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Subject: Nerve Conduction Studies; F-Wave Studies; H- Reflex Studies

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DESCRIPTION:

Electrodiagnostic medicine (EDX) is an extension of the clinical evaluation of patients with disorders of the peripheral or central nervous system. EDX studies are often crucial to evaluating symptoms, arriving at a proper diagnosis, and in following a disease process and its response to therapy in patients with neuromuscular disorders. EDX studies include the following:

- Needle electromyography (NEMG)
- Nerve conduction studies (NCSs)
- Late responses
  - H-reflex studies
  - F-wave studies.
- Neuromuscular junction (NMJ) studies
- Somatosensory evoked potentials (SEPs)
- Autonomic nervous system function testing.

This medical coverage guideline addresses nerve conduction studies (NCS), H-reflex studies, and F-wave studies.

Motor, sensory, and mixed NCSs and late responses (F-waves and H-reflex studies) are frequently complementary and performed during the same patient evaluation. Although the stimulation of nerves is similar across all NCSs, the characteristics of motor, sensory, and mixed NCSs are different. In each case, an appropriate nerve is stimulated and a recording is made either from appropriate nerves or from muscle supplied by the motor nerve.

- 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.
- 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.
- 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.

F-wave and H-reflex studies are noninvasive assessments of the peripheral nervous system. The nerve trunk is stimulated and the response of the innervated muscle recorded. These studies evaluate the entire length of a nerve, from the spinal cord to innervated muscle.

H-reflex and F-wave testing detect proximal pathology in nerves that would not be detected by standard motor and sensory nerve conduction techniques, such as lesions at the nerve root level that can occur in cervical or lumbar radiculopathies or Guillian-Barre syndrome.

F-wave studies of a nerve are virtually never performed without a motor nerve conduction study of that nerve. F-wave studies assess motor nerve function along the entire extent of that nerve. Multiple F-wave studies may be performed on a patient during a given encounter. The number of F-wave studies required depends on the working diagnosis and the electro-diagnostic findings already in evidence. Frequently, two and sometimes more F-wave studies are needed. When F-wave studies are indicated on one limb, the same number of studies must be performed on the contralateral limb for comparison purposes. It is not unusual to perform four separate F-wave studies, two on the affected limb and two on the unaffected limb to serve as normal controls.

H-reflex studies involve both the sensory and motor nerves. They assess sensory and motor nerve function and their connections in the spinal cord. They usually involve assessment of the tibial motor nerve and the gastrocnemius soleus muscle complex and are not often performed in conjunction with conventional nerve conduction studies of this nerve-muscle pair. Typically, only one or two H-reflex studies are performed on a patient during a given encounter. Bilateral gastrocnemius-soleus H-reflex abnormalities are often early indications of spinal stenosis, bilateral S1 radiculopathies, and peripheral polyneuropathies. In rare instances, H-reflex studies are tested in muscles other than the gastrocnemius-soleus muscle, such as, 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.

Portable devices have been developed to provide point-of-care nerve conduction studies. These portable devices have computational algorithms that are able to drive stimulus delivery, measure and analyze the response, and provide a detailed report of study results. Automated nerve conduction could be used in various settings, including primary care, without the need for specialized training or equipment.

Point-of-care nerve conduction testing has also been proposed for the diagnosis of peripheral neuropathy and, in particular, for detecting neuropathy in patients with diabetes. Peripheral neuropathy is relatively common in patients with diabetes mellitus, and the diagnosis is often made clinically through the physical examination. Diabetic peripheral neuropathy can lead to important morbidity

including pain, foot deformity, and foot ulceration. Clinical practice guidelines recommend using simple sensory tools such as the 10-g Semmes-Weinstein monofilament or the 128-Hz vibration tuning fork for diagnosis. These simple tests predict the presence of neuropathy defined by electrophysiological criteria with a high level of accuracy. Electrophysiological testing may be used in research studies and may be required in cases with an atypical presentation. NC-stat® by NeuroMetrix is a portable nerve conduction test device designed to be used at the point-of-care. The system comprises a biosensor array, an electronic monitor, and a remote report generation system.

Several nerve conduction measurement devices have received marketing clearance by the U.S. Food and Drug Administration (FDA) (e.g., BREVIO, NC-stat, ILTEK NeuroPath, NeuroMetrix ADVANCE system, Cadwell Sierra Summit, Cadwell Sierra Ascent, CareFusion Nicolet EDX).

Summary and Analysis of Evidence: Electrodiagnostic studies are a critical tool for the identification and study of peripheral neuropathy, enabling definition of the pathophysiologic type of nerve injury, its distribution, severity, and the degree of motor or sensory nerve involvement. These data help to differentiate the varieties of neuropathy from other neuromuscular diseases (Gooch, Weimer 2007).

