

## **Model Policy for Nerve Conduction Studies and Needle Electromyography**

The electrodiagnostic (EDX) evaluation is an extension of the neuromuscular portion of the physical examination and requires a detailed knowledge of a patient and their disease. During an EDX evaluation, physicians typically perform nerve conduction studies (NCSs) and needle electromyography (EMG).

EDX evaluations are performed by physicians, almost exclusively neurologists or physiatrists. Training to perform these procedures should occur in conjunction with training in the clinical diagnostic and management aspects of neuromuscular disease. This training allows for the proper performance of an EDX evaluation and the correct interpretation of EDX test results. Physicians performing an EDX evaluation must be aware of the patterns of abnormality observed in different diseases. Physicians must also be able to interpret the results of NCSs and needle EMG and combine these results with the patient's history, physical examination, and other test results to reach a diagnosis. EDX results may be similar in different diseases therefore a thorough knowledge of EDX evaluation is important to assure quality patient care. Non-physician providers, including physical therapists, chiropractors, physician assistants, and others, do not have the appropriate training and knowledge to perform and interpret EMG studies and interpret NCSs. These providers, along with appropriately trained and supervised technologists, may perform NCS with direct physician supervision.

Both EMGs and NCSs are usually required for a clinical diagnosis of peripheral nervous system disorders. Performance of one test does not eliminate the need for the other. The number of EMG and NCSs needed to determine a diagnosis are matters of clinical judgment. The complexity and extent of testing needed is determined after the initial pre-test evaluation and often modified during the testing procedure. NCSs may be performed without EMG on some occasions, e.g., entrapment neuropathies, but this should be the exception rather than the normal practice pattern.

Decisions to continue, modify, or conclude an EDX study rely on knowledge of anatomy, physiology, and neuromuscular diseases. Ongoing real-time assessment of data is required during the clinical diagnostic evaluation and especially during the needle EMG examination. The EDX physician is integrally involved in performing and interpreting the needle EMGs as the study progresses. A needle EMG may not be performed at one time and "read" at another time; the diagnostic decision-making is simultaneous with performance.

After conducting a history and physical examination, the EDX physician develops a working diagnosis that may modify the referral diagnosis. The EDX physician's working diagnosis also may be modified as the EDX evaluation proceeds. A number of tests may be needed to address the

referral and working diagnoses and to arrive at the correct final diagnosis. Other diagnoses are often considered during testing, the final diagnosis therefore may not accurately reflect all the decisions made throughout the testing process or all the work the physician performed to reach the final diagnosis. 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 examination.

### **Indications**

EDX testing is used to evaluate the integrity and function of the peripheral nervous system (most cranial nerves, spinal roots, plexi, and nerves, neuromuscular junction, muscles) and its connection with the central nervous system.

A typical EDX examination includes the following:

- a. Development of a differential diagnosis by the EDX physician, based upon appropriate history and physical examination and the referring physician’s concerns if applicable
- b. NCSs 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. Needle EMG testing of selected muscles. This is accomplished by inserting a needle electrode into appropriate muscles, one at a time.

Indications for EDX testing include the following scenarios:

1. Focal neuropathies, entrapment neuropathies, or compressive lesions/syndromes such as carpal tunnel syndrome, ulnar neuropathies, or root lesions, for localization
2. Traumatic nerve lesions, for diagnosis and prognosis
3. Generalized neuropathies, such as metabolic (ie diabetic, uremic, etc), toxic, hereditary or immune-mediated
4. Neuromuscular junction disorders such as myasthenia gravis, myasthenic syndrome or botulism
5. Symptom-based presentations such as “pain in limb”, weakness, cramping/twitching, disturbance of skin sensation or “paresthesia” when appropriate pre-test evaluations are inconclusive and the clinical assessment unequivocally supports the need for the study
6. Radiculopathy-cervical, thoracic, lumbosacral
7. Plexopathy- including idiopathic, traumatic, inflammatory or infiltrative, radiation-induced
8. Myopathy-including inflammatory myopathies like polymyositis and dermatomyositis, myotonic disorders, and congenital myopathies
9. Precise muscle location for injections such as botulinum toxin, phenol, etc.

