

The Intervention Series presents:  
***Neuro-Muscular Re-education (NMR)***

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THE REHAB DOCUMENTATION GURU

IN CONJUNCTION WITH:  
ALLIED HEALTH EDUCATION



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## Bio

- BSc PT from Northeastern University, Boston, MA 1991
- MDiv Southern Seminary, Louisville, KY 2006
- APTA Board Certified Geriatric Clinical Specialist (GCS) 2015
- 6+ years area management as Clinical Specialist
- Currently Clinical & Compliance Specialist
- Multiple setting/populations experience
- Documentation auditing experience since 2009
- Father of 9 children

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# Objectives

By the end of this training, you will be able to:

- Define NM Re-ed
- Identify testing options to determine need for NM Re-ed
- Utilize appropriate treatment strategies that are evidence-based to support skill of NM Re-ed
- Document each component of evaluations/progress notes/daily notes to demonstrate skilled nature of NM Re-ed application



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# Course Outline

Definition of NM Re-Ed

- Areas of impact
  - ICD codes proving need for NM Re-Ed
  - Standardized Tests and Measures for determining NM Re-Ed necessity
  - Treatment options for NM Re-Ed
  - Documentation of NM Re-Ed



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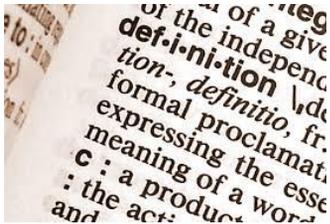
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# Definition of Neuromuscular Reeducation



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## NM Re-Ed is...

“This therapeutic procedure is provided to improve **balance, coordination, kinesthetic sense, posture, and proprioception.**”

American Medical Association (AMA)

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## The Component Parts of the NM Reed Definition

- Balance
- Coordination
- Kinesthetic Sense
- Posture
- Proprioception

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## Defining Balance

noun1.a state of equilibrium or equipoise; equal distribution of weight, amount, etc.

<http://www.dictionary.com/browse/balance>



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# Systems of Balance

Visual



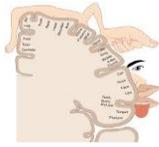
<https://www.youtube.com/watch?v=svemv0TARPU>

Vestibular



[https://en.wikipedia.org/wiki/Vestibular\\_system](https://en.wikipedia.org/wiki/Vestibular_system)

Somatosensory



[https://en.wikipedia.org/wiki/Corticul\\_of\\_humans](https://en.wikipedia.org/wiki/Corticul_of_humans)

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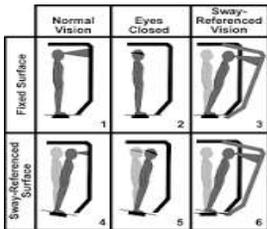
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## Differentiating between balance systems- the "foam and dome"




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## Visual

- Gaze stabilization
- VOR- Vestibular Ocular Reflex
- Acuity
- Smooth Pursuits
- Saccades
- Etc...

**IMPORTANT-** to tie assessment of these into balance assessment

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## Vestibular

- APTA recommends strongly *specialized training* to safely and effectively assess, and is beyond the scope of this course.
- It can be treated for with accommodating activities.

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## Somatosensory

- Proprioceptive awareness
- Kinesthetic awareness
- Protective sensation (monofilaments)

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## Proprioceptive Assessment

### Finger to nose test:

- 1. Ask patient to close their eyes. 2. Lightly touch one of the patient's fingers. 3. Ask the patient to touch their nose with the same finger you touched. 4. Repeat test on opposite hand.

### Space test:

- 1. Ask patient to close their eyes. 2. The clinician moves the patient's arm or leg into a different position. 3. The patient is asked to copy the position with the opposite limb.

### Movement test:

- 1. Ask patient to close their eyes. 2. The clinician grasps a finger or a toe by the sides of the appendage and gently moves it up or down. 3. The patient reports if the appendage was moved up or down.

### Romberg test:

- 1. Ask the patient to stand with their feet together and their eyes open. 2. The clinician guards the patient. 3. The clinician observes for signs of loss of balance. 4. The test is repeated with the eyes closed.

