

Making Outcome Measures Work for You and Your Patient in Adult Neurorehabilitation

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SPEAKERS

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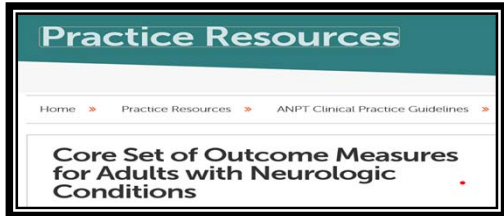
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OBJECTIVES

1. **Select, administer, and interpret a core set of outcome measures with clinical utility in adult neurorehabilitation.**
2. **Develop an action plan to facilitate the use of a core set of outcome measures in the participants' clinical practice.**
3. **Discuss the value of outcome measure data in collaborative/shared decision-making and goal-setting in adult neurorehabilitation.**

BACKGROUND – Why the Need for a Core Set of Outcome Measures?





REFERENCE FOR REHABILITATION PROFESSIONALS
CLINICAL PRACTICE GUIDELINE: A CORE SET OF OUTCOME MEASURES FOR ADULTS WITH NEUROLOGICAL CONDITIONS

Should be administered to adult patients with neurological conditions who have goals and the capacity to improve in the constructs of:

- Balance,
- Transfers, and/or
- Gait



REFERENCE FOR REHABILITATION PROFESSIONALS
CLINICAL PRACTICE GUIDELINE: A CORE SET OF OUTCOME MEASURES FOR ADULTS WITH NEUROLOGICAL CONDITIONS

- **Six Minute Walk Test** (Walking distance)
- **10 Meter Walk Test** (Walking speed)
- **Activities-Specific Balance Confidence Scale** (Balance confidence)
- **Berg Balance Scale** (Static and Dynamic, Sitting and Standing balance)
- **Functional Gait Assessment** (Walking balance)
- **Five Times Sit to Stand** (Transfer)



REFERENCE FOR REHABILITATION PROFESSIONALS
CLINICAL PRACTICE GUIDELINE: A CORE SET
OF OUTCOME MEASURES FOR ADULTS WITH
NEUROLOGICAL CONDITIONS

Best Practice Recommendation:

Documentation of Patient Goals

Document patient-stated goals and monitor changes using an outcome measure such as the Goal Attainment Scale

Goal Attainment Scaling

Individualized goals that are criterion-referenced

Rated by patient on a 5-point scale:

- +2 = Much more than expected
- +1 = Somewhat more than expected
- 0 = Achieves the expected level
- 1 = Somewhat less than expected
- 2 = Much less than expected



REFERENCE FOR REHABILITATION PROFESSIONALS
CLINICAL PRACTICE GUIDELINE: A CORE SET
OF OUTCOME MEASURES FOR ADULTS WITH
NEUROLOGICAL CONDITIONS

Best Practice Recommendation:

Discussing Outcome Measure Results and Collaborative/Shared Decision Making with Patients



REFERENCE FOR REHABILITATION PROFESSIONALS
CLINICAL PRACTICE GUIDELINE: A CORE SET
OF OUTCOME MEASURES FOR ADULTS WITH
NEUROLOGICAL CONDITIONS

**Discussing Outcome Measure Results and
Collaborative/Shared Decision Making with Patients**

**60% of consumers stated test results are "very important"
37% of consumers reported "very satisfied" with information
they received**

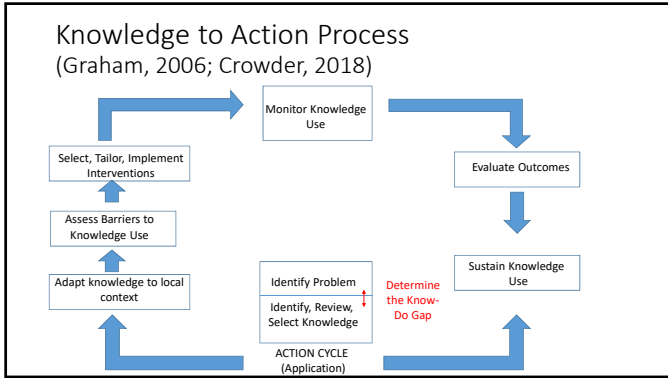
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Addressing Knowledge
Translation and the "Evidence to
Practice Gap"

What is Knowledge Translation?

(Crowner, 2018)

- Reducing the "know-do gap"
 - Closing the gap between what we know and what we do
- Knowledge awareness and facilitation of use
 - Making users aware of knowledge and facilitating use to improve health and health care systems
- Moving knowledge into action
 - Evidence → Practice



The Challenge of Knowledge Translation

- > 17 years for evidence to be used in clinical practice (Morris, 2011)
- Multifaceted (Strauss, 2009)
 - Patient
 - Individual Clinician
 - Organization Leaders/Stakeholders
 - Political
 - Economic

Let's Discuss

- Facilitators vs. Barriers
 - Organizational Context
 - Social Context
 - Economic
 - Political
 - Individual Facilitators (Clinicians)

Factors that Influence the Frequency of Gait Speed Measurement

(Saale, 2018)

- The purpose of this study was to:
 - Identify the barriers to measuring gait speed
 - Determine if gait speed utilization could be influenced by removing certain barriers within an inpatient rehabilitation facility.
 - Barriers addressed included lack of education, lack of dedicated space to measure, and lack of support for measurement and interpretation.

Factors that Influence the Frequency of Gait Speed Measurement

(Saale, 2018)

- Methods:
 - To address education barriers:
 - Clinicians (n=17) provided a 45 minute education session focused on utility of gait speed measurement, process for calculation and interpretation of measures, and hands-on practice of measuring and interpreting gait speed with provided clinic resources.
 - To address environmental and clinical resource constraints:
 - Two pathways marked for the 4MWT were placed in easy to access areas of the clinic
 - Access to an iPod touch with the 4MWT IOS app
 - 4MWT IOS app assisted with measurement and interpretation of gait speed measurements
 - Paper handout with calculation procedures, gait speed interpretations, and numerical examples
- Frequency of gait speed measurement was collected two weeks before and two weeks after the presentation. This data was analyzed using a z-test.
- Of the 14 PTs that returned a pre-survey, 6 PTs returned the post-survey. Results from the pre- and post- surveys were evaluated using thematic analysis.

Factors that Influence the Frequency of Gait Speed Measurement

(Saale, 2018)

Four Meter Walk Test (4MWT):
Calculation and Interpretation

Trial Time 1 (s): _____ Trial Time 2 (s): _____

Calculate Gait Speed

Speed (m/s) = $\frac{4 \text{ meters}}{t}$

Where t = fastest trial time (s)

Example: If the patient's fastest trial time was 7.2 seconds

Speed (m/s) = $\frac{4 \text{ meters}}{7.2 \text{ seconds}} = 0.56 \text{ m/s}$

| Functional Ambulation Level Assistance with Walking Level | Risk of Hospitalization | Level of Dependence Level for ADLs/ADLs |
|---|--|--|
| <input type="checkbox"/> 0-0.2 m/s Homebound walker <input type="checkbox"/> 0.4 - 0.8 m/s Limited community walker <input type="checkbox"/> 0.8 - 1.2 m/s Community walker | <input type="checkbox"/> 0 - 0.4 m/s High Risk <input type="checkbox"/> 0.6 - 1.0 m/s Medium Risk <input type="checkbox"/> >1.0 m/s Low Risk | <input type="checkbox"/> 0 - 0.6 m/s Dependent ADLs <input type="checkbox"/> 1 - 1.0 m/s Independent ADLs |
| Exit Risk | Level Discharge Location | |
| <input type="checkbox"/> >1.2 m/s Crisis avert and exceed walk speed <input type="checkbox"/> 0 - 1.0 m/s Intervention needed to prevent fall risk | <input type="checkbox"/> 0 - 0.1 m/s Discharge to SNF <input type="checkbox"/> 0.1 - 1.4 Discharge to home with help | |

Gait Speed (m/s): _____ • Documentation should include level of assistance and assistive devices if needed

Factors that Influence the Frequency of Gait Speed Measurement

(Saale, 2018)

•Common cited barriers before intervention:



•75% of post-survey data revealed that most barriers were eliminated with the education session and clinic resources.

Factors that Influence the Frequency of Gait Speed Measurement

(Saale, 2018)

•Gait speed was measured in 2% of the patients in the pre-test period by clinicians and 11% in the post-test period.

