motor conduction velocity.
   b. Sensory NCSs are performed by applying electrical stimulation near a nerve and recording the response from a distant site along the nerve. Response parameters include amplitude, latency, configuration, and sensory conduction velocity.
   c. Mixed NCS are performed by applying electrical stimulation near a nerve containing both motor and sensory fibers (a mixed nerve) and recording from a different location along that nerve that also contains both motor and sensory nerve fibers. Response parameters include amplitude, latency, configuration, and both sensory and motor conduction velocity.
5. NCS reports should document the nerves evaluated, the distance between the stimulation and recording sites, the conduction velocity, latency values, and amplitude. The temperature of the studied limbs should be included. A final diagnosis, which, in some cases, may be a symptom diagnosis or a diagnosis of normal, is then made.

   To the extent possible, inclusion of the NCS waveforms in the chart is encouraged. Requiring hard copy as a condition for reimbursement is generally unnecessary and burdensome. A legitimate reason to make a request for the hard copy of neurophysiological data is to permit an independent expert to review the original material to provide an independent interpretation of the findings. There are clinical (second opinion) and medical-legal (dispute over the diagnosis) situations in which this type of review is indicated, although there are limitations to later interpretation of the hard copy. Other reasons for requesting hard copy may be if questions of over-utilization are at issue, or significant concerns exist regarding fraud and abuse. Anyone requiring hard copy of neurophysiologic data must notify the physician ahead of time, as many physicians do not store this data.

6. The number of nerves tested should be the minimum necessary to address the clinical issue. In almost all studies, this will appropriately include evaluation of 1 or more nerves that have normal test results.
7. Because the EDX evaluation is tailored to the individual patient, it is inappropriate to identify set numbers of acceptable studies for a given diagnosis. However, practice parameters and professional guidelines define general principles, and the AANEM's *Common Referral Indications for Electrodiagnostic Medicine Evaluations* is useful in this regard. One mechanism for gauging utilization is to compare a practitioner's practice patterns against other physicians. Physicians who regularly (>10% of the time) differ from established norms might be asked to provide information about the characteristics of their patient population or practice style.
8. The CPT descriptor language for codes 95907-95913 describes one or more NCSs. For the purposes of coding, a single conduction study is defined as a sensory conduction test, a motor conduction test with or without an F wave test, or an H-reflex test.

Each type of study (sensory, motor with or without F-wave, H-reflex) for each nerve includes all orthodromic and antidromic impulses associated with that nerve and constitutes a distinct study when determining the number of studies in each grouping (e.g., one-two or three-four NCSs). Each type of NCS is counted only once when multiple sites on the same nerve are stimulated or recorded."

To qualify as a single NCS refer to the List of Nerves at the end of the document. Each line on the list of nerves refers to a different nerve and should be billed as an individual unit. It is inappropriate to bill more than one unit for "inching" or studying the same nerve by moving the stimulating electrode closer to the recording electrode. It should be noted that most nerves have a contralateral counterpart; bilateral testing is often necessary for comparison purposes and the nerve on each side may be billed separately.

9. Multiple NCS CPT codes cannot be billed together for a given patient on a given day.

CPT Code 95905: Nerve Conduction with Preconfigured Electrode Array(s)

1. Technical and reporting aspects of NCSs described in items 1, 2, and 7 of the NCS Overview above apply to studies performed with preconfigured electrode array(s).
2. 95905 may be reported only once per limb studied and cannot be used in conjunction with codes for NCS or H-reflex studies, as indicated in the parenthetical notes following code 95905.

CPT Codes 95860-95872, 95885-95887: Needle Electromyography Overview

1. Needle EMG (CPT codes 95860-95870, 95885-95887) is performed to evaluate diseases of the peripheral nervous system and muscle. Needle EMG refers to the recording and study of electrical activity of muscle using a needle electrode. This portion of the EDX evaluation should always be performed by the physician.
2. A typical EMG examination includes the following:
   a. Development of a differential diagnosis by the EDX physician, based upon appropriate history and physical examination.
   b. Completion of indicated NCSs (see above) to evaluate the differential diagnosis and to complement the needle EMG studies.
   c. Needle EMG testing of selected muscles. The muscles' electrical activity at rest and during voluntary activation must be evaluated and interpreted. The needle electrode allows the muscle's electrical characteristics at rest and during activity to be interpreted by the EDX physician. This interpretation includes analysis of tracings and the characteristic sounds produced by electrical potentials. The final interpretation of the study is a synthesis by the EDX physician of the patient's history, physical examination, and the preceding and following portions of the study.
3. The muscles studied will vary depending upon the differential diagnosis and the ongoing synthesis of new information obtained by the EDX physician while the test is being performed.
4. Needle EMG studies are interpreted in real time, as they are being performed.
5. Normal findings and abnormalities uncovered during the study are documented and interpreted. Needle EMG reports should document the muscles tested, and report the presence and type of spontaneous activity, as well as the characteristics of the voluntary unit potentials. A final diagnosis, which, in some cases, may be a symptom diagnosis or a diagnosis of normal, is made.

CPT Codes 95860-95864: Extremity Needle Electromyography Studies

1. Use 95860-95864 when no NCSs are performed on the same day.
2. Only 1 unit of service of codes 95860-95864 may be reported per patient for a given examination.
3. One unit includes all muscles tested in a particular extremity or extremities, with or without related paraspinal muscles. In some instances, evaluation of the paraspinal musculature may either be contraindicated or not feasible. Some examples may include but are not limited to: (1) patients with disorders of coagulation or on anticoagulation medications, (2) history of surgery in paraspinal muscles, (3) infection in the paraspinal muscle region, (4) patient refusal, (5) inability to position a ventilator-dependent patient, and (6) diagnosis of a condition which eliminates the need to evaluate paraspinal muscles.

   The ultimate decision about the indication for paraspinal examination should be left to the EDX physician, as is the decision about what other muscles should be examined.