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# Kinesthetic Assessment

- Explain the procedure to the patient with his/her eyes open. For example, "I am going to move your wrist (or ankle, shoulder, elbow, etc.) in a certain direction, and I want you to describe the direction of the movement as soon as you feel it."
- Demonstrate the procedure with the patient's eyes open until the patient understands the procedure to be performed.
- The patient closes his/her eyes, or vision is otherwise occluded.
- Hold the body segment being tested on the lateral surfaces of the limb to minimize cues from touch and pressure sensations.
- Passively move the individual's joint in one direction. The increments of movement should be relatively small and avoid the full end range of motion.
- Have the patient indicate the direction of movement.
- The procedure is repeated enough times to conclude if joint movement sense is intact or impaired. A suggested minimum number of trials is five per joint.

Reference:  
[http://healthsciencesocw.wayne.edu/sensory11\\_1.htm](http://healthsciencesocw.wayne.edu/sensory11_1.htm)

# Monofilament Assessment

The median value for the 18-34 group was 3.61(.4g), the 35-64 group was 4.31 (2g), and the 65 and older group was 4.74 (6g). The 18-34 group was significantly (40.941, df=2, p<0.001) different than the other groups. The older two groups did not significantly differ.

<http://idfc.org/spotlight/normative-values-for-foot-sensation-challenging-the-5-07-monofilament/>

# ICD-10 Codes Proving Issues with Balance Dysfunction

- History of Falls (need documented h/o falls)
- Abnormality of Gait; Difficulty Walking (need documented components of gait)
- Injuries to the visual cortex
- Cerebral dysfunction/disorders/infarcts/injuries
- Cerebellar ""
- Vestibular dysfunctions: H81.\_\_\_\_
- Neuropathies/injury to peripheral nerves
- Etc... Consider any word associated with what the definition says it is addressing.
- Tool: [www.icd10data.com](http://www.icd10data.com)

## ICD Coding - Continued

- MACs are beginning to deny claims for NM reed **unless** one of these diagnoses are present:
  - Documented **nerve palsy**, such as peroneal nerve injury causing foot drop
  - Documented muscular weakness or flaccidity as result of a **cerebral dysfunction**, a **nerve injury** or disease or having had a **spinal cord disease** or **trauma**
- Check with your MAC's LCD to determine if **absolutist** language is present – if not, then make sure that documentation supports one or more of coverage criteria: definition of CPT criteria.

## Example from LCD from NGS without **absolutist** language:

This procedure **may be** reasonable and necessary for restoring prior function which has been affected by:

- loss of deep tendon reflexes and vibration sense accompanied by paresthesia, burning, or diffuse pain of the feet, lower legs, and/or fingers;
- nerve palsy, such as peroneal nerve injury causing foot drop;
- muscular weakness or flaccidity as result of a cerebral dysfunction, a nerve injury or disease or having had a spinal cord disease or trauma;
- poor static or dynamic sitting/standing balance;
- postural abnormalities;
- loss of gross and fine motor coordination;
- hypo/hypertonicity.

## Alternative to Neuromuscular Re-Education

Some MACs recognize Therapeutic Exercises as addressing balance, coordination, and abnormal posture, so if NMRE is prohibited except for a neuro diagnosis, consider Therapeutic Exercises.



# mFRT

- Minimal Detectable Change (MDC)
  - Generally between 4-8 CM improvement

### Cut-off Scores

- <7 inches- limited in mobility, unable to leave community without assist
- <18.5 cm- high fall risk frail elderly
- <25.4 cm- high fall risk Parkinson's
- <15 cm- high fall risk stroke

Normative Data

	Young 21-39	Middle 40-59	Old 65-93
Forward Reach	44.9 cm	42.3 cm	32.9 cm
Lateral Reach	29.5 cm	26.7 cm	20.3 cm

<http://www.rehabmeasures.org/Units/RehabMeasures/DispForm.asp?ID=450>

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# FIST (Function in Sitting Test)

### Purposes of the FIST

- The FIST can be useful for a variety of clinical uses including:
- Assess functional sitting abilities
- Describe sitting balance dysfunction
- Focus interventions
- Track changes in sitting balance over time
- Assessment of lower level patients, especially if other balance tests may be too difficult for the patient

<http://www.samuelmerritt.edu/fist>

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# Standing Testing

- Berg Balance Scale
- Tinetti
- Functional Reach Test (FRT)
- Fullerton Advanced Balance Scale (FAB)
- Romberg (part of foam and dome)

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# Berg Balance Scale (BBS)

- 14 performance areas, 56 points total
- Designed to assess static balance and fall risk
- Interpretation:
  - 0-20- unable to walk
  - 21-40- walking with assist
  - 41-56- walking independently
- Berg K, Wood-Dauphinee S, Williams JJ, Maki B: Measuring balance in the elderly: Validation of an instrument. *Can. J. Pub. Health*, July/August supplement 2:57-11, 1992.
- Berg K, Wood-Dauphinee S, Williams JJ, Gayton D: Measuring balance in the elderly: Preliminary development of an instrument. *Physiotherapy Canada*, 41:304-311, 1989.