•A z-test indicated there was a significant increase (p=0.01) in the frequency of gait speed measurements for ambulatory patients after the presentation and provision of resources.

•84% of ambulatory patients evaluated during the test period walked sufficient distance to complete the 4MWT

Introduction
Gait speed has been identified as an important indicator of fall risk, functional limitations, and risk of hospitalizations. It has also been shown to be a key factor in determining rehabilitation needs. Gait speed measurement for ambulatory patients is not frequently utilized in the clinical setting. Gait speed measurement tools are quick and easy to administer, yet these measurement are frequently under-utilized in the clinic.

Purpose
The purpose of this study was to identify the barriers to measuring gait speed and to determine if gait speed education could be implemented in an outpatient ambulatory facility. These barriers included lack of education, lack of dedicated space to measure, and lack of support for measurement and interpretation.

Methods
• Researcher-provided clinicians (RPTs) with a 60-minute education session based on utility of gait speed measurement, proper technique, and hands-on practice of measuring and interpreting gait speed with provided clinic resources.
• Clinical resources included two pathways marked for the 6MWT as well as access to a clinic couch with the 4MWT. 4MWT and 6MWT were used to assess and interpret 6MWT results. A paper handout with education, gait speed interpretation, and resource lists was also provided.
• Frequency of gait speed measurement was collected two weeks before and two weeks after the presentation. The data was analyzed using a z-test.
• Of 97 RPTs that returned a pre-survey, 67 RPTs returned the post-survey. Results from the pre- and post-survey were evaluated using thematic analysis.

Results
• Gait speed was measured in 2% of the patients in the pre-test period by clinicians and 11% in the post-test period.
• A z-test indicated there was a significant increase (p=0.01) in the frequency of gait speed measurements for ambulatory patients after the presentation and provision of resources.
• Common barriers reported on pre-survey but not post-survey included:
• Gait speed measurement not applicable for patient
• Patient too weak for walk testing
• Lack of patient
• Patient required device/resistance
• Only a small survey data revealed that education session and clinic resources.
• 84% of ambulatory patients indicated during the post-period walked sufficient distance to complete the 4MWT.

Discussion
Providing resources and education for gait speed measurement had a small but statistically significant impact on utilization in the clinic. These findings indicate that frequency of gait speed measurements may be affected by the identification and elimination of certain barriers within the clinic. Future studies should examine factors leading to higher survey rates and to evaluate the impact of addressing other barriers to gait speed measurement. Some of these barriers include the reliance on a single educational session as they receive a significant return with in many clinics. For example, 50% of survey respondents reported that gait speed measurement was not adequate for a majority of their patients, but 84% of ambulatory patients in the post-test period walked sufficient distance to complete the 4MWT.


Conclusion
Addressing barriers and identifying ways to make gait speed easier for clinicians to measure may lead to greater utilization in the clinic.

References
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So what about now....

ACADEMY OF NEUROLOGIC PHYSICAL THERAPY | **CORE MEASURES: SET UP YOUR ENVIRONMENT FOR SUCCESS!**
<http://www.neuropt.org/practice-resources/ncpt-clinical-practice-guidelines/core-outcome-measures-cog>

- Select a testing space
- Pre-measure space for 10 meter walk test, 6 minute walk test, and functional gait assessment
 - Once you determine a space, mark the distances for the 10 meter walk test, 6 minute walk test, and functional gait assessment



- If you can't tape the floor, you can use small tape marks on the baseboard → provides quick reference for placement of cones

ACADEMY OF NEUROLOGIC PHYSICAL THERAPY | **CORE MEASURES: SET UP YOUR ENVIRONMENT FOR SUCCESS!**
<http://www.neuropt.org/practice-resources/ncpt-clinical-practice-guidelines/core-outcome-measures-cog>

- What if tape is not allowed?
 - Ask about floor tape (made specifically to avoid pulling finish off the floor)
 - You can use floor or ceiling tiles → measure and use as quick reference for placing cones
 - Use reflective tape/ribbon (may be able to attach to cones and roll up between uses)
 - Use an industrial tape measure (at least 40' long) with marks at necessary distances
 - Use a dry erase marker on tile floors that will wash easily



CORE MEASURES: SET UP YOUR ENVIRONMENT FOR SUCCESS!

<http://www.neuropt.org/practice-resources/nrpt-clinical-practice-guidelines/core-outcome-measures-cpg>

- Items needed for any of the core measure tests
 - Stopwatch
 - Cones
 - 2 standard height chairs with backrests (one with arms and one without)
 - A height of 18" will meet the standard for 5X STS and Berg
 - Mechanical lap counter or paper/pencil
 - Step stool (7 3/4" – 9" high)
 - Ruler
 - Slipper or shoe
 - 2 stacked shoeboxes (9 inches high)
 - Stairs with bilateral handrails (step height = 7 1/4 - 9 inches high)



CORE MEASURES: SET UP YOUR ENVIRONMENT FOR SUCCESS!

<http://www.neuropt.org/practice-resources/nrpt-clinical-practice-guidelines/core-outcome-measures-cpg>

- Keep all protocol instructions and/or cut off/MDC/MCID values nearby for quick reference
- What other things might be useful?

What about what we have covered in this course is a problem implementing in the clinic?
How can we do this?

Barriers to Implementation: Identification and Reduction

| Barriers to Implementation | How can we reduce these barriers? |
|----------------------------|-----------------------------------|
| | |

Developing an Action Plan to Use Core Set of Outcome Measures: Monday Morning Take Home



References

- Academy of Neurologic Physical Therapy <http://www.neuropt.org/practice-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>
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This Clinical Practice Guideline aims to standardize practice by providing rehabilitation clinicians with recommendations for a core set of outcome measures for adults with neurological conditions that should be routinely used in all settings.

Use of the Core Set of Outcome Measures

- o The core set should be administered with patients who have goals and the capacity to improve transfers, balance, and/or gait to assess change over time
- o Measures in the core set include: The Berg Balance Scale, Functional Gait Assessment, Activities-Specific Balance Confidence Scale, 10-Meter Walk Test, 6 -Minute Walk Test and the 5 Times Sit to Stand
- o In cases when a patient cannot complete one or more of the core set, a score of 0 should be documented
- o Core set should be administered under the same test conditions at least two times, at admission and discharge, and when feasible between these periods
- o **Moderate recommendation (Level II*)**
- o **Benefits**
 - Comparison interventions and programs
 - Measurement of patient progress over time and across continuum of care
 - Comprehensive examination of balance, gait, transfers to assist with clinical-decision making
 - Standardization of entry-level
- o **Risk, Harm, Cost**
 - Organizational costs to alter medical records, time for staff training and test administration, cost of testing forms and equipment
- o **Exclusions**
 - In the acute care setting, in situations where a patient's length of stay is short or when the patient is abruptly discharged, administration of the core set at interim and discharge may not be feasible
 - If a patient does not have goals or a prognosis to improve in specific construct areas, the measure should not be collected
 - When a measure in the core set cannot be administered, the clinician should document "not administered" and provide rationale

Static and Dynamic and Standing Balance Assessment: Berg Balance Scale (BBS)

- o **Strong recommendation (Level I*)**
- o **Benefits**
 - Excellent internal consistency and reliability
 - High clinical feasibility, minimal equipment, free, requires less than 20 minutes to administer

- o **Risk, Harm, Cost**
 - No adverse events documented in research
- o **Preponderance of benefit compared to harm**
- o **Exclusions**
 - Patients who do not have goals to improve static and dynamic sitting and standing balance
 - Patients with a high level of balance ability may experience a ceiling effect

Walking Balance Assessment: Functional Gait Assessment (FGA)

- o **Moderate recommendation (Level I*)**
- o **Benefits**
 - Excellent internal consistency and reliability
 - High clinical feasibility, minimal equipment, free, requires less than 20 minutes to administer
- o **Risk, Harm, Cost**
 - No adverse events documented in research
- o **Preponderance of benefit compared to harm**
- o **Exclusions**
 - Clinicians should use discretion when applying the FGA for patients who do not have explicit goals to improve balance while walking
 - Not appropriate for patients who do not have the capacity to walk (score 0)

Balance Confidence Assessment: Activities-Specific Balance Confidence Scale (ABC) Strong recommendation (Level I*)

- o **Benefits**
 - Excellent internal consistency and reliability
 - High clinical feasibility, free, requires less than 5 minutes to administer
 - Minimal time-cost
- o **Risk, Harm, Cost**
 - Potential burden to patients, as the ABC is a patient-reported measure
- o **Preponderance of benefit compared to harm**
- o **Exclusions**
 - Clinicians should use discretion when applying the ABC with patients undergoing neurological rehabilitation who do not have goals to improve balance confidence