### **Nerve Conduction Studies**

1. NCSs are performed to assess the integrity and diagnose diseases of the peripheral nervous system. Specifically, they assess action potentials resulting from peripheral nerve

stimulation which are recordable over the nerve or from an innervated muscle, the speed (conduction velocity and/or latency), size (amplitude), and shape of the response. Pathological findings include conduction slowing, conduction block, or reduced response. Results of the NCS reflect on the integrity and function of: (I) the myelin sheath, and (II) the axon of a nerve. Interruption of axon and dysfunction of myelin will both affect NCS results. This portion of EDX evaluation is performed by the physician alone or by a trained allied health professional under direct supervision of a physician trained in electrodiagnostic medicine.

2. Motor, sensory, and mixed NCSs and late responses (F-wave and H-reflex studies) are frequently complementary and performed during the same patient evaluation.
  
3. 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 a 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 NCSs 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.
  - d. NCSs performed with preconfigured electrode arrays (CPT code 95905) utilize anatomically specific electrodes to perform both motor and sensory nerve conduction testing. This service has previously been reported using HCPCS code S3905 or CPT code 95999. Parenthetical CPT instructions direct 95905 to be reported once per limb, and not in conjunction with 95885, 95886, or 95907-95913. Devices that utilize preconfigured electrode arrays are highly automated and further addressed in the limitation section below.
  
4. NCS reports should document the nerves evaluated, the distance between the stimulation and recording sites, the conduction velocity, latency, 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.
  
5. The CPT header for 95907-95913 clarifies: (1) The number of nerves tested should be the minimum necessary to address the clinical issue. Standardized screening tests are not equivalent to carefully designed NCSs and do not entail the same physician work. In almost all studies, testing will appropriately include evaluation of 1 or more nerves that have normal test results. (2) Waveforms must be reviewed on site. (3) Reports must be prepared on site.

6. The CPT descriptor language, codes 95907-95913 describe 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 NCS is counted only once when multiple sites on the same nerve are stimulated or recorded. The number of these separate tests should be added to determine which code to use. For a list of nerves, refer to the List of Nerves in CPT Appendix J. Each line on the list of nerves refers to a different nerve and should be counted as an individual unit to determine the correct CPT code to be billed. It is inappropriate to count more than one unit for “inching” or studying the same nerve by moving the stimulating electrode closer to the recording electrode.

### **Late Responses: H-Reflex and F-Wave Studies**

1. Late responses are performed to evaluate nerve conduction in more proximal portions of the nerve that are 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, Guillain-Barré syndrome or chronic inflammatory demyelinating polyradiculoneuropathy), 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.

### **Needle Electromyography**

1. Needle EMG (CPT codes 95860-95870 and 95885-95887) is performed to exclude, diagnose, describe, and follow diseases of the peripheral nervous system. Needle EMG refers to the recording and study of electrical activity of skeletal muscle using a needle electrode. This portion of the EDX evaluation should always be performed by the physician.
2. The needle electrode allows for interpretation of the muscle’s electrical characteristics at rest and during activation. This interpretation includes analysis of the recruitment pattern and morphology and characteristic sound of motor unit potentials and spontaneous electrical activity. Needle EMG studies are interpreted in real time, as they are being performed.
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. To report a needle EMG code of “complete” extremity, a minimum of 5 muscles innervated by 3 nerves (for example, radial, ulnar, median, tibial, peroneal, femoral, not sub branches) or 4 spinal levels must be evaluated.
4. Normal and abnormal findings 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 motor unit potentials. A final

diagnosis, which, in some cases, may be a symptom diagnosis or a diagnosis of normal, is made.

## **Limitations**

### *Nerve Conduction Studies*

EDX testing with automated, noninvasive nerve conduction testing devices is considered investigational and not medically necessary for all indications, including as an alternative method of performing NCSs.

Screening testing for polyneuropathy of diabetes or end stage renal disease (ESRD) in patients without clinical deficits is not indicated. Testing for the sole purpose of monitoring disease intensity or treatment efficacy in these two conditions is not indicated.

Psychophysical measurements (electrical, vibratory or thermal perceptions), even though they may involve delivery of a stimulus, are not covered.