4. CPT codes 95860-95864 require evaluation of extremity muscles innervated by 3 nerves [for example, radial, ulnar, median, tibial, peroneal (fibular), femoral, not sub-branches] or 4 spinal levels, with a minimum of 5 muscles studied per limb.
5. Codes 95860-95864 can appropriately be reported in combination with CPT code 95869 (Needle electromyography; thoracic paraspinal muscles) only if paraspinals between T2-T11 are studied. If this occurs in more than 20% of cases, the payer may wish to consult with the provider in order to better understand the necessity of performing both of these tests. CPT code 95869 may not be billed with CPT codes 95860-95864 if only T1 are studied when an upper extremity was also studied.
6. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.

CPT Code 95865: Needle Electromyography, Larynx

1. CPT code 95865 is used to report needle examination of the larynx.
2. Because needle EMG of the larynx is typically performed bilaterally, modifier 50 should not be appended to 95865 for bilateral testing.
3. Modifier 52 should be reported for unilateral testing.

CPT Code 95866: Needle Electromyography, Hemidiaphragm

1. CPT code 95866 is used to report needle examination of the diaphragm.
2. Up to 2 units of service may be billed per day.

CPT Codes 95867 and 95868: Needle Electromyography, Cranial Nerve Supplied Muscles

1. Use 95867 and 95886 when no NCSs are performed on the same day.
2. CPT code 95867 is used for the needle examination of 1 or more muscles supplied by cranial nerves on 1 side of the body. CPT code 95868 is used for the needle examination of 1 or more muscles supplied by cranial nerves on both sides of the body. These 2 CPT codes should not be reported together.
3. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.

CPT Code 95869: Needle Electromyography; Thoracic Paraspinal Muscles

1. CPT code 95869 should be used when exclusively studying thoracic paraspinal muscles without NCSs the same day.
2. One unit should be billed, despite the number of levels studied or whether unilateral or bilateral.
3. Characteristics of the examination should be noted as described in the overview of needle EMG above.

CPT Code 95870: Needle Electromyography; Limited Study of Muscles in One Extremity or Non-limb (Axial) Muscles (Unilateral or Bilateral), Other Than Thoracic Paraspinal, Cranial Nerve Supplied Muscles, or Sphincters

1. Code 95870 is used for limited testing of four or fewer muscles and only when no NCSs are performed on the same day.
2. Code 95870 can be billed at 1 unit per extremity. The code can also be used for muscles on the thorax or abdomen (unilateral or bilateral). One unit may be billed for studying cervical or lumbar paraspinal muscles (unilateral or bilateral), regardless of the number of levels tested.
3. Multiple units of CPT code 95870 may be billed in a single study. However, if an individual physician's practice pattern reveals that multiple units of this code are used in more than 20% of the provider's needle EMG studies, the payer may wish to consult with the provider in order to better understand the necessity of providing multiple units of this service. In such cases, peer review of this pattern may be appropriate.
4. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.
5. CPT code 95870 may be billed with 95860-95864 if a limited study is performed in conjunction with a full-limb.

CPT Code 95872: Single Fiber Electromyography

1. In single-fiber electromyography (SFEMG), a specially designed needle electrode is used to record and identify action potentials (APs) from individual muscle fibers. These recordings are used to calculate the NM jitter and the muscle fiber density (FD). Jitter is the variability in time between activation of the motor nerve and generation of the muscle fiber AP,

and reflects the normality of nerve-muscle transmission. Jitter may be assessed by measuring the time variability between APs from 2 muscle fibers in the same voluntarily activated motor unit, or by stimulating the motor axon and measuring the variability between stimulus and APs in the responding muscle fibers.

Normal jitter varies among muscles and among muscle fibers within individual muscles, but is generally in the range of 10 to 50 μs. To determine if jitter is abnormally increased, statistical analysis is performed on the results from recordings from a population of muscle fibers within each tested muscle. When NM transmission is sufficiently abnormal that nerve activation produces no muscle AP, blocking is seen. Increased jitter, blocking, or both, may occur in a variety of conditions, including primary disorders of NM transmission.

2. FD is a measurement of the mean number of muscle fibers belonging to the same motor unit detected by the SFEMG electrode at a number of different insertion sites during voluntary activation of the motor unit.
3. Needle EMG should be performed in at least 1 clinically involved muscle before attributing pathologic jitter or blocking to a NM transmission disorder.
4. The results of jitter testing in each muscle are reported as the mean jitter among all pairs of APs recorded during voluntary activation (or the mean jitter of all APs recorded during axonal stimulation), the percentage of pairs (or APs) in which blocking was seen, and the percentage of pairs (or APs) in which jitter was normal. FD is reported as the mean number of muscle fibers per motor unit at 20 recording sites for each muscle tested.
5. Jitter and FD may be measured in 1 or more muscles depending on the condition being evaluated and the results of testing.
6. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above, as well as specific discussion about the presence or absence of jitter and other abnormalities in the muscles tested.

CPT Code 95885-95887 were created in 2012 to report needle EMG services performed the same day as nerve conduction studies

CPT Code 95885: Needle EMG, Limited, Each Extremity, When Done With Nerve Conduction Studies

1. Code 95885 is used for limited testing of four or fewer muscles and only when NCSs (95907-95913) are performed on the same day.
2. Code 95885 can be billed at 1 unit per extremity.
3. Multiple units of CPT code 95885 may be billed, however, if an individual physician's practice pattern reveals that multiple units of this code are used in more than 20% of the provider's needle EMG studies, the payer may wish to consult with the provider in order to better understand the necessity of providing multiple units of this service. In such cases, peer review of this pattern may be appropriate.
4. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.
5. CPT code 95885 should be reported in conjunction with 95907-95913. It can appropriately be reported in combination with CPT code 95886 or 95887, but should not be reported with 95860-95864, 95870, or 95905.