For more detailed information, please refer to the original document: https://journals.lww.com/jnpt/Fulltext/2018/07000/A_Core_Set_of_Outcome_Measures_for_Adults_With.10.aspx

LEVEL OF EVIDENCE*

| I | II | III | IV | V |
|--|---|--|--|-----------------------------------|
| Evidence obtained from at least one, high quality (>50% critical appraisal score) study of psychometric properties | Evidence obtained from multiple, lesser quality (< 50% critical appraisal score) studies of psychometric properties | Evidence obtained from one study of lesser quality (< 50% critical appraisal score) of psychometric properties | Not applicable to studies of psychometric properties | Expert opinion (or best practice) |

COSMIN-M

Walking Speed Assessment: 10 Meter Walk Test (10mWT)

Strong recommendation (Level I*)

- **Benefits**
 - Excellent reliability (chronic)
 - Minimal equipment
- **Risk, Harm, Cost**
 - Minimal risk provided the patient's vital signs are monitored and appropriate guarding is provided
- **Preponderance of benefit compared to harm**
- **Exclusions**
 - Not appropriate for patients who do not have the capacity to walk
 - Score 0 meters/second for patients who are unable to walk at a given point in time, but who have goals and the capacity to walk in the future

Walking Distance Assessment: Six Minute Walk Test (6MWT)

Moderate recommendation (Level I*)

- **Benefits**
 - Excellent reliability (chronic)
 - High clinical feasibility, minimal equipment
- **Risk, Harm, Cost**
 - Minimal risk provided the patient's vital signs are monitored and appropriate guarding is provided
- **Preponderance of benefit compared to harm**
- **Exclusions**
 - Not appropriate for patient who do not have the capacity to walk
 - Score 0 meters for patients who are unable to walk at a given point in time, but who have goals and the capacity to walk in the future
 - Limited feasibility in certain settings (e.g., limited walkway or fixed environmental barriers)
 - If unable to administer due to feasibility, document "unable to administer"

Transfer Assessment: Five Times Sit to Stand (5TSTS)

- **Best practice recommendation (Level V*)**
- **Risk, Harm, Cost**
 - May extend the length of session
- **Preponderance of benefit compared to harm**

Documentation of Patient Goals

- **Best practice recommendation (Level V*)** for use with patients with acute, chronic stable, and chronic progressive conditions
- Clinicians should document patient-stated goals and monitor changes in individuals with neurologic conditions using an outcome measure such as the Goal Attainment Scale, reporting task, the performance conditions, and the time to complete or level of independence desired.
- **Benefits**
 - Provides an opportunity for patients and clinicians to share their beliefs and values
 - May capture activities or constructs not included in other measures, but are important to patients
 - May assist clinicians identifying and addressing discrepancies between perceived and actual performance
- **Preponderance of benefit compared to harm**
- **Exclusions**
 - Patients with impaired consciousness, cognition and/or communication
 - A caregiver may be able to provide a proxy response

Discussing Outcome Measure Results and Collaborative/ Shared Decision-Making with Patients

- **Best practice recommendation (Level V*)** for assessment of patients with acute, chronic stable, and chronic progressive conditions
- **Benefits**
 - Patients more informed and engaged in rehabilitation
 - Better alignment of the plan of care with patient's goals, preferences and measurement results
- **Risk, Harm, Cost**
 - May extend length of the session
 - Patients may have difficulty understanding the results, or experience stress/discomfort

The core set may be viewed as a "starting point" for measure selection, with additional condition-specific measures as recommended by the EDGE task force used to provide insight into issues specific to their patient's health condition

For more detailed information, please refer to the original document: https://journals.lww.com/jnpt/Fulltext/2018/07000/A_Core_Set_of_Outcome_Measures_for_Adults_With.10.aspx

LEVEL OF EVIDENCE*

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COSMIN-M

6 MINUTE WALK TEST (6MWT)

Set Up:

- o Hallway or open area at least 12 meters long with smooth, consistent surface
- o Mark start (0 meters) and turn around (12 meters)
- o Object (e.g. cone) at each end for turnaround; turning area should be 49 in (124 cm) wide.
- o Place chair at one end
- o Allow patient to rest prior to starting the test

Instructions:

- o *"The aim of this test is to walk as far as possible in six minutes. You will walk back and forth in the hallway. Six minutes is a long time to walk, so you will be exerting yourself. You may get out of breath or become tired. You are allowed to slow down, to stop, and to rest as necessary. You may lean against the wall while resting but resume walking as soon as you are able. Are you ready to do that?"*
- o *"Walk around the object at each end. I am going to use this counter to keep track of the laps you complete. Remember the aim is to walk as far as possible, but do not run or jog." "Start now or when you are ready."*

Count laps and give standard encouragement:

- o Encouragement is given after each minute of the test (e.g., *"You're doing a good job and you have 5 minutes left"*, or *"Keep up the good work. You have 4 minutes to go."*); no other communication should occur during the test. At 6 minutes: *"Stop"*

Distance (in meters) covered in six minutes is calculated by multiplying the number of total laps by 12 meters and adding the distance of the partial lap completed at the time the test ended.

Notes:

- o Standing rests are OK, keep the timer going
- o Document assistive device/bracing used and keep consistent between trials; if the patient no longer needs the device/brace or has progressed to a less restrictive device/brace, the test should be repeated, and these changes documented.
- o Document the level of physical assistance provided (see instructions: 6 MWT & 10mWT: Documenting Level of Physical Assistance)

10 METER WALK TEST (10mWT)

Set Up:

- o Clear pathway 10 meters in length in a designated area over solid flooring
- o Mark start (0 meters) and end points (10 meters)
- o Place marks at 2 meters and 8 meters

Instructions:

- o Two trials for each speed is recommended: comfortable speed trials first, then fast speed; Average of 2 trials is score for that condition
- o Comfortable speed instructions:
 - o *"Walk at your own comfortable walking pace and stop when you reach the far mark."*
- o Fast speed instructions:
 - o *"Walk as fast as you can safely walk and stop when you reach the far mark."*

Timing and conversion

- o The time is started when any part of the leading foot crosses the plane of the 2-meter mark.
- o The time is stopped when any part of the leading foot crosses the plane of the 8-meter mark.
- o Divide 6m by the seconds recorded to get a speed in m/sec

Notes:

- o Document assistive device/bracing used and keep consistent between trials; if the patient no longer needs the device/brace or has progressed to a less restrictive device/brace, the test should be repeated, and these changes documented.
- o Document the level of physical assistance provided (see instructions: 6MWT & 10mWT: Documenting Level of Physical Assistance)

6MWT & 10mWT: DOCUMENTING LEVEL OF PHYSICAL ASSISTANCE

- o The level of physical assistance required should be documented using a 7-point scale:
 - 1 = total assist [patient performs 0%-24% of task] *
 - 2 = maximum assist [patient performs 25%-49% of task]
 - 3 = moderate assist [patient performs 50%-74% of task]
 - 4 = minimum assist [patient performs 75%-99% of task]
 - 5 = supervision [patient requires stand-by or set-up assist; no physical contact is provided]
 - 6 = modified independent [patient requires use of assistive devices or bracing, needs extra time, mild safety issues]
 - 7 = independent

**If total assist is required, a score of "0" should be documented*

- o Assistance should be provided to prevent a fall or collapsing (i.e. knee buckling, trunk collapse, etc.).
- o Assistance should not be provided for limb swing, or any other way the assistance is propelling the patient forward. If this type of assistance is required, a score of "0" should be documented.