POSITION STATEMENT:

When a therapeutic decision is based on test results, nerve conduction studies (NCS) **meet the definition of medical necessity** when **ALL** of the following criteria are met:

- Conservative treatments have failed (e.g., activity modification, physical therapy, medications, inconclusive imaging studies);
- Performed for the purpose of assessing the integrity and diagnosing diseases of the peripheral nervous system;
- Performed by or under the direct supervision of a physician;
- Conducted and interpreted at the same time as a needle electromyography (NEMG).

There may be instances when a needle electromyography (NEMG) is not typically performed in conjunction with nerve conduction studies. Nerve conduction studies performed alone (without a NEMG) **meet the definition of medical necessity** for the following situations:

- Follow up evaluation after previous electrodiagnostic evaluation; or
- Member is currently on anticoagulant therapy; or
- Member has lymphedema; or
- Member has carpal tunnel syndrome; or
- Member is unable to tolerate NEMG.

Automated point-of-care nerve conduction tests are considered **experimental or investigational**. The evidence is insufficient to determine the effects of automated point-of-care nerve conduction tests on health outcomes.

BILLING/CODING INFORMATION:

CPT Coding:

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)
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 (**investigational**)
95907	Nerve conduction studies; 1-2 studies
95908	Nerve conduction studies; 3-4 studies
95909	Nerve conduction studies; 5-6 studies
95910	Nerve conduction studies; 7-8 studies
95911	Nerve conduction studies; 9-10 studies
95912	Nerve conduction studies; 11-12 studies
95913	Nerve conduction studies; 13 or more studies

CODING NOTES

- CPT codes 95907-95913: Three types of nerve conduction studies are represented by these codes: sensory conduction, motor conduction (with or without an F wave test), or an H-reflex test. Electrodes are placed directly over the nerve, in sensory conduction testing, or over the motor point of a specific muscle in motor conduction testing. Electrical stimulation is applied. The latency, amplitude, and conduction velocity of the stimulation are measured. Adjustments to any of the testing elements (stimulus site, recording site, ground site, filtered settings) are made to minimize unintended stimulation of adjacent nerves. A report is generated on site that interprets the numerous test results at each site tested. Each type of study is reported only once regardless of the number of times performed on the same nerve in different areas.
- When needle electromyography (EMG) is performed in conjunction with nerve conduction studies, CPT codes 95885-95887 are reported for each limb tested, in addition to CPT codes 95907-95913.
- CPT codes 95885 and 95886 can be reported together up to a combined total of four (4) units of service per member when all four extremities are tested.
- Bilateral procedures should be coded using the -50 modifier.

REIMBURSEMENT INFORMATION:

Reimbursement for electrodiagnostic testing requires that the professional component be reported by the supervising physician rather than by an out-sourced entity.

Reimbursement for nerve conduction study codes 95907, 95908, 95909, 95910, 95911, 95912, **OR** 95913 is limited to one nerve conduction studies code per day and is limited to a combined total of three (3) in 6 months; services beyond these limitations are subject to medical review of medical necessity.

Reimbursement for needle electromyography is limited to the following:

- Combined total of eight (8) of 95885 and/or 95886 in 12 months;
- Eight (8) of 95887 in 12 months.

NOTE: Services in excess of these limitations are subject to medical review for medical necessity and would include conditions such as, but not limited to, members with complex neuromuscular disorders or members whose conditions are changing rapidly. Documentation should include physician progress notes and physician procedure notes documenting the member's history of sensory and/or motor nerve dysfunction and should include a printed recording of the nerve conduction study (NCS) test results. NCS reports should document the nerves evaluated, the distance between the stimulation and recording sites, conduction velocity, latency values, and amplitude. The temperature of the studied limbs may be included.

LOINC Codes:

The following information may be required documentation to support medical necessity: physician history and physical, physician progress notes, plan of treatment and reason for nerve conduction studies.

DOCUMENTATION TABLE	LOINC CODES	LOINC TIME FRAME MODIFIER CODE	LOINC TIME FRAME MODIFIER CODES NARRATIVE
Attending physician progress notes	18741-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim.
Physician procedure note	11505-5	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim.
Neuromuscular Electrophysiology Studies (i.e., nerve conduction study [NCS] test results)	27897-8	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim.

PROGRAM EXCEPTIONS:

Federal Employee Program (FEP): Follow FEP guidelines.

State Account Organization (SAO): Follow SAO guidelines.

Medicare Advantage Products: The following Local Coverage Determination (LCD) was reviewed on the last guideline reviewed date: Electromyography and Nerve Conduction Studies and Electromyography (L34859) located at fcso.com. The following National Coverage Determination (NCD) was reviewed on the last guideline reviewed date: Sensory Nerve Conduction Threshold Tests (sNCTs) (160.23) located at cms.gov.

If this Medical Coverage Guideline contains a step therapy requirement, in compliance with Florida law 627.42393, members or providers may request a step therapy protocol exemption to this requirement if based on medical necessity. The process for requesting a protocol exemption can be found at Coverage Protocol Exemption Request.

DEFINITIONS:

Antidromic: conducting impulses in a direction opposite to the normal.

Gastrocnemius: the largest and most superficial muscle of the calf of the leg that arises by two heads from the condyles of the femur and has its tendon of insertion incorporated as part of the Achilles tendon; also called gastrocnemius muscle.

Mononeuropathy multiplex: signifies focal involvement of two or more nerves, usually as a result of generalized disorder, such as diabetes mellitus or vasculitis.

Mononeuropathy: a disorder of a single nerve and is often due to local causes such as trauma or entrapment as in carpal tunnel syndrome. Patients with mononeuropathies exhibit motor and/or sensory symptoms and signs due to injury of a particular nerve.

Myopathies: a diverse group of disorders characterized by primary dysfunction of skeletal muscles and include polymyositis, muscular dystrophy, and congenital, toxic and metabolic myopathies.

Neuritis: inflammatory disorders of nerves resulting from infection or autoimmunity.

Neuronopathies: occur in diverse forms, at varying ages, and with varied clinical presentations; can be both acquired and inherited. The common feature is pathophysiology of either the motor neurons in the anterior horn of the spinal cord (motor neuronopathies) or, less commonly, of the dorsal root ganglia (sensory neuronopathies).

Orthodromic: conducting impulses in the normal direction; said of nerve fibers.

Peripheral neuropathy and polyneuropathy: syndromes resulting from diffuse lesions of peripheral nerves, usually manifest by weakness, sensory loss, and autonomic dysfunction.

Plexopathies-plexi: located between the roots and peripheral nerves, and their disorders often pose a clinical challenge. The manifestations of a plexopathy may be distant from the actual site of nerve injury.

Polyneuropathies: diseases, which affect peripheral nerve axons, their myelin sheaths, or both; manifested by sensory, motor and autonomic signs and symptoms.

Radiculitis: inflammation of spinal nerve roots, accompanied by pain and hyperesthesia.

Radiculopathy: any diseased condition of roots of spinal nerves.

Reflex sympathetic dystrophy: is an excessive or abnormal response of the sympathetic nervous system to injury of the shoulder and arm, rarely the leg; burning or aching pain following trauma to an extremity of a severity greater than that expected from the initiating injury; pain, usually burning or aching, in an injured extremity is the single most common findings. Manifestations of vasomotor instability are generally present and include temperature, color, and texture alterations of the skin of the involved extremity.

Soleus: a broad flat muscle of the calf of the leg that lies deep to the gastrocnemius, arises from the back and upper part of the tibia and fibula and from a tendinous arch between them, inserts by a tendon that unites with that of the gastrocnemius to form the Achilles tendon; acts to flex the foot.

RELATED GUIDELINES:

None applicable.

OTHER:

None applicable.

REFERENCES:

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COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 12/5/24.

GUIDELINE UPDATE INFORMATION:

11/15/01	Medical Coverage Guideline Reformatted and revised.
12/15/02	Added coverage information added for current perception threshold testing (G0255).
10/15/03	Annual Review. Developed separate MCG 01-95805-18 for Current Perception Threshold Testing.
03/15/04	Review and revision to guideline consisting of adding additional ICD-9 codes.
09/15/07	Review and revision of guideline consisting of updated references and reformatted guideline.
09/15/08	Review and revision of guideline consisting of updated references.
07/15/09	Revision of Position Statement to add coverage criteria; updated ICD-9 diagnosis code table to include fifth digit specificity as applicable; add reimbursement statement regarding billing of professional components; updated references.
01/01/10	Annual HCPCS coding update: added 95905.
10/15/10	Revision; related ICD-10 codes added.
04/01/11	2nd Quarter HCPCS coding update: deleted S3905.
07/15/11	Scheduled review; position statement unchanged; related ICD-10 codes added; formatting changes, and references updated.
01/01/12	Annual HCPCS coding update: added 95885, 95886, and 95887.
03/15/12	Revision; added Medicare Program Exception regarding 95905.
06/15/12	Added coding information relevant to 95920.
01/01/13	Annual CPT/HCPCS coding update: added 95907-95913; deleted 95900, 95903, 95904, 95934, and 95936; revised coding notation to replace 95920 with 95940 and 95941; added G0453; updated reimbursement section.
05/11/14	Revision: Program Exceptions section updated.
11/01/15	Revision: ICD-9 Codes deleted.
10/01/16	Revision; billing/coding information section updated.
07/15/18	Revision; revised position statement. Updated description, program exceptions, coding notes and references.
12/15/20	Review/update; no change to position statement. Updated references.

12/01/22	Review/update; no change to position statement. Deleted code G0453. Updated references.
05/22/23	Update to Program Exceptions section.
12/15/24	Review; no change in position statement. Updated references.