CPT Code 95886: Needle EMG, Complete, Each Extremity, When Done With Nerve Conduction Studies

1. CPT code 95886 requires evaluation of extremity muscles innervated by 3 nerves (for example, radial, ulnar, median, tibial, peroneal (fibular), femoral, not sub-branches) or 4 spinal levels, with a minimum of 5 muscles studied per limb. It should only be reported when EMG testing and NCSs are performed on the same day.
2. One unit includes all muscles tested in a particular extremity, with or without related paraspinal muscles. In some instances, evaluation of the paraspinal musculature may either be contraindicated or not feasible. Some examples may include but are not limited to: (1) patients with disorders of coagulation or on anticoagulation medications, (2) history of surgery in paraspinal muscles, (3) infection in the paraspinal muscle region, (4) patient refusal, (5) inability to position a ventilator-dependent patient, and (6) diagnosis of a condition which eliminates the need to evaluate paraspinal muscles.

The ultimate decision about the indication for paraspinal examination should be left to the EDX physician, as is the decision about what other muscles should be examined.

3. Up to 4 units of service may be reported per patient for a given examination, depending on the number of extremities tested.

4. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.
5. CPT code 95886 should be reported in conjunction with 95907-95913. It can appropriately be reported in combination with CPT code 95885 or 95887, but should not be reported with 95860-95864, 95870, or 95905.

Codes 95885 and 95886 may be reported together up to a combined total of four units per patient when all four extremities are tested.

CPT Code 95887: Needle EMG, non-extremity, when done with Nerve Conduction Studies

1. CPT code 95887 is used for the needle examination of 1 or more muscles supplied by cranial nerves or non-limb (axial) muscles performed in conjunction with a NCS
2. Report 95887 once per anatomic site (ie, cervical paraspinal muscle[s], thoracic paraspinal muscle[s], lumbar paraspinal muscle[s], chest wall muscle[s], and abdominal wall muscle[s].
3. Use 95887 for a unilateral study of the cranial nerve innervated muscles (excluding extra-ocular and larynx); when performed bilaterally, 95887 may be reported twice.
4. Use 95887 when a study of the cervical paraspinal muscle(s), or the lumbar paraspinal muscle(s) is performed with no corresponding limb study (95885 or 95886) on the same day.
5. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.
6. CPT code 95887 should be reported in conjunction with 95907-95913. It can appropriately be reported in combination with CPT code 95885 or 95886, but should not be reported with 95860-95864, 95870, or 95905.

CPT Codes 95873 and 95874: Electrical Stimulation and Needle Electromyography for Guidance in Conjunction with Chemodenervation

1. Electrical stimulation and needle EMG for guidance in conjunction with chemodenervation (CPT codes 95873 and 95874) can be medically necessary to determine the precise localization for needle placement before the drug or biological is injected. Electrical stimulation or needle EMG should always be performed by the physician.
2. A typical electrical stimulation or needle EMG guidance procedure for chemodenervation includes the following:
   a. Determine whether precise localization with electrical stimulation or needle EMG is medically necessary to facilitate delivery of the chemodenervation drug or biological to the appropriate target muscle sites.
   b. Electrical stimulation localization. This is accomplished by having the physician attach the stimulating needle electrode and syringe containing the drug or biological to be injected to the stimulating apparatus. The target muscles are identified by anatomical surface markers and the needle is advanced through the skin. The stimulating apparatus is activated at low frequency and relatively high intensity, and the needle is relocated until muscle contraction is seen or palpated by the physician. The stimulus is decreased and the needle position is adjusted to achieve the maximal muscle contraction at that intensity. The procedure is repeated until a maximal muscle contraction is achieved at a minimal stimulus intensity.
   c. Needle EMG localization. This is accomplished by having the physician attach a recording needle electrode and syringe containing the drug or biological to be injected together. The needle is advanced into the body and a small amount of the drug or biological is injected. The needle is advanced further to spread the drug or biological through the targeted muscle. The presence of persistent EMG motor unit activity confirms that the needle is in the muscle.
3. The electrical stimulation or needle EMG localization procedures may be repeated depending on the number of target muscle sites involved. It is appropriate to report multiple units of 95873 or 95874 when electrical stimulation or needle EMG involves more than one contiguous body part.
4. Codes 95873 and 95874 are add-on codes that should be reported in conjunction with chemodenervation codes 64612-64616 and 64642-64647, which are reported separately. Codes 95873 and 95874 should not be reported in conjunction with needle electromyography procedure codes 95860-95870. Codes 95873 and 95874 should not be reported together.

CPT Code 51785: Needle Electromyography of Anal or Urethral Sphincter, Any Technique

1. Under specific circumstances in which there is suspicion of injury to the sacral roots of the spinal cord, separate study of the anal sphincter is required since this is the only muscle accessible to needle EMG examination which receives its innervation through these roots. This testing may also be performed to assess the innervation and anatomic integrity of the sphincters.

2. In investigations of the function of the sacral roots, needle EMG study of the anal sphincter can be combined with electrically-elicited measurement of the bulbocavernosus reflex latency (CPT code 51792).
3. The physician's report should identify the muscles tested. Characteristics of the examination should be noted as described in the overview of needle EMG above.

Late Responses: H-Reflex and F-Wave Studies
Overview
1. Late responses are performed to evaluate nerve conduction in portions of the nerve more proximal (near the spine) and, therefore, inaccessible to direct assessment using conventional techniques. Electrical stimulation is applied on the skin surface near a nerve site in a manner that sends impulses both proximally and distally. Characteristics of the response are assessed, including latency.
2. F-wave and H-reflex studies provide information in the evaluation of radiculopathies, plexopathies, polyneuropathies (especially with multifocal conduction block or in suspected Guillain-Barré syndrome or chronic inflammatory demyelinating polyneuropathy), and proximal mononeuropathies. In some cases, they may be the only abnormal study.
3. The physician's report should identify the nerves evaluated and the F-wave and H-reflex characteristics, including latency. Typically, only two H-reflex studies are performed in a given examination.
4. H-reflex studies usually must be performed bilaterally because symmetry of responses is an important criterion for abnormality. When a bilateral H-reflex study is performed, the entire procedure must be repeated, increasing examiner time and effort; there are no economies of scale in multiple H-reflex testing.
5. H-reflex studies usually involve assessment of the gastrocnemius/soleus muscle complex in the calf (. Bilateral gastrocnemius/soleus H-reflex abnormalities are often early indications of spinal stenosis, or bilateral S1 radiculopathies.
6. In rare instances, H-reflexes need to be tested in muscles other than the gastrocnemius/soleus muscle, for example, in the upper limbs. In conditions such as cervical radiculopathies or brachial plexopathies, an H-reflex study can be performed in the arm (flexor carpi radialis muscle). Other muscles that may be tested, although rarely, are the intrinsic small muscles of the hand and foot.