ACTIVITIES SPECIFIC BALANCE CONFIDENCE SCALE (ABC)

Instructions:

- o Patient is administered the self-report questionnaire either by interview (face-to-face) or by paper on their own
- o Use a copy of the ABC.
- o *"For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale: 0% (No confidence), 10, 20, 30, 40, 50, 60, 70, 80, 90, 100% (Completely confident)"*
- o *"How confident are you that you will not lose your balance or become unsteady when you..."*

Scoring:

- o Total the ratings and divide that number by 16 for the ABC self-confidence score (reported in %)
- o For patients who skip items, sum the ratings and divide by the number of items completed
- o 12 of the 16 items must be answered to get a score

BERG BALANCE SCALE

Equipment/Set Up:

- o Stopwatch
- o 2 chairs, standard height (18-20 in), one with arm rests and one without
- o Step stool or step of average height (7 ¾ -9 inches high)
- o Ruler
- o Slipper or shoe

Instructions/Administration/Scoring

- o Use a copy of the Berg Balance Scale and perform each item with the patient, using the instructions and scoring indicators for each item
- o When complete, add all items for a total score (0-56)

Notes:

- o Assistive devices are not to be used
- o A hospital bed or mat table can be used in lieu of a chair without arm rests as long as the height is between 18-20 inches
- o Item 8: Patients should use both arms to reach unless one is limited in ability to lift (e.g.: ROM or strength limitation). If there is a limitation on one side, the intact side can be utilized provided that the patient is not utilizing trunk rotation to achieve further reach. Item 9: If a shoe/slipper is not available, only substitute with an item that is similar height as a shoe/slipper
- o Item 13/14: The BBS allows the patient to self-select the limb that they stand on, however in instances where they have unilateral impairment it is recommended that the patient be tested with on the involved limb (SLS) and placing the involved limb in the back (tandem)

FUNCTIONAL GAIT ASSESSMENT

Equipment/Set Up:

- o Stopwatch
- o Marked walking area of 20 feet (6 meters) long and 12 inches (30.48 cm) wide
- o Obstacle of 9-inch height (2 stacked shoeboxes)
- o Set of steps (7 ¾ -9-inch step height) with bilateral railings

Instructions/Administration/Scoring

- o Use a copy of the Functional Gait Assessment and perform each item with the patient, using the instructions and scoring indicators given for each item
- o When complete, add all items for a total score (0-30)

Notes:

- o You can use a set of 4 steps as long as they have bilateral railings and a step height of 7 ¾- 9 inches
- o Assistive devices are permitted where the scoring indicates a score for completion with a device. For other items, use of a device would be scored a 0

5TSTS

Equipment/Set Up:

- o Place a standard height chair (17-18 in) such that it is unsecured (i.e.: not up against a wall)
- o Patient sits in the chair with arms folded across chest
- o Patient places feet comfortably underneath them

Instructions:

- o One trial is administered
- o *"I want you to stand up and sit down 5 times in a row as quickly as you can when I say 'Go'. Be sure to stand up fully and try not to let your back touch the chair between each repetition. Do not use the back of your legs against the chair"*

Timing:

- o Begin timing when you say "Go"
- o Stop timer when the patient's buttocks hit the seat on the 5th repetition

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| OVERVIEW | <ul style="list-style-type: none"> ◦ The 6MWT is a sub-maximal exercise test used to assess walking endurance and aerobic capacity. Participants will walk a set circuit for a total of six minutes. |
| NUMBER OF TEST ITEMS | <ul style="list-style-type: none"> ◦ 1 item |
| SCORING | <ul style="list-style-type: none"> ◦ The score of the test is the distance a patient walks in 6 minutes (measured in meters and can round to the nearest decimal point). |
| EQUIPMENT | <ul style="list-style-type: none"> ◦ Stopwatch ◦ Chair ◦ Measuring instrument (meters) ◦ At least a 12 meter long hallway or open area (e.g., quiet gym) with a smooth, consistent surface ◦ Two objects (e.g. cones) to indicate turnaround ◦ Mechanical lap counter or pencil and paper |
| TIME (NEW CLINICIAN) TIME (EXPERIENCED CLINICIAN) | <ul style="list-style-type: none"> ◦ Less than 10 minutes ◦ Less than 10 minutes |
| COST | <ul style="list-style-type: none"> ◦ Free |
| LOGISTICS-SETUP | <ul style="list-style-type: none"> ◦ A hallway or open area at least 12 meters long with a smooth, consistent surface ◦ There should be a clear pathway on the sides and at either end. ◦ An object (e.g. cone) at each end for a turnaround point, with an area for turning approximately 49 in (124 cm) wide. ◦ A chair should be placed at one end. |
| LOGISTICS-ADMINISTRATION | <ul style="list-style-type: none"> ◦ Prior to administering the measure, the patient should be sitting in a chair, rested, near the starting point of the test. ◦ Please review any contraindications and take resting vital signs [e.g. heart rate, blood pressure, oxygen level, Borg Rate of Perceived Exertion¹, etc.] as indicated² ◦ Instructions to the patient in sitting³: <ul style="list-style-type: none"> • <i>"The aim of this test is to walk as far as possible in six minutes. You will walk back and forth in the hallway. Six minutes is a long time to walk, so you will be exerting yourself. You may get out of breath or become tired. You are allowed to slow down, to stop, and to rest as necessary. You may stand and rest, but resume walking as soon as you are able. Are you ready to do that?"</i> • <i>"Walk around the object at each end. I am going to use this counter to keep track of the laps you complete. Remember the aim is to walk as far as possible, but do not run or jog."</i> • <i>"Start now or when you are ready."</i> • Encouragement (eg, "You're doing a good job and you have 5 minutes left, or "Keep up the good work. You have 4 minutes to go.") is given after each minute of the test; no other communication should occur during the test. ◦ The patient may take as many standing rests as they like, but the timer should keep going and record the number of rests taken and the total rest time. ◦ Patients may use any assistive device or bracing that they are currently using. The type of device and/or bracing must be documented. ◦ When administering the test, do not walk in front of or directly beside the patient, as this may "pace" the patient and influence the speed and distance they walk. Instead, walk at least a half step behind the patient. ◦ If a patient requires assistance, only the minimum amount of assistance required for a patient to complete the task should be provided. The level of assistance documented, however, should reflect the greatest amount of assistance provided during the test. For example, if a patient required minimum assistance for the majority of the test but required moderate assistance for stability on one occasion, the patient should be rated as requiring moderate assistance. Assistance should be provided to prevent a fall or collapsing (i.e. knee buckling, trunk collapse, etc). If assistance is needed for limb swing, or any other manner in which the assistance is propelling the patient forward, this limiting factor should be noted along with a score of 0 for the test. <ul style="list-style-type: none"> • The level of physical assistance documented using an ordinal 7-point scale is described below. <ul style="list-style-type: none"> 1 = total assistance [patient performs 0%-24% of task]* 2 = maximum assistance [patient performs 25%-49% of task] 3 = moderate assistance [patient performs 50%-74% of task] 4 = minimum assistance [patient performs 75%-99% of task] 5 = supervision [patient requires stand-by or set-up assistance; no physical contact is provided] 6 = modified independent [patient requires use of assistive devices or bracing, needs extra time, mild safety issues] 7 = independent <p>*Note: if your patient requires total assistance, a score of 0 should be documented</p> |

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| <p>LOGISTICS-SCORING</p> | <ul style="list-style-type: none"> ◦ Distance (in meters) covered in six minutes is calculated by multiplying the number of total laps by 12 meters and adding the distance of the partial lap completed at the time the test ended. ◦ If the patient needs to stop and sit prior to the end of the six minutes, the test ends, and the distance ambulated is recorded. ◦ <u>Document the distance in meters, the level of assistance, and type of assistive device and/or bracing used.</u> ◦ If a patient requires total assistance or is unable to ambulate at all or requires assistance which affects the speed of forward propulsion, a score of 0 meters should be documented. |
| <p>ADDITIONAL RECOMMENDATIONS</p> | <ul style="list-style-type: none"> ◦ Vital signs (e.g. heart rate, blood pressure, oxygen level, Borg Rate of Perceived Exertion,¹ etc.) should be assessed pre and post test, as indicated² ◦ Patients should not talk during the test, as this depletes their respiratory reserves. Exceptions to this are if the patient requests to stop the test or needs to report any symptoms (e.g. pain, dizziness). ◦ The person administering the test also should not talk, except to provide updates every minute (as described above). Talking during the test can distract the patient and affect their score on the test. ◦ For patients who are unable to walk, but have a goal and the capacity to achieve walking, a baseline a score of 0 meters should be documented. ◦ To track change, it is recommended that this measure is administered a minimum of two times (admission and discharge), and when feasible, between these periods, under the same test conditions for the patient. ◦ Recommend review of this standardized procedure and, on an annual basis, establish consistency within and among raters using the tool. |

COMMON QUESTIONS AND VARIATIONS

1. “My current setting does not have a 12-meter hallway or open area available. What should I do?”