Current Perception Threshold/Sensory Nerve Conduction Threshold Test (sNCT) is investigational and not covered. This procedure is different and distinct from assessment of nerve conduction velocity, amplitude, and latency. It is also different from short-latency somatosensory evoked potentials (SSEPs). Codes designated for eliciting nerve conduction velocity, latency, or amplitude and those designed for SSEPs are not to be used for sNCT. sNCT has a unique G code, G0255. Effective on October 1, 2002, CMS initially concluded that there was insufficient scientific or clinical evidence to consider the sNCT test and the device used in performing this test reasonable and necessary within the meaning of section 1862(a)(1)(A) of the law. Therefore, sNCT was not covered. Based on a reconsideration [in March, 2004] of current Medicare policy for sNCT, CMS concluded that there continues to be insufficient scientific or clinical evidence to consider the sNCT test and the device used in performing this test as reasonable and necessary within the meaning of section 1862(a)(1)(A) of the law (CMS Publication 100-3, Medicare National Coverage Issues Manual, Chapter 1, Section 160.23).

Examination using portable hand-held devices, which are incapable of real-time wave-form display and analysis, will be included in the evaluation & management (E/M) service. They will not be paid separately.

### *Needle Electromyography*

Beginning in 2012, three new CPT codes (95885, 95886 and 95887) have been created to report EMG studies performed the same day as nerve conduction testing. Each of these codes should be reported in conjunction with CPT Codes 95907-95913. Codes 95885 and 95886 can be reported together up to a combined total of four units per patient when all four extremities are tested. None of these codes should be reported with 95860-95864, 95870 or 95905.

It is expected that providers will use CPT code 95870 for sampling muscles other than the paraspinals associated with extremities, which have been tested. This code should not be billed

when the paraspinal muscles corresponding to an extremity are tested and when the extremity EMG code 95860, 95861, 95863, 95864, 95885 or 95886 is also billed. If nerve conduction studies are performed on the same day, CPT Code 95887 is used instead.

The necessity and reasonableness of the following uses of needle EMG studies have not been established:

1. exclusive testing of intrinsic foot muscles in the diagnosis of proximal lesions
2. definitive diagnostic conclusions based on paraspinal EMG in regions bearing scar of past surgeries (e.g., previous laminectomies)
3. needle EMG testing shortly after trauma, before needle EMG abnormalities would have reasonable time to develop
4. surface and macro EMGs
5. multiple uses of needle EMG in the same patient at the same location for the purpose of optimizing botulinum toxin injections

### **Maximum Number of Tests Necessary in 90% of Cases**

Table 1, “Maximum Number of Studies,” summarizes the American Association of Neuromuscular & Electrodiagnostic Medicine’s (AANEM) 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 and 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 that specified by the Maximum Number of Studies Table (Table 1) must be established at the time the EDX testing is performed and pertinent specific documentation 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 may be necessary to test selected muscles or nerves in a contralateral, at times asymptomatic, limb to better define the diagnosis. It is appropriate to bill for the additional testing and this is accounted for in the table below.

	<b>Limbs Studied by Needle Electromyography (95860-95864, 95867-95870, 95885-95887)</b>	<b>Nerve Conduction Studies (Total nerve studied, 95907-95913)</b>	<b>Neuromuscular Junction Testing (Repetitive Stimulation)</b>
<b>Indication</b>	<b>Number of Services (Tests)</b>	<b>Number of Services (Tests)</b>	<b>Number of Services (Tests)</b>
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	2	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 S-1 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 additional 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 lumbosacral radiculopathy, mononeuropathies and polyneuropathy, it may be necessary to perform up to 4 sensory studies, up to 4 motor studies and up to 2 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 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 before 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 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 disease course. 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), and to assess recovery over time following peripheral nerve surgery.

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 evaluation 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 neuromuscular junction (NMJ) disorders.
2. Three tests for motor neuronopathy, plexopathy, acute inflammatory demyelinating polyradiculoneuropathy/Guillain Barré Syndrome (AIDP/GBS), and following peripheral nerve surgery.

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 then may be required or appropriate 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 and guided by a documented neuromuscular history and physical.
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.
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.
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. NCS should not be performed without an EMG except in unique circumstances. Needle EMG and NCS should be performed together in the same EDX evaluation when possible.
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.
8. All EDX laboratories accredited by the AANEM EDX Laboratory Accreditation Program meet or exceed these minimum standards.

### **References**

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