Nerve Conduction Study With F-Wave Study
F-wave studies are billed in combination with the motor nerves that are examined. Although the set-up for an F-wave study is similar to the set-up for a motor NCS, the testing is performed separately from motor NCSs, utilizing different machine settings and separate stimulation to obtain a larger number of responses (at least 10).
1. The number of F-wave studies which need to be performed on a given patient depends on the working diagnosis and the EDX findings already in evidence. It may be appropriate in the same patient to perform some motor NCSs with an F wave and others without an F wave.

CPT Code 95933: Blink Reflexes Overview
1. The blink reflex (CPT code 95933) is an electrophysiologic analog of the corneal reflex. The latency of the responses, including side-to-side differences, can help localize pathology in the region of the fifth or seventh cranial nerves, or in the brainstem. The latencies and amplitudes of directly elicited facial motor responses should be determined to exclude a peripheral abnormality if the blink reflexes are abnormal.
2. Recordings should be made bilaterally with both ipsilateral and contralateral stimulation.
3. The report of this study should include the presence or absence of the R1 and R2 components on both sides and the latencies of recorded R1 and R2 components.

CPT Code 95937: Neuromuscular Junction Studies Overview
1. Repetitive stimulation studies (CPT code 95937) are used to identify and to differentiate disorders of the NMJ. This test consists of recording muscle responses to a series of nerve stimuli (at variable rates), both before, and at various intervals after, exercise or transmission of high-frequency stimuli.
2. These codes may be used in association with motor and sensory NCSs of the same nerves and are reimbursed separately.
3. When this study is performed, the physician's report should note characteristics of the test, including the rate of repetition of stimulations, and any significant incremental or decremental response.

CPT Codes 95925-95927, 95938: Somatosensory Evoked Potentials Overview
Somatosensory evoked potentials (SEPs) are an extension of the EDX evaluation and can be used to test conduction in various sensory fibers of the peripheral and central nervous systems. SEPs may be used to assess the functional integrity of the central and peripheral sensory pathways.

Common diagnoses in EDX medicine where SEPs have demonstrated usefulness include but are not limited to the following: spinal cord trauma, subacute combined degeneration, nontraumatic spinal cord lesions (e.g., cervical spondylosis), multiple sclerosis, spinocerebellar degeneration, myoclonus, coma, and intraoperative monitoring of spinal cord, brainstem, and brain sensory tracts. Intraoperative SEP monitoring is indicated for selected spine surgeries in which there is a risk of additional nerve root or spinal cord injury. Indications for SEP monitoring may include, but are not limited to, complex, extensive, or lengthy procedures, and when mandated by hospital policy. However, intraoperative SEP monitoring may not be indicated for routine lumbar or cervical root decompression.

SEPs are noninvasive studies performed by repetitive submaximal stimulation of a sensory or mixed sensorimotor peripheral nerve and recording the averaged responses from electrodes placed over proximal portions of the nerve stimulated, plexus, spine, and scalp. Amplitude, peak, and interpeak latency measurements with side-to-side comparisons are used to assess abnormalities.

1. The SEP study codes include the ability to report testing of upper (CPT 95925) and lower (CPT 95926) limbs. In 2012, a new CPT code (95938) was created to combine both upper and lower limb testing into one code. CPT code 95927 is used to report SEP studies of the trunk or head.
2. SEP study codes are defined as bilateral studies. A unilateral study using CPT codes 95925, 95926, 95927, or 95938 should be reported with modifier "-52, Reduced Services."
3. Depending on the clinical condition being investigated, several nerves in 1 extremity may have to be tested and compared with the opposite limb.
4. The physician's SEP report should note which nerves were tested, latencies at various testing points, and an evaluation of whether the resulting values are normal or abnormal.

CPT Codes 95928-95929, 95939: Motor Evoked Potentials Overview

1. The MEP codes also include the ability to report testing of upper limbs (CPT Code 95928) or lower limbs (CPT Code 95929). In 2012, a new CPT code (95939) was created to combine both upper and lower limb testing into one code.
2. MEP study codes are defined as bilateral studies. A unilateral study using CPT codes 98928, 95929 or 95939 should be reported with modifier "-52, Reduced services."

Autonomic Nervous System Function Testing Overview
The purpose of autonomic nervous system function testing is to determine the presence of autonomic dysfunction, the site of autonomic dysfunction, and the various autonomic systems which may be disordered.

CPT Code 95921: Cardiovagal Innervation
Cardiovagal innervation tests provide a standardized quantitative evaluation of vagal innervation to the heart (parasympathetic function). The responses are based on the interpretation of changes in continuous heart rate recordings in response to standardized maneuvers. Impairment occurs in autonomic failure due to diseases such as multiple system atrophy (MSA), idiopathic orthostatic hypotension, diabetic neuropathy, and other neuropathies affecting autonomic nerves.

CPT Code 95922: Vasomotor
Adrenergic Innervation
Vasomotor adrenergic innervation evaluates adrenergic innervation of the circulation and of the heart in autonomic failure due to diseases such as Shy-Drager syndrome, idiopathic orthostatic hypotension, diabetic neuropathy, and other neuropathies affecting autonomic nerves.