- Length of the track does matter. According to one study, using shorter hallways or “tracks” resulted in patients walking shorter overall distances on the 6MWT compared to when they used longer hallways⁴. Therefore, it is recommended that the test be administered consistent with recommendations above.
- If your facility does not have a 12 meter hallway, the test can be administered outside over level ground, free of street crossings.
- If your facility does not have a 12 meter hallway, AND you can’t administer the test outside due to safety, weather, unlevel surfaces, etc., the test can still be administered over a shorter track, and a consistent administration procedure should be utilized each time the test is performed. The shorter track distance and any other modifications should be documented and clearly identified as a variation from the standardized procedure detailed above. Be aware that the results may not be comparable to published normative values or appropriate to include in an aggregate analysis. Additionally, the 6MWT may have limited feasibility in certain settings with limited walkway space (hospital room, home environment). Thus, clinicians will need to determine the feasibility and appropriateness of the 6MWT in specific situations. If unable to administer due to limited feasibility, the clinician should document “unable to administer” and provide an explanation in the patient’s medical record.

2. “In my setting the longest area available transitions from laminate flooring to carpet. Is this a problem?”

- Ideally the floor surface would be hard and flat² throughout, as well as being the same, however this may not be possible in all settings, particularly in the home. The test should still be administered in the area that you have, and a consistent administration procedure and environment be utilized each time the test is performed. The variation in surface or environment should be documented and clearly identified as a variation from the standardized procedure above. Be aware that the results may not be comparable to published normative values or appropriate to include in an aggregate analysis.

3. “My patient requires contact guard assist, can I still administer this measure?”

- Yes. If physical assistance is needed for a patient to complete the 6MWT, please document the distance in meters, the level of assistance provided, and the assistive device or bracing used.
- The level of physical assistance documented using an ordinal 7-point scale is described below.
 - 1 = *total assistance* [patient performs 0%-24% of task]*
 - 2 = *maximum assistance* [patient performs 25%-49% of task]

- 3 = *moderate assistance* [patient performs 50%-74% of task]
- 4 = *minimum assistance* [patient performs 75%-99% of task]
- 5 = *supervision* [patient requires stand-by or set-up assistance; no physical contact is provided]
- 6 = *modified independent* [patient requires use of assistive devices or bracing, needs extra time, mild safety issues]
- 7 = *independent*

***Note:** if your patient requires *total assistance*, a score of 0 should be documented

- It is important to note that the assisted test may not be directly comparable to the distance that patient walks without assistance, and it may not be compared to published normative values.

4. “My patient stumbled during the measure and I jumped in to catch them and prevent a fall. How do I score this measure?”

- If the patient is able to resume walking, the trial can continue. The number of times and the distance at which the patient stumbled should be documented.
- The level of physical assistance required should be documented using an ordinal 7-point scale described below.
 - 1 = *total assistance* [patient performs 0%-24% of task]*
 - 2 = *maximum assistance* [patient performs 25%-49% of task]
 - 3 = *moderate assistance* [patient performs 50%-74% of task]
 - 4 = *minimum assistance* [patient performs 75%-99% of task]
 - 5 = *supervision* [patient requires stand-by or set-up assistance; no physical contact is provided]
 - 6 = *modified independent* [patient requires use of assistive devices or bracing, needs extra time, mild safety issues]
 - 7 = *independent*

***Note:** if your patient requires total assistance, a score of 0 should be documented

5. “My patient has impaired cognition and gets distracted during the test, frequently forgetting the intended goal. Can I still administer this measure?”

- Yes. Examiners can use brief verbal, visual, or tactile cues to keep a patient on-task and to remind him/her of the goal, but be consistent (e.g., “Keep going. Walk to the mark.”). Document the type and frequency of the required cues.

6. “My patient can’t walk for 6 consecutive minutes. Why can’t I just do the 2 Minute Walk, instead?”

- The good news is that any patient with goals to improve walking distance and capacity can perform the 6MWT. Even if your patient has to end the test well before the 6 minutes are over, he/she can still receive a score (distance walked) on this test. In some cases the score might be just a few meters distance.

b. In order to decrease variability in practice and for consistency of measurement across episodes and the continuum of care, the 6MWT is the preferred measure of walking endurance. It is recommended that clinicians use this measure instead of (or in addition to) other measures of walking endurance.

7. “My patient needs to stop and sit during the 6MWT. Is it acceptable to keep the clock running while they sit, and then have them stand and continue walking?”

a. The test stops when a person needs to sit and rest, and this is the distance recorded. A patient can take as many standing rest breaks as needed, even leaning against a wall, but standard procedure is to stop the test when a person needs to sit because this indicates the true distance the patient can walk.²

8. “Can the patient use an assistive device during the test?”

- a. Yes, the patient can use an assistive device during the test. Recommendations include documenting the assistive device and keeping the assistive device consistent between trials and reassessments.
- b. Inappropriate assistive devices can have a negative impact on walking speed and therefore reduce the validity of the test. It is likely that the type of assistive device a patient needs may change over time. If/when a different assistive device is indicated, the reason behind a different device choice should be noted.
- c. If the patient no longer needs the assistive device, or has progressed to a less restrictive device, it would be appropriate to repeat the test with this change in conditions and document this fact.
- d. It is appropriate to have the patient utilize the assistive device which he/she is most likely to use in his/her own environment.

9. “Can the patient use orthoses or bracing during the test?”

- a. Yes, the patient should wear the walking devices necessary for ambulation (AFO, KAFO, Neuroprostheses, etc). The walking device should be documented and kept consistent between trials and assessments.
- b. If the patient no longer needs the orthosis which was used in the initial test, it is appropriate to repeat the test without the orthosis and document this fact.
- c. It is appropriate to have the patient utilize the orthosis or brace which he/she is most likely to use in his/her own environment.

10. “What about monitoring vital signs after the test. Should I check them?”

- a. It is always good practice to monitor vital signs, particularly in patients with cardiovascular or pulmonary involvement. Per the American Thoracic Society Guidelines, it is up to the clinician's judgement on which and if vitals should be obtained.²

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CORE MEASURE: 10 METER WALK TEST (10mWT)

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| OVERVIEW | <ul style="list-style-type: none"> o The 10mWT is used to assess walking speed in meters/second (m/s) over a short distance. |
| NUMBER OF TEST ITEMS | <ul style="list-style-type: none"> o 1 item |
| SCORING | <ul style="list-style-type: none"> o The total time taken to ambulate 6 meters (m) is recorded to the nearest hundredth of a second. 6 m is then divided by the total time (in seconds) taken to ambulate and recorded in m/s¹. |
| EQUIPMENT | <ul style="list-style-type: none"> o Stopwatch o A clear pathway of at least 10 m (32.8 ft) in length in a designated area over solid flooring^{2,3} |
| TIME (NEW CLINICIAN) | <ul style="list-style-type: none"> o 5 minutes or less |
| TIME (EXPERIENCED CLINICIAN) | <ul style="list-style-type: none"> o 5 minutes or less |
| COST | <ul style="list-style-type: none"> o Free |
| LOGISTICS-SETUP | <ul style="list-style-type: none"> o A clear pathway of at least 10 m (32.8 ft) in length in a designated area over solid flooring is required. o Measure and mark the start and end point of a 10-m walkway. o Add a mark at 2 m and 8 m (identifying the central 6 m which will be timed). o Quiet conditions¹ |
| LOGISTICS-ADMINISTRATION | <ul style="list-style-type: none"> o Comfortable walking speed: <ul style="list-style-type: none"> • Have the patient start on the 0-m mark (start line) • Instructions to patient: <i>“Walk at your own comfortable walking pace and stop when you reach the far mark.”</i> o Fast walking speed: <ul style="list-style-type: none"> • Have the patient start on the 0-m mark (start line) • Instructions to patient: <i>“Walk as fast as you can safely walk and stop when you reach the far mark.”</i> o Two trials are administered at the patient’s comfortable walking speed, followed by 2 trials at his/her fast walking speed, per the below instructions. The 2 trials, for each speed, are averaged and the 2 gait speeds are documented in meters/second.¹ o Patients may use any assistive device or bracing that they are currently using. The type of device and/or bracing must be documented. o When administering the test, do not walk in front of or directly beside the patient, as this may “pace” the patient and influence the speed and distance they walk. Instead, walk at least a half step behind the patient. o If a patient requires assistance, only the minimum amount of assistance required for a patient to complete the task should be provided. The level of assistance documented, however, should reflect the greatest amount of assistance provided during the test. For example, if a patient required minimum assistance for the majority of the test but required moderate assistance for stability on one occasion, the patient should be rated as requiring moderate assistance. Assistance should be provided to prevent a fall or collapsing (i.e. knee buckling, trunk collapse, etc). If assistance is needed for limb swing, or any other manner in which the assistance is propelling the patient forward, this limiting factor should be noted along with a score of 0 for the test. <ul style="list-style-type: none"> • The level of physical assistance documented using an ordinal 7-point scale is described below. <ul style="list-style-type: none"> 1 = <i>total assistance</i> [patient performs 0%-24% of task]* 2 = <i>maximum assistance</i> [patient performs 25%-49% of task] 3 = <i>moderate assistance</i> [patient performs 50%-74% of task] 4 = <i>minimum assistance</i> [patient performs 75%-99% of task] 5 = <i>supervision</i> [patient requires stand-by or set-up assistance; no physical contact is provided] 6 = <i>modified independent</i> [patient requires use of assistive devices or bracing, needs extra time, mild safety issues] 7 = <i>independent</i> o *Note: if your patient requires <i>total assistance</i>, a score of 0 should be documented |