## Berg Balance Scale (BBS) - continued

Minimal Detectable Change (MDC) – example, 8 points in institutionalized adults

Age normative data:

Age	Gender	N	Mean	SD	95% CI
60-69	Male	15	55	1	55-56
	Female	22	55	2	54-56
70-79	Male	14	54	3	52-56
	Female	22	53	4	52-55
80-89	Male	8	53	2	51-54
	Female	15	50	3	49-52

<http://www.rehabmeasures.org/Lists/RehabMeasures/PrintView.aspx?ID=888>

## Tinetti

- Originally designed for elderly
- 28 point scale measures components of
  - Balance- 16 points
  - Gait- 12 points
- MDC- 4-6 points, with higher end for CVA patients
- Could be used to address 97110, 97530, and 97116 as well
- Good basic way to incorporate balance with function
- Norms:
  - Mean POMA score for males aged 65-79 years = 26.21(3.40)
  - Mean POMA score for females age 65-79 years = 25.16(4.30)
  - Mean POMA score for males over 80 years = 23.29(6.02)
  - Mean POMA score for females over 80 years = 17.20(8.32)

<http://www.rehabmeasures.org/Lists/RehabMeasures/PrintView.aspx?ID=1039>

## Functional Reach Test

- MDC for PD patients with a history of falls = 4.32 cm
- MDC for PD patients with no history of falls = 8.07 cm
- Cut-off scores
  - FRT < 7 inches:
  - Unable to leave neighborhood without help
  - Limited in mobility skills
  - Most restricted in ADLs

<http://www.rehabmeasures.org/Lists/RehabMeasures/PrintView.aspx?ID=950>




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## Functional Reach Test

Age	Men		Women		YE
Age	Mean	SD	Mean	SD	SD
20-40	16.7	1.9	14.6	2.2	2.2
41-40	14.9	2.2	13.8	2.2	2.2
70-87	13.2	1.6	10.5	3.5	3.5

[https://www.med.illinois.edu/depts\\_programs/sciences/clinical/internal\\_med/Documents/Functional\\_Reach.pdf](https://www.med.illinois.edu/depts_programs/sciences/clinical/internal_med/Documents/Functional_Reach.pdf)




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## Fullerton Advanced Balance Scale (FAB)

More sensitive to fall risk in elderly than the Berg Scale, and harder to complete (has a jump component)

Every 1 point decrease in the total FAB scale score was associated with an 8% increase in the older adult's probability of sustaining a fall.

### Test Equipment Needed:

- Stop Watch
- 36 inch ruler
- Pen or pencil
- 6 inch bench (18 x 18 inch stepping surface)
- Metronome
- 2 Airex™ pads and one or more 12 inch lengths of non-slip material (Dycem)




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## Romberg

Limited study for applicability, and not any normative data

***Moral of the story... be careful of the tests that you utilize to substantiate patient deficits and effects of treatment.***

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## Gait-based Balance Assessment

- Tinetti- addressed in another slide
- Gait Speed- several studies of gait speed as indicator of fall risk
- Timed Up and Go (TUG)- several factors, including balance, impact functionality of this score

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## Treatment Options

- Balance
- Coordination
- Kinesthetic Sense
- Proprioception
- Posture

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## Balance Treatment – Somato-sensation

“Rehabilitation of Somatic Sensation and Related Deficit of Motor Control in Patients With Pure Sensory Stroke,” N. Smania, MD, et al.

- Looked at just 4 patients with primarily parietal lobe infarct
- Patients had sensory loss unilaterally
- Several exclusions from the study- no previous stroked, no significant cognitive impairments, intact contra-laterally.
- Tested for a number of somatosensory areas in the hand- so not applied to LE directly.
- 30 training sessions, 1 hour daily of HEP

## Somato-sensation (continued)

Challenges received during HEP:

- Tactile discrimination (eyes open allowed)
  - Variable gripping challenges
  - Various manipulative activities for hand dexterity
- Blind-folded
  - Object recognition
  - Joint position sense- mirroring blinded unaffected side positioning/movements
  - Weight discrimination
  - Motor sequences (finger drumming and piano key sequencing)
  - Reaching and grasping after seeing where object was (variable sized objects)
  - Small item grouping into homogenous groups

Results- patients can demonstrate significant gains in pure sensory loss with upper motor neuron deficits.