CPT Code 95923: Evaluation of Sudomotor Function
Sudomotor function can be evaluated using any of the following methods:

1. A quantitative sudomotor axon reflex test (QSART) is a noninvasive test that evaluates the integrity of the distal postganglionic sympathetic nerve fibers which may be impaired in diabetic and other neuropathies affecting autonomic nerves and in progressive autonomic disorders. This test involves the stimulation of sympathetic nerve fibers to the sweat

glands at standard sites by the iontophoresis of acetylcholine and measuring the evoked sweat response by sudorometers. The test is performed optimally on 1 forearm site and 3 sites on the lower extremities in order to determine the severity and distribution of the sympathetic deficit.

2. The silastic sweat imprint differs from QSART in that the recording is an imprint of the sweat droplets appearing as indentations on silastic material.
3. The thermoregulatory sweat test is a test of sympathetic nerves that supply the skin. The skin is dusted with an indicator powder which changes color when the patient sweats in response to raising the patient's temperature by raising the ambient temperature in a heat cabinet.
4. Sympathetic skin responses (or surface) (SSRs) are evoked by electrical stimulation (of the skin) and electric potential recordings are made over the palm and soles of the feet. The SSR change is carried by autonomic nerve fibers and evaluates if these fibers are working normally.
5. When these evaluative tests are conducted, the physician's report should state which test(s) was/were conducted and whether the test results were normal or abnormal.

Maximum Number of Tests Necessary in 90% of Cases

Table 1, "Maximum Number of Studies," summarizes the AANEM's recommendations regarding a reasonable maximum number of studies per diagnostic category necessary for a physician to arrive at a diagnosis in 90% of patients with that final diagnosis. Each number in the "Maximum Number of Studies Table" represents 1 study or unit. The table is designed as a tool to identify outlier trends and prevent abuse and overutilization; it is not an absolute maximum threshold, and should not be used to automatically deny reimbursement over the maximum.

The maximum numbers, as shown in the table, are designed to apply to a diversity of practice styles, as well as practice types, including those at referral centers where more complex testing is frequently necessary. In simple, straightforward cases, fewer tests will be necessary. This is particularly true when results of the most critical tests are normal. In complex cases, the maximum numbers in the table will be insufficient for the physician to arrive at a complete diagnosis. In cases where there are borderline findings, additional tests may be required to determine if the findings are significant.

The appropriate number of studies to be performed should be left to the judgment of the physician performing the EDX evaluation; however, in the small number of cases which require testing in excess of the numbers listed in the table (the AANEM estimates 10% of cases), the physician should be able to provide supplementary documentation to justify the additional testing. Such documentation should explain what other differential diagnostic problems needed to be ruled out in that particular situation. Justification of the need to perform studies greater than specified by the Maximum Number of Studies Table (Table 1) must be identified at the time the EDX testing is performed and included in the EDX testing report.

Multiple diagnoses might be established by EDX testing in up to 25% of patients. When multiple diagnoses are identified, the recommendations listed in Table 1 for a single diagnostic category may not apply. When multiple diagnoses are being considered, the appropriate number of studies is not arrived at by simply adding the number of studies identified for each diagnosis from Table 1. With only rare exception, the studies needed for different diagnoses "overlap" and a majority of the studies performed can be used in assessing multiple and different diagnoses. For example, one does not simply add the 10 studies allowed for polyneuropathy and the 7 studies allowed for lumbar radiculopathy to allow a total of 17 studies when these two diagnoses are being considered. In fact, all 7 of the studies utilized for the radiculopathy can be utilized in the assessment for polyneuropathy. Therefore, the 10 studies allowed for polyneuropathy are typically adequate to diagnose lumbar radiculopathy as well. Similarly, simultaneous diagnostic considerations such as cervical radiculopathy and carpal tunnel syndrome or lumbar radiculopathy and mononeuropathy would utilize the diagnosis with the higher number of allowed studies from Table 1.

It should be noted that in some situations it is necessary to test an asymptomatic contralateral limb to establish normative values for an individual patient. Normal values based on the general population alone are less sensitive than this approach, therefore restrictions on contralateral asymptomatic limb testing will reduce the sensitivity and specificity of EDX tests.

	Limbs Studied by Needle Electromyography (95860-95864, 95867-95870, 95885-95887)	Nerve Conduction Studies (Total nerve studied, 95907-95913)	Neuromuscular Junction Testing (Repetitive Stimulation)
Indication	**Number of Services (Tests)**	**Number of Services (Tests)**	**Number of Services (Tests)**
Carpal Tunnel (unilateral)	1	7	--
Carpal Tunnel (bilateral)	2	10	--
Radiculopathy	2	7	--
Mononeuropathy	1	8	--
Polyneuropathy/ Mononeuropathy Multiplex	3	10	--
Myopathy	2	4	2
Motor Neuronopathy (e.g., ALS)	4	6	2
Plexopathy	2	12	--
Neuromuscular Junction	2	4	3
Tarsal Tunnel Syndrome (unilateral)	1	8	--
Tarsal Tunnel Syndrome (bilateral)	2	11	--
Weakness, Fatigue, Cramps, or Twitching (focal)	2	7	2
Weakness, Fatigue, Cramps, or Twitching (general)	4	8	2
Pain, Numbness, or Tingling (unilateral)	1	9	--
Pain, Numbness, or Tingling (bilateral)	2	12	--

Carpal Tunnel Syndrome
For suspected carpal tunnel syndrome (CTS), bilateral median motor and sensory NCSs are often indicated. The studies in the contralateral asymptomatic limb serve as controls in cases where values are borderline and may establish the presence of bilateral CTS, which is a frequent finding. Two to 4 additional sensory or mixed NCSs can be compared to the median sensory NCSs to increase the diagnostic sensitivity of the testing. The additional sensory NCSs and an additional motor NCS (usually ulnar) are indicated to exclude a generalized polyneuropathy or multiple mononeuropathies.