CORE MEASURE: 10 METER WALK TEST (10mWT)

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| <p>LOGISTICS-SCORING</p> | <ul style="list-style-type: none"> o The time is measured for the middle 6 m to allow for patient acceleration and deceleration.^{1,4} <ul style="list-style-type: none"> • The time is started when any part of the leading foot crosses the plane of the 2-m mark. • The time is stopped when any part of the leading foot crosses the plane of the 8-m mark.¹ o <u>Document the time to walk the middle 6m, the level of assistance, and type of assistive device and/or bracing used.</u> o If a patient requires total assistance or is unable to ambulate at all or requires assistance which affects the speed of forward propulsion, a score of 0 meters should be documented. |
| <p>ADDITIONAL RECOMMENDATIONS</p> | <ul style="list-style-type: none"> o Patients should not talk during the test, as this depletes their respiratory reserves. Exceptions to this are if the patient requests to stop the test or needs to report any symptoms (e.g. pain, dizziness). o The person administering the test also should not talk. Talking during the test can distract the patient and affect their score on the test. o For patients who are unable to walk, but have a goal and the capacity to achieve walking, a baseline score of 0 meters/second should be documented. o To track change, it is recommended that this measure is administered a minimum of two times (admission and discharge), and when feasible, between these periods, under the same test conditions for the patient. o Recommend review of this standardized procedure and, on an annual basis, establish consistency within and among raters using the tool. |

COMMON QUESTIONS AND VARIATIONS

1. **“What if I don’t have 10 open meters to do the assessment?”**
 - a. Variations to the 10mWT exist, including the 5MWT. Clinical recommendations include a “rolling start and finish” during the 5MWT to allow for acceleration and deceleration. It is important to note that the 5MWT has not been validated in as many health conditions as the 10mWT.^{4,5}
 - b. Individuals or organizations should use the 10mWT standardized protocol to assess aggregate data for their patients. In cases when the protocol cannot be used, the modifications to the administration process should be documented.
2. **“My patient requires contact guard assistance, can I still administer this measure?”**
 - a. Yes, If physical assistance is needed for a patient to complete the 10mWT please document the time (m/s), the level of assistance provided, and the assistive device or bracing used.
 - b. The level of physical assistance required should be documented using an ordinal 7-point scale described below.
 - 1 = *total assistance* [patient performs 0%-24% of task]*
 - 2 = *maximum assistance* [patient performs 25%-49% of task]
 - 3 = *moderate assistance* [patient performs 50%-74% of task]
 - 4 = *minimum assistance* [patient performs 75%-99% of task]
 - 5 = *supervision* [patient requires stand-by or set-up assistance; no physical contact is provided]
 - 6 = *modified independent* [patient requires use of assistive devices or bracing, needs extra time, mild safety issues]
 - 7 = *independent*

***NOTE:** if your patient requires *total assistance*, a score of 0 should be documented
 - c. It is important to note that the assisted test may not be directly comparable to the distance that patient walks without assistance, and it may not be compared to published normative values.
3. **“What if it is not clinically feasible to complete two trials of each condition, comfortable and fast walking speed?”**
 - a. If four test trials are not clinically feasible, it is recommended that two trials, one trial at a comfortable and one at a fast walking speed, be performed to provide an assessment of the patient’s ability to alter gait speed.
 - b. If two trials are not clinically feasible, it is recommended that a trial of comfortable walking speed be prioritized. Consider that if a patient has goals to return to the community, the assessment of fast walking speed has more value. If a patient has the ability to walk fast, he/she may be able to more fully participate in the community and adapt to environmental context. If the projected outcome for the patient is community ambulation, a fast gait speed should be collected at the earliest time point possible, and re-testing is recommended to track change.
4. **“My patient has impaired cognition and gets distracted during the test, frequently forgetting what their goal is. Can I still administer this measure?”**
 - a. Yes. Examiners can use brief verbal, visual, or tactile cues to keep a patient on-task and to remind him/her of the goal, but be consistent (e.g., “Keep going. Walk to the mark.”). Document the type and frequency of the required cues.
5. **“Can the patient use an assistive device during the test?”**
 - a. Yes, the patient can use an assistive device during the test. Recommendations include documenting the assistive device and keeping the assistive device consistent between trials and reassessments.
 - b. Inappropriate assistive devices can have a negative impact on walking speed and therefore reduce the validity of the test.² It is likely that the type of assistive device a patient needs may change over time. If/when a different assistive device is indicated, the reason behind a different device choice should be noted.
 - c. If the patient no longer needs the assistive device, or has progressed to a less restrictive device, it would be appropriate to repeat the test with this change in conditions and document this fact.
 - d. It is appropriate to have the patient utilize the assistive device which he/she is most likely to use in his/her own environment.
6. **“Can the patient use orthoses or bracing during the test?”**
 - a. Yes, the patient should wear the walking devices necessary for ambulation (AFO, KAFO, Neuroprostheses, etc). The walking device should be documented and kept consistent between trials and assessments.⁶
 - b. If the patient no longer needs the orthosis which was used in the initial test, it is appropriate to repeat the test without the orthosis and document this fact.
 - c. It is appropriate to have the patient utilize the orthosis or brace which he/she is most likely to use in his/her own environment.
7. **“Where should the therapist stand and guard?”**
 - a. Standing behind the patient will reduce the likelihood of the clinician setting the pace and will also keep the clinician and stopwatch out of sight of the patient to reduce the likelihood of the patient “racing.”²
8. **“Should I count the number of steps taken to complete the 10mWT?”**
 - a. You can! The number steps to complete the test may provide insight into stride length. Although documenting this number may add individual value to specific clinical situations, there has not been extensive research validating the observational step count in various neurological conditions.²

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CORE MEASURE: ACTIVITIES-SPECIFIC BALANCE CONFIDENCE SCALE (ABC SCALE)

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| OVERVIEW | <ul style="list-style-type: none"> The ABC Scale is a self-report measure of balance confidence in performing various activities without losing balance or experiencing a sense of unsteadiness. |
| NUMBER OF TEST ITEMS | <ul style="list-style-type: none"> 16 items |
| SCORING | <ul style="list-style-type: none"> Each item is rated from 0% to 100%, with 0 indicating no confidence and 100% indicating complete confidence. Ratings for each item should be whole numbers (0-100). Total the ratings (possible range = 0-1600) and divide by 16 (number of items) to get the individual's ABC score or overall percentage of balance confidence.¹ <p>SCORING: Total ÷ 16 = _____ % of self-confidence (ABC score)</p> |
| EQUIPMENT | <ul style="list-style-type: none"> None |
| TIME (NEW CLINICIAN) | <ul style="list-style-type: none"> Approximately 5-10 minutes^{1,2} |
| TIME (EXPERIENCED CLINICIAN) | <ul style="list-style-type: none"> Approximately 5-10 minutes^{1,2} |
| COST | <ul style="list-style-type: none"> Free |
| LOGISTICS-SETUP | <ul style="list-style-type: none"> Paper Survey |
| LOGISTICS-ADMINISTRATION | <ul style="list-style-type: none"> Administration by face-to-face interview is recommended.¹ The ABC can be self-administered via a paper copy.¹ Instructions (also on the paper copy): For <u>each</u> of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale <p>0% 10 20 30 40 50 60 70 80 90 100% No Confidence Completely Confident</p> <ul style="list-style-type: none"> "How confident are you that you will <u>not</u> lose your balance or become unsteady when you..." Item 1: ... walk around the house? ____% Item 2: ... walk up or down stairs? ____% Item 3: ... bend over and pick up a slipper from the front of a closet floor? ____% Item 4: ... reach for a small can off a shelf at eye level? ____% Item 5: ... stand on tip toes and reach for something above your head? ____% Item 6: ... stand on a chair and reach for something? ____% Item 7: ... sweep the floor? ____% Item 8: ... walk outside the house to a car parked in the driveway? ____% Item 9: ... get into or out of a car? ____% Item 10: ... walk across a parking lot to the mall? ____% Item 11: ... walk up or down a ramp? ____% Item 12: ... walk in a crowded mall where people rapidly walk past you? ____% Item 13: ... are bumped into by people as you walk through the mall? ____% Item 14: ... step onto or off of an escalator while you are holding onto a railing? ____% Item 15: ... step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing? ____% Item 16: ... walk outside on icy sidewalks? ____% |
| ADDITIONAL RECOMMENDATIONS | <ul style="list-style-type: none"> To track change, it is recommended that this measure is administered a minimum of two times (admission and discharge), and when feasible, between these periods, under the same test conditions for the patient. Recommend review of this standardized procedure and, on an annual basis, establish consistency within and among raters using the tool. |