<https://www.ismif.org/meetings/2008/may/SMANIAAPMR03.pdf>

## Balance Treatment- Visual

- Saccades- performing rapid, ballistic movements to/from objects- head stationary or head moving
- Smooth Pursuits- following a moving object, or scanning a stationary object with smooth eye movements- can be head still or heading moving in different planes
- Convergence- Eyes adjust focus upon object close up, with eyes adducting towards each other
- Divergence- Eyes adjust focus on object moving away, with eyes performing relative abduction away from each other
- Vestibulo-Ocular Response movements (VOR)- keeping eyes fixed on stationary object (or moving) while head rotates (challenge to occular response to vestibular input)

## Balance Treatment- Vestibular

- Accommodation exercises
  - It is suggested that specific training in the area of vestibular occur prior to prescription by a therapist of treatment
- The Home Epley Maneuver
- The Home Semont Maneuver
  - Both Epley and Semont are available on web and YouTube, and have been proven effective in most cases. If symptoms do not resolve, specific diagnosis is strongly recommended.

<http://www.dizziness-and-balance.com/disorders/bppv/home/home-pc.html#CRP>

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## Coordination

- Challenging fine and gross motor
  - Various gripping tasks (ie, for fine motor)
  - Kicking/punching balls/balloons (for gross motor)
  - Developmental sequencing
- Utilizing specialized tasks for training (i.e., using keys, getting shoe on without using hands)
- Utilizing sports-related activities to address (i.e., Wii bowling, golfing, tennis, etc.)

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## Kinesthetic/Proprioceptive Training

- Use the tests themselves for retraining patient
- Joint approximation (through weight bearing exercises especially- more recruitment of afferent pathways)
- General exercises involving limb shown to improve overall joint sense awareness in elderly

<https://eurapa.biomedcentral.com/articles/10.1007/s11556-007-0026-x>

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## Postural Awareness Training

- Kinesio-taping
- Mirrors
- Plumb lines
- Feldenkrais, Alexander Technique, Pilates, Gokhale, etc
- Training for the lower level cognitive patient

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## Documentation of NM Re-ed

- Diagnoses are first defense- make sure to have medical and/or treatment dx that proves need.
- Reason for Referral/Initial Assessment Statement- discuss key, objective deficits in **underlying impairments** in the areas of the definition- balance, coordination, kinesthetic sense, proprioceptive sense, and/or posture.
- Objective measures:
  - If you do not measure it, you cannot treat it.
  - If you do not **keep** measuring it, you cannot justify ongoing treatment of it.

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## Documentation of NM Re-ed (continued)

- Goals
  - Correlate functional deficit area with underlying impairment(s) fitting NM Re-ed definition.
  - Ensure measurability of each component.
  - Make sure goals are attainable by patient:
    - **I**mprovement goals for areas that can improve
    - Teach patient to **C**ompensate for areas that he/she cannot improve – this may not directly correlate with billing in NM Re-ed
    - Perform **E**nvironmental adaptations to assist patient in areas that he/she cannot improve or compensate for- this may not directly correlate with billing of NM Re-ed

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## Documentation of NM Re-ed (continued)

### •Analysis-

- Weave narrative analysis that combines the functional issues with the measured underlying impairments.
- Discuss progress made in each component of each special test- be sure to objectify.
- Explain lack of progress in any area of measurement, with explanation as to why.
- If no progress in a given measurement associated with NM Re-ed, justify why continued treatment needed (see continuing skilled services)
- Discuss observations made by non-skilled caregivers/patient that demonstrates impact upon underlying impairment and functionality.