If 2 sensitive sensory NCSs are performed at the beginning, additional sensory testing on the same limb is rarely needed. For suspected bilateral CTS, bilateral median motor and sensory NCSs are indicated. Up to 2 additional motor and 2 additional sensory NCSs are often indicated. The extent of the needle EMG examination depends on the results of the NCSs and the differential diagnosis considered in the individual patient.

Additional testing may be indicated in patients with a differential diagnosis which includes peripheral neuropathy, cervical radiculopathy, brachial plexopathy, or more proximal median neuropathy.

Radiculopathy
A minimal evaluation for radiculopathy includes 1 motor and 1 sensory NCS and a needle EMG examination of the involved limb. However, the EDX testing can include up to 3 motor NCSs (in cases of an abnormal motor NCS, the same nerve in the contralateral limb and another motor nerve in the ipsilateral limb can be studied) and 2 sensory NCSs. Bilateral studies are often necessary to exclude a central disc herniation with bilateral radiculopathies or spinal stenosis or to differentiate between radiculopathy and plexopathy, polyneuropathy, or mononeuropathy. H reflexes can provide useful complementary

information that is helpful in the evaluation of suspected S1 radiculopathy and can add to the certainty of EDX information supporting this diagnosis.

Radiculopathies cannot be diagnosed by NCS alone; needle EMG must be performed to confirm a radiculopathy. Therefore, these studies should be performed together by 1 physician supervising and/or performing all aspects of the study

Polyneuropathy/Mononeuropathy Multiplex
In order to characterize the nature of the polyneuropathy (axonal or demyelinating, diffuse or multifocal) and in order to exclude polyradiculopathy, plexopathy, neuronopathy, or multiple mononeuropathies, it may be necessary to study 4 motor and 4 sensory nerves, consisting of 2 motor and 2 sensory NCSs in 1 leg, 1 motor and 1 sensory NCS in the opposite leg, and 1 motor and 1 sensory NCS in 1 arm. H-reflex studies and F-wave studies from 2 nerves may provide additional diagnostic information. At least 2 limbs should be studied by a needle EMG examination. Studies of related paraspinal muscles are indicated to exclude some conditions such as polyradiculopathy.

Myopathy
To diagnose a myopathy, a needle EMG examination of 2 limbs is indicated. To help exclude other disorders such as polyneuropathy or neuronopathy, 2 motor and 2 sensory NCSs are indicated. Two repetitive motor nerve stimulation studies may be performed to exclude a disorder of NMJ transmission.

Motor Neuronopathy
In order to establish the diagnosis of motor neuronopathy (for example, amyotrophic lateral sclerosis [ALS or Lou Gehrig's disease]) and to exclude other disorders in the differential diagnosis, such as multifocal motor neuropathy or polyneuropathy, up to 4 motor nerves and 2 sensory nerves may be studied.

Needle EMG of up to 4 extremities (or 3 limbs and facial or tongue muscles) is often necessary to document widespread denervation and to exclude a myopathy. One repetitive motor nerve stimulation study may be indicated to exclude a disorder affecting NMJ transmission.

Plexopathy
To characterize a brachial plexopathy and to differentiate it from cervical radiculopathy and mononeuropathies it may be necessary to perform a few more sensory studies (e.g. – medial and lateral antebrachial cutaneous nerves) for a total of up to 6 sensory studies. It may also be necessary to perform up to 4 motor studies.

To characterize a lumbosacral plexopathy and to differentiate it from lumbar radiculopathy, mononeuropathies and polyneuropathy, it may be necessary to perform up to 4 sensory studies, up to 4 motor studies and up to 2 tibial H-reflex studies.

For both brachial and lumbosacral plexopathies, up to 2 additional studies (sensory and/or motor) may be performed in the contralateral (at times asymptomatic) limb to better define the diagnosis.

Neuromuscular Junction
To demonstrate and characterize abnormal NMJ transmission, repetitive nerve stimulation studies should be performed in up to 3 nerves and SFEMG in up to 2 muscles. If any of these are abnormal, up to 2 motor and 2 sensory NCSs may be performed to exclude neuropathies that can be associated with abnormal NMJ transmission. At least 1 motor and 1 sensory NCS should be performed in a clinically involved limb, preferably in the distribution of a nerve studied with repetitive stimulation or SFEMG. At least 1 distal and 1 proximal muscle should be studied by a needle EMG examination to exclude a neuropathy or myopathy that can be associated with abnormal repetitive stimulation studies or SFEMG. At least 1 of the muscles should be clinically involved and both muscles should be in clinically involved limbs.

Timing of Testing After an Injury
In combination, NCSs and a needle EMG examination may be most helpful when performed several weeks after the injury has occurred. However, NCSs are often useful acutely after nerve injury, for example, if there is concern that a nerve has been severed. In fact, if studies are delayed, the opportunity to precisely identify the region of injury or to intervene may be lost. In some cases, even needle EMG testing performed immediately after a nerve injury may demonstrate abnormal motor

unit action potential (MUAP) recruitment and/or provide baseline information that can be helpful to document preexisting conditions, date the injury, or serve as a baseline for comparison with later studies.

Because of the variability of different nerve injuries, a standard rule on the timing of EDX testing cannot easily be established and the AANEM does not have specific recommendations in this regard. In all instances, the AANEM encourages dialogue between physicians and payers and encourages the appropriate use of the physician's clinical judgment in determining when studies are most appropriately performed and what studies should be conducted.

Frequency of Electrodiagnostic Testing in a Given Patient

There are many clinical situations where good medical management requires repeat testing, such as in the following examples:

1. **Second diagnosis**. Where a single diagnosis is made on the first visit, but the patient subsequently develops a new set of symptoms, further evaluation is required for a second diagnosis that treatment can begin.
2 **Inconclusive diagnosis**. When a serious diagnosis (e.g., ALS) is suspected but the results of the needle EMG/NCS examination are insufficient to be conclusive, follow-up studies are needed to establish or exclude the diagnosis.
3. **Rapidly evolving disease**. Initial EDX testing in some diseases may not show any abnormality (e.g., Guillain-Barré syndrome) in the first 1 to 2 weeks. An early diagnosis confirmed by repeat electrodiagnosis must be made quickly so that treatment can begin. Follow-up testing can be extremely useful in establishing prognosis and monitoring patient status.
4. **Course of the disease**. Certain treatable diseases such as polymyositis and myasthenia gravis follow a fluctuating course with variable response to treatment. The physician treating such patients needs to monitor the disease progress and the response to therapeutic interventions. The results of follow-up evaluations may be necessary to guide treatment decisions.
5. **Unexpected course or change in course of the disease.** In certain situations, management of a diagnosed condition may not yield expected results or new, questionably related problems may occur (e.g., failure to improve following surgery for radiculopathy). In these instances, reexamination is appropriate.
6**. Recovery from injury**. Repeat evaluations may be needed to monitor recovery, to help establish prognosis, and/or to determine the need for and timing of surgical intervention (e.g., traumatic nerve injury).

Repeat EDX evaluation is therefore sometimes necessary and, when justifiable, should be reimbursed. Reasonable limits can be set concerning the frequency of repeat EDX testing per year in a given patient by a given EDX physician for a given diagnosis. The following numbers of tests per 12-month period per diagnosis per physician are acceptable:

1. **Two** tests for carpal tunnel-unilateral, carpal tunnel-bilateral, radiculopathy, mononeuropathy, polyneuropathy, myopathy, and NMJ disorders.
2. **Three** tests for motor neuronopathy and plexopathy. These limits should **not** apply if the patient requires evaluation by more than 1 EDX physician (i.e., a second opinion or an expert opinion at a tertiary care center) in a given year or if the patient requires evaluation for a second diagnosis in a given year.

Additional studies may be required or appropriate over and above these guidelines. In such situations, the reason for the repeat study should be included in the body of the report or in the patient's chart. Comparison with the previous test results should be documented. This additional documentation from the physician regarding the necessity for the additional repeat testing would be appropriate. Repeat EDX testing should not be necessary in a 12-month period in 80% of all cases.

Minimum Standards

1. EDX testing should be medically indicated.
2. Testing should be performed using EDX equipment that provides assessment of all parameters of the recorded signals. Studies performed with devices designed only for "screening purposes" rather than diagnosis are not acceptable under this policy. *See* AANEM's position statement: *EDX Study Instrument Design Requirements.*
3. The number of tests performed should be the minimum needed to establish an accurate diagnosis.
4. NCSs should be either (a) performed directly by a physician or (b) performed by a trained individual under the direct supervision of a physician. Direct supervision means that the physician is in close physical proximity to the EDX laboratory while testing is underway, is immediately available to provide the trained individual with assistance and direction, and is responsible for selecting the appropriate NCSs to be performed. *See* AANEM's position statement: *Who is Qualified to Practice EDX Medicine.*
5. The needle EMG examination must be performed by a physician specially trained in EDX medicine, as these tests are simultaneously performed and interpreted. The EDX laboratory must have the ability to perform needle EMG. The needle

EMG must include evaluation of both resting and voluntary activities. NCSs should not be performed without needle EMG except in unique circumstances. EMG and NCSs should be performed together in the same EDX evaluation when possible. *See* AANEM's position statement: *Proper Performance and Interpretation of EDX Studies.*

6. It is appropriate for only 1 attending physician to perform or supervise all of the components of the EDX testing (e.g., history taking, physical evaluation, supervision and/or performance of the EDX test, and interpretation) for a given patient and for all the testing to occur on the same date of service. The reporting of NCS and needle EMG study results should be integrated into a unifying diagnostic impression.
7. In contrast, dissociation of NCS and needle EMG results into separate reports is inappropriate unless specifically explained by the physician. Performance and/or interpretation of NCSs separately from that of the needle EMG component of the test should clearly be the exception (e.g. when testing an acute nerve injury) rather than an established practice pattern for a given practitioner.

Conclusion

Well written reimbursement policies will positively impact patient care. On the other hand, poorly written policies may lead to diagnostic judgments based on inadequate information. The quality of patient care will suffer, the risk of patient injury will increase due to misdiagnosis, or improper treatment (e.g., unnecessary surgery), and the cost of medical care will escalate. In addition, underutilization of needed diagnostic testing may cost payers money. If the physician does not get the full information needed for proper diagnosis from an initial EDX evaluation because the evaluation is inadequate, the evaluation may need to be repeated in a more thorough manner with additional expense. It must also be emphasized that having to justify the reasons behind each CPT unit by separate narrative will be time consuming and expensive for physician and insurance carrier alike, and will not allow for efficient electronic claims submission.

Looking to the Future

Physicians expect that the development of practice parameters and outcome studies will profoundly influence the practice of medicine. Practice parameter documents, however, may contain hierarchical decision trees that recommend modification of the planned EDX testing during the performance of the study in response to the information obtained as the study proceeds. Such a dynamic study design does not readily lend itself to a reductionistic bottom-line approach to the number of EDX studies allowed to be reimbursed per diagnosis. The AANEM will utilize appropriate practice guidelines to update this policy.

The AANEM will provide additional input in the future to help organizations establish medically appropriate practice guidelines for EDX medicine from which new and improved coding and reimbursement policies could be developed.

Approved by the American Association of Neuromuscular & Electrodiagnostic Medicine: September 1997; updated 1998, 1999, 2000, 2001, 2002, 2004, 2014, 2017, 2019 and January 2023.

Endorsed by the American Academy of Neurology: February 1998, February 2002, June 2004, and September 2014.
Endorsed by the American Academy of Physical Medicine & Rehabilitation: June 1998, March 2002, and June 2004.

Codes 95907-95913 involve the following motor nerves:

I. Upper Extremity/Cervical Plexus/Brachial Plexus Motor Nerves

A. Axillary motor nerve to the deltoid
B. Long thoracic motor nerve to the serratus anterior
C. Median nerve
1. Median motor nerve to the abductor pollicis brevis
2. Median motor nerve, anterior interosseou branch, to the flexor pollicis longus
3 Median motor nerve, anterior interosseous branch, to the pronator quadratus
4. Median motor nerve to the first lumbrical
5. Median motor nerve to the second lumbrical
D. Musculocutaneous motor nerve to the biceps brachii
E. Radial nerve
1. Radial motor nerve to the extensor carpi ulnaris
2. Radial motor nerve to the extensor digitorum communis
3. Radial motor nerve to the extensor indicis proprius
4. Radial motor nerve to the brachioradialis
F. Suprascapular nerve
1. Suprascapular motor nerve to the supraspinatus
2. Suprascapular motor nerve to the infraspinatus
G. Thoracodorsal motor nerve to the latissimus dorsi
H. Ulnar nerve
1. Ulnar motor nerve to the abductor digiti minimi
2. Ulnar motor nerve to the palmar interosseous
3. Ulnar motor nerve to the first dorsal interosseous
4. Ulnar motor nerve to the flexor carpi ulnaris
I. Other

II. Lower Extremity Motor Nerves

A. Femoral motor nerve to the quadriceps
1. Femoral motor nerve to vastus medialis
2. Femoral motor nerve to vastus lateralis
3. Femoral motor nerve to vastus intermedialis
4. Femoral motor nerve to rectus femoris.
B. Iloinguinal motor nerve
C. Peroneal (fibular) nerve
1. Peroneal (fibular) motor nerve to the extensor digitorum brevis
2. Peroneal (fibular) motor nerve to the peroneus brevis
3. Peroneal (fibular) motor nerve to the peroneus longus
4. Peroneal (fibular) motor nerve to the tibialis anterior

D. Plantar motor nerve
E. Sciatic nerve
F. Tibial nerve
1. Tibial motor nerve, inferior calcaneal branch, to the abductor digiti minimi
2. Tibial motor nerve, medial plantar branch, to the abductor hallucis
3. Tibial motor nerve, lateral plantar branch, to the flexor digiti minimi brevis
G. Other

II. Cranial Nerves and Trunk
A. Cranial nerve VII (facial motor nerve)
1. Facial nerve to the frontalis
2 Facial nerve to the nasalis
3. Facial nerve to the orbicularis oculi
4. Facial nerve to the orbicularis oris
B. Cranial nerve XI (spinal accessory motor nerve)
C. Cranial nerve XII (hypoglossal motor nerve)
D. Intercostal motor nerve
E. Phrenic motor nerve to the diaphragm
F. Recurrent laryngeal nerve
G. Other

IV. Nerve Roots
A Cervical nerve root stimulation
1. Cervical level 5 (C5)
2. Cervical level 6 (C6)
3. Cervical level 7 (C7)
4. Cervical level 8 (C8)
B. Thoracic nerve root stimulation
1. Thoracic level 1 (T1)
2. Thoracic level 2 (T2)
3. Thoracic level 3 (T3)
4. Thoracic level 4 (T4)
5. Thoracic level 5 (T5)
6. Thoracic level 6 (T6)
7. Thoracic level 7 (T7)
8. Thoracic level 8 (T8)
9. Thoracic level 9 (T9)
10. Thoracic level 10 (T10)
11. Thoracic level 11 (T11)
12. Thoracic level 12 (T12)
C. Lumbar nerve root stimulation
1. Lumbar level 1 (L1)
2. Lumbar level 2 (L2)
3. Lumbar level 3 (L3)
4. Lumbar level 4 (L4)
5. Lumbar level 5 (L5)

D. Sacral nerve root stimulation
1. Sacral level 1 (S1)
2. Sacral level 2 (S2)
3. Sacral level 3 (S3)
4. Sacral level 4 (S4)

Code 95907-95913 involves the following sensory and mixed nerves:
I. Upper Extremity Sensory and Mixed Nerves
A. Lateral antebrachial cutaneous sensory nerve
B Medial antebrachial cutaneous sensory nerve
C. Medial brachial cutaneous sensory nerve
D. Median nerve
1. Median sensory nerve to the 1st digit
2. Median sensory nerve to the 2nd digit
3. Median sensory nerve to the 3rd digit
4. Median sensory nerve to the 4th digit
5. Median palmar cutaneous sensory nerve
6. Median palmar mixed nerve
E. Posterior antebrachial cutaneous sensory nerve
F. Radial sensory nerve
1. Radial sensory nerve to the base of the thumb
2. Radial sensory nerve to digit 1
G. Ulnar nerve
1. Ulnar dorsal cutaneous sensory nerve
2. Ulnar sensory nerve to the 4th digit
3. Ulnar sensory nerve to the 5th digit
4. Ulnar palmar mixed nerve
H. Intercostal sensory nerve
I Other

II. Lower Extremity Sensory and Mixed Nerves
A. Lateral femoral cutaneous sensory nerve
B. Medial calcaneal sensory nerve
C. Medial femoral cutaneous sensory nerve
D. Peroneal (fibular) nerve
1. Deep peroneal (fibular) sensory nerve
2. Superficial peroneal (fibular) sensory nerve, medial dorsal cutaneous branch
3. Superficial peroneal (fibular) sensory nerve, intermediate dorsal cutaneous branch
E. Posterior femoral cutaneous sensory nerve
F. Saphenous nerve
1. Saphenous sensory nerve (distal technique)
2. Saphenous sensory nerve (proximal technique)
G. Sural nerve
1. Sural sensory nerve, lateral dorsal cutaneous branch
2. Sural sensory nerve
H. Tibial sensory nerve (digital nerve to toe 1)
I. Tibial sensory nerve (medial plantar nerve)

J. Tibial sensory nerve (lateral plantar nerve)
K. Other

III. Head and Trunk Sensory Nerves
A. Dorsal nerve of the penis
B. Greater auricular nerve
C. Ophthalmic branch of the trigeminal nerve
D. Pudendal sensory nerve
E. Suprascapular sensory nerves
F. Other

*This list has also been published in the American Medical Association's *CPT® Codebook.*