COMMON QUESTIONS AND VARIATIONS

- 1. “What if the patient doesn’t complete one of the tasks on the ABC? How do I score the measure when this occurs?”**
 - a. The clinician should always try to have the patient complete all items. If appropriate, have the patient rate how confident they would be if they *had* to perform the activity, even if they do not currently do the activity.³
 - b. If it is not appropriate or the patient does not complete an item, an ABC score can still be determined by summing the ratings and dividing by the number of items answered if an individual answers at least 12 of the 16 questions. Most commonly omitted is the last item (...walk outside on icy sidewalks? _____%) in warmer climates.³
- 2. “What if the patient typically uses an assistive device when they complete the activity in question? Should they rate their confidence with or without using the assistive device?”**
 - a. The patient should rate their confidence in completing the task while using their current device.³
 - b. The assistive device considered by the patient should be documented and kept consistent between trials and reassessments.
 - c. It is likely, however that the type of assistive device may change over time. If the type of device “used” during rating of confidence has changed, the new type or condition of “no device” should be documented.
- 3. “What if the patient qualifies their responses with different rating for ‘up’ versus ‘down’ or ‘onto’ versus ‘off’ (i.e. items 2, 9, 11, 14, or 15)?”**
 - a. It is suggested to solicit separate ratings and use the lowest confidence of the two ratings, as this will limit the entire activity. For example, if on item 2 (...walk up or down stairs? _____%), the patient says they are 80% confident walking up the stairs and 60% confident walking down the stairs, their score for this item is 60%.³
- 4. “What if my patient is unable to read the instructions/questions (due to impaired cognition, impaired speech/language, vision deficits, etc)? Can I read it to them?”**
 - a. Yes. The measure can be administered by personal or telephone interview, if needed.
 - b. Patients with lack of insight into impairments may have difficulty accurately answering the ABC questions. In these cases, clinicians should use their judgement to determine appropriateness of administering this test.
- 5. “What if my patient is unable to correctly interpret the stem question (*How confident are you that you will not lose your balance or become unsteady when you...*)? Can you vary it?”**
 - a. Yes. While adhering to the scripted stem question is preferred for standardization, you can vary/explain the stem if this is a barrier to administering the assessment.
- 6. “What if my patient does not speak English? Is the ABC available in other languages?”**
 - a. Yes. The ABC has been translated into a variety of other languages. However, the reliability and validity of these translations should be understood when administering a translated version of the ABC. Languages available include: Spanish,⁴ German,⁵ Chinese,⁶ French-Canadian,⁷ Korean,⁸ Dutch,⁹ Persian,¹⁰ Brazilian-Portuguese,¹¹ Arabic,¹² Hindi,¹³ and Turkish.¹⁴
 - b. If the measure is administered in a different language, there is a risk of misinterpretation of items for those testers who are not fluent in the given language.
- 7. “What if my patient has a decline in the ABC score, the percent of balance confidence, but as a clinician I believe it is due to improved awareness and insight, not regression?”**
 - a. If this happens, it may be helpful for the clinician to look across other objective measures to provide support and rationale for the clinician’s conclusions.
 - b. Administration of both clinician-rated and patient-reported measures may provide a more comprehensive assessment of balance confidence than administering only a clinician-rated measure.
 - c. These data points may need to be excluded in aggregate analysis of change scores if the impression is that these do not reflect a true measure of balance confidence.
- 8. “These questions are not appropriate for patients who are non-ambulatory. Should I utilize this measure?”**
 - a. Clinicians should use the ABC to assess adults with neurologic conditions who have goals and the capacity to change in this area. If you predict that your patient may ambulate further along in his or her recovery, it may be worthwhile to perform this measure.

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| OVERVIEW | <ul style="list-style-type: none"> The BBS is a widely-used, clinician-rated scale used to assess sitting and standing, static and dynamic balance. |
| NUMBER OF TEST ITEMS | <ul style="list-style-type: none"> The BBS consists of 14 functional balance items that focus on the ability to maintain a position and perform postural adjustments to complete functional movements.¹ |
| SCORING | <ul style="list-style-type: none"> Each item is scored on a 5-point ordinal scale ranging from 0 to 4, with 0 indicating an inability to complete the task entirely and 4 indicating an ability to complete the task criterion.² Items are scored relative to time, level of independence or supervision required. Points are deducted for requiring supervision, assistance and/or taking more than the allotted time to complete the task. The lowest category that applies should be marked. Supervision is required in the event of excessive sway or safety concerns. |
| EQUIPMENT | <ul style="list-style-type: none"> Stopwatch Standard height chair (18-20 inches) with armrests Standard height chair (18-20 inches) without arm rests Step or stool of average height (7¾ - 9 inch step stool)⁴ Ruler Slipper³ or a shoe |
| TIME (NEW CLINICIAN) TIME (EXPERIENCED CLINICIAN) | <ul style="list-style-type: none"> Less than 20 minutes Less than 20 minutes |
| COST | <ul style="list-style-type: none"> Cost of equipment only |
| ITEM-BY-ITEM | <ul style="list-style-type: none"> Item 1: Sitting to standing^{1,5,6} <ul style="list-style-type: none"> Patient is seated in a free standing, standard height chair (18-20 in) with arm rests Instructions: <i>Please stand up, try not to use your hands for support</i> <u>Scoring:</u> 4: able to stand without using hands, stabilizes independently 3: able to stand independently using hands 2: able to stand using hands after several tries 1: needs minimal aid to stand or to stabilize 0: needs moderate or maximal assist to stand Item 2: Standing unsupported <ul style="list-style-type: none"> Patient is standing quietly with feet shoulder width apart on a solid surface Examiner has stopwatch in hand Instructions: <i>Please stand for 2 minutes without holding on</i> <u>Scoring:</u> (If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4) 4: able to stand safely for 2 minutes 3: able to stand 2 minutes with supervision 2: able to stand 30 seconds unsupported 1: needs several tries to stand 30 seconds unsupported 0: unable to stand 30 seconds unsupported Item 3: Sitting with back unsupported <ul style="list-style-type: none"> Patient is seated, back unsupported but feet supported on floor or a stool Examiner has stopwatch in hand Instructions: <i>Please sit with arms folded for 2 minutes</i> <u>Scoring:</u> 4: able to sit safely and securely for 2 minutes 3: able to sit 2 minutes under supervision 2: able to sit 30 seconds 1: able to sit 10 seconds 0: unable to sit without support 10 seconds |

ITEM-BY-ITEM

o Item 4: Standing to sitting

- Patient is standing quietly in front of a chair with arm rests
- Instructions: *Please sit down*

Scoring:

- 4: sits safely with minimal use of hands
- 3: controls descent by using hands
- 2: uses back of legs against chair to control descent
- 1: sits independently but has uncontrolled descent
- 0: needs assistance to sit

o Item 5: Transfers^{1,5,6}

- Arrange two chairs at approximately 90 degrees for a pivot transfer. You may use two chairs (one with arm rests and one without) or a bed and a chair with arm rests.
- Ensure that the patient will transfer both directions and that they will be transferring from one surface without arm rests and one surface with arm rests.
- Instructions: *Please transfer from this chair, with arm armrests, to that chair, without arm rests, and back again*

Scoring:

- 4: able to transfer safely with minor use of hands
- 3: able to transfer safely with definite need of hands
- 2: able to transfer with verbal cueing and/or supervision
- 1: needs one person assist
- 0: needs two person assistance or supervision for safety

o Item 6: Standing unsupported with eyes closed

- Patient is standing quietly
- Examiner has stopwatch in hand
- Instructions: *Please close your eyes and stand still for 10 seconds*

Scoring:

- 4: able to stand 10 seconds safely
- 3: able to stand 10 seconds with supervision
- 2: able to stand 3 seconds
- 1: unable to keep eyes closed 3 seconds but stays safely
- 0: needs help to keep from falling

o Item 7: Standing unsupported with feet together

- Patient is standing quietly with feet together
- Examiner has stopwatch in hand
- Instructions: *Place your feet together and stand without holding on*

Scoring:

- 4: able to place feet together independently and stand 1 minute safely
- 3: able to place feet together independently and stand 1 minute with supervision
- 2: able to place feet together independently but unable to hold for 30 seconds
- 1: needs help to attain position but able to stand 15 seconds feet together
- 0: needs help to attain position and unable to hold 15 seconds

o Item 8: Reaching forward with outstretched arm while standing

- Patient is standing quietly with both arms lifted to 90 degrees of shoulder flexion with fingers extended. If the patient has a shoulder impairment limiting the ability to lift arms symmetrically, use only the arm that can be lifted to 90 degrees easily and painlessly. Examiner is holding a ruler at the end of the fingertips. If the patient is unable to extend fingers, utilize the metacarpal phalangeal joint instead of the fingertips.
- Instructions: *Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can*
- Fingers are not touching the ruler at any point during the test. Both arms are utilized by the patient to avoid trunk rotation during the forward reach. If one arm is utilized, provide verbal cueing to the patient to limit trunk rotation
- Examiner measures how far the patient can reach in the most forward lean position, without trunk rotation or losing balance

Scoring:

- 4: can reach forward confidently 25 cm (10 in)
- 3: can reach forward 12 cm safely (5 in)
- 2: can reach forward 5 cm safely (2 in)
- 1: reaches forward but needs supervision
- 0: loses balance while trying/requires external support

ITEM-BY-ITEM

o Item 9: Pick up object from the floor from a standing position

- Patient is standing quietly
- A slipper or shoe is placed in front of the patient, close to the patient's feet.
 - The patient should be able to bend and easily reach the slipper. This is not a test for forward reach or limits of stability.
 - Do not substitute with any object that is shorter or taller than a slipper toe box or shoe as this will make the subject bend lower or not as far as intended for this criteria.
- Instructions: *Pick up the shoe/slipper which is placed in front of your feet*
- Examiner pays attention to how close the patient is able to get to the object
- Examiner also ensures that the patient is not using the back of the legs against a bed or chair during the reach

Scoring:

- 4: able to pick up slipper safely and easily
- 3: able to pick up slipper but needs supervision
- 2: unable to pick up but reaches 2-5 cm (1-2 in) from slipper and keeps balance independently
- 1: unable to pick up and needs supervision while trying
- 0: unable to try/needs assist to keep from losing balance or falling

o Item 10: Turning to look behind over left and right shoulders

- Patient is standing quietly
- Examiner is standing in front of the patient to accurately assess rotation and weight shift
- Instructions: *Turn to look directly behind you over toward the left shoulder. Repeat to the right*
- Examiner may pick an object to look at directly behind the subject to encourage a better twist turn
- Examiner assess the amount of trunk rotation and weight shift

Scoring:

- 4: looks behind from both sides and weight shifts well
- 3: looks behind one side only other side shows less weight shift
- 2: turns sideways only but maintains balance
- 1: needs supervision when turning
- 0: needs assist to keep from losing balance or falling

o Item 11: Turn 360 degrees

- Patient is standing quietly
- Examiner has stopwatch in hand
- Instructions: *Turn completely around in a full circle. Pause. Then turn a full circle in the other direction*
- Examiner times the time it takes to complete each full turn

Scoring:

- 4: able to turn 360 degrees safely in 4 seconds or less
- 3: able to turn 360 degrees safely one side only in 4 seconds or less
- 2: able to turn 360 degrees safely but slowly
- 1: needs close supervision or verbal cueing
- 0: needs assistance while turning

o Item 12: Placing alternate foot on step or stool while standing unsupported

- Patient is standing quietly
- Examiner places a 7¾ - 9 inch step stool in front of the patient, or the patient is able to stand in front of a flight of steps⁵
- Examiner stands close by to provide assistance if needed
- Examiner has stopwatch in hand
- Instructions: *Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times*
- Examiner times how long it takes to complete task

Scoring:

- 4: able to stand independently and safely and complete 8 steps in 20 seconds
- 3: able to stand independently and complete 8 steps in > 20 seconds
- 2: able to complete 4 steps without aid with supervision
- 1: able to complete >2 steps needs minimal assist
- 0: needs assistance to keep from falling/unable to try
- 0: loses balance while stepping or standing

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| <p>ITEM-BY-ITEM</p> | <ul style="list-style-type: none"> o Item 13: Standing unsupported one foot in front <ul style="list-style-type: none"> • Patient is standing quietly • Examiner has stopwatch in hand • Instructions: <i>(Demonstrate to subject) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot</i> <p><u>Scoring:</u></p> <ul style="list-style-type: none"> 4: able to place foot tandem independently and hold 30 seconds 3: able to place foot ahead of other independently and hold 30 seconds <ul style="list-style-type: none"> ▪ Foot must completely pass the other foot⁷ ▪ Step width should be no wider than shoulders 2: able to take small step independently and hold 30 seconds 1: needs help to step but can hold 15 seconds 0: loses balance while stepping or standing o Item 14: Standing on one leg <ul style="list-style-type: none"> • Patient is standing quietly • Examiner has stopwatch in hand • Instructions: <i>Stand on one leg as long as you can without holding on with your hands. Do not let your lifted leg touch your standing leg.</i> <p><u>Scoring:</u></p> <ul style="list-style-type: none"> 4: able to lift leg independently and hold >10 seconds 3: able to lift leg independently and hold 5-10 seconds 2: able to lift leg independently and hold ≥3 seconds 1: tries to lift leg unable to hold 3 seconds but remains standing independently 0: unable to try or needs assist to prevent fall |
| <p>ADDITIONAL RECOMMENDATIONS</p> | <ul style="list-style-type: none"> o To track change, it is recommended that this measure is administered a minimum of two times (admission and discharge), and when feasible, between these periods, under the same test conditions for the patient. o Recommend review of this standardized procedure and, on an annual basis, establish consistency within and among raters using the tool. |

COMMON QUESTIONS AND VARIATIONS

1. **“If my patient cannot stand, should I still complete the BBS?”**
 - a. If you anticipate that the patient is going to be able to stand and complete transfers, you should complete the BBS at examination to document change over time. If the patient cannot complete any elements of the BBS, they will have a score of 0 which will be their starting score. The recommendation would be that all patients have a baseline Berg Balance score.⁹ However, for patients who do not have goals to improve static and dynamic balance, the BBS should not be administered and the clinician should provide rationale.
 - b. The BBS only includes one item that assesses sitting balance. Therefore, if a patient has a primary goal to improve sitting balance, the BBS should be administered in addition to a sitting balance measure (i.e. Function in Sitting Test, Trunk Impairment Scale, etc.).
2. **“Can I provide touching assistance, or hold the gait belt, during the balance components of the BBS?”**
 - a. If a patient requires touching assistance for an item, the lowest associated score for that item should be utilized or the specified score for that item (i.e. Item 1 sitting to standing: a score of 1 if needs minimal aid to stand or stabilize, or 0 if needs moderate or maximal assist to stand). If you are unsure of the capabilities of the patient, you may elect to hold a gait belt, but consider completing a second trial without touching assistance by the therapist for a true measure of patient performance.
3. **“Can the patient use an assistive device for any elements of the BBS?”**
 - a. Assistive devices should not be used by a patient when performing the BBS. If the patient normally utilizes an assistive device to perform a respective task, the administrator should encourage the patient to attempt the task without it. If the patient cannot perform the item without an assistive device they will be scored a 0.
 - b. If an assistive device is utilized during the test, the score should be excluded from data analysis of balance outcomes of a group of patients.
4. **“Can a hospital bed or mat table serve as one of the seating surfaces during the BBS?”**
 - a. Yes, however attempts should be