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## Documentation of NM Re-ed (continued)

### •Skilled Services- When documenting what you did to justify billing, include:

- State the specific interventions: "Neuromuscular Reeducation including..."
- An action word to describe what you were doing- examples:
  - Analyzed, assessed, facilitated, modified, progressed, adjusted, incorporated, etc.
- Target of the action-
  - Balance, sensation, coordination, kinesthetic/proprioceptive awareness, postural control.
  - Anatomical region treated- especially important for sensation and kinesthetic/proprioceptive sense.
- Special techniques incorporated that demonstrate skill:
  - Example- quick stretch techniques, brushing over skin, balance perturbations
- Evolving nature of care over time- avoid repetition of the same techniques

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## Documenting NM Re-ed (continued)

### •Justification for continued care

- Tie into remaining objective measures of according to definition
- Tie into functional impact of the remaining deficit according to the definition
- Discuss positive responses to care of this area (ties back to analysis/assessment)
- Discuss rationale for **inability of non-skilled person** to do the activity that you are doing:
  - Complex nature of the task
  - Safety concerns with someone else attempting
  - Inability of non-skilled person being effective in carrying out activity
  - Necessity for evolving/progressing nature of treatment

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## Documentation Samples – RFR/Initial Analysis

### •RFR/Initial Analysis Statement:

- "Patient is a 79 y/o female with recent diagnosis of **right CVA** with **left dominant hemiparesis**, who demonstrated lack of ability to dress upper body, perform perineal hygiene tasks, and perform self feeding due to loss of **fine and gross motor coordination** as measured by \_\_\_\_\_, loss of **tactile awareness left hand** (making grasping objects difficult), and **decreased joint position sense** of left wrist and fingers, putting patient at risk for injury to hand/wrist during ADLs and mobility."
- "Patient is a 47 y/o male with blunt trauma **peroneal nerve injury** with **nerve palsy**, with resultant gait deficits due to foot drop and **lacking ability to sense ankle stability and maintain appropriate ankle posturing** during stance phase of gait."

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## Documentation Samples – Objective Measures

### •Objective Measures

- "Fine motor coordination impaired as measured by 9-hole peg test score of \_\_\_\_\_."
- "Patient scored \_\_\_/12 balance portion of Tinetti, with deficits noted in eyes closed/firm surface loss of balance immediately, and inability to maintain balance during nudge test."
- "Patient unable to detect limb movement direction of left tibia on femur on 4/5 trials."
- "Patient unable to detect \_\_\_\_\_ monofilament over entire palmar aspect of right hand, indicating loss of protective sensation and impacting patient's ability to sense cup/utensils in hand."

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## Documentation Samples - Goals

- "Improve patient's Berg Balance Scale score to \_\_\_/56 to allow safe, IND ambulation on sidewalk and curbing with straight cane."
- "Patient will utilize compensations of looking at right foot placement before squat-pivot transfer 90% of trials due to lack of right LE sensory awareness, to prevent injury to lower right LE during weight bearing and twisting."
- "Patient will be set up 100% of time by caregiver in wheelchair with chair tilt at appropriate angle to allow self feeding but supporting posture to prevent slumping during entire meal, without repositioning needed."

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## Documentation Sample - Analysis

- “Due to patient’s improvement to \_\_\_\_\_ on the FIST, patient demonstrates improved capability to perform seated edge of bed grooming and hygiene for morning cares, with CNAs reporting improved patient participation in self cares and decreased burden of care overall.”
- “Patient has not progressed in ability to ambulate on uneven surfaces due to continued lack of toe clearance right and decreased step length on left, impacting gait speed at 0.4 meters/second, placing patient at high fall risk.”

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## Documentation Sample – Skilled Services

- “Facilitated improved balance response with challenges to various sensory systems for balance, utilizing eyes open/closed and compliant/non-compliant surface alterations, with external perturbations randomly applied.”
- “Progressed patient from head turns/fixed gaze to head turns/alternating gaze during straight line gait activities to improve vestibular ocular response and visual-vestibular coordination for balance.”

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## Documentation Samples – Justification for Continued Care

- “Patient improved mFRT from 2 cm to 13 cm, indicating achievement of a minimal detectable change (MDC) with functional impact noted in \_\_\_\_\_.”
- “Caregivers observed to cue patient 3/7 trials effectively for joint protection left shoulder during assisting UB dressing, placing patient at risk for significant injury to rotator cuff due to patient’s subluxation and lack of position sense, indicating that further training is needed, and patient will benefit from additional training and improvement left shoulder function to prevent injury.”

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## In Summary

- NM Re-ed has a definition, which we must follow to justify billing.
- Certain diagnostic categories support medical necessity of NM Re-ed.
- If you cannot measure a component of the definition of the covered underlying impairments of NM Re-ed, you cannot bill it.
- Every part of your documentation is impacted by, and proves need for, NM Re-ed.

## Thank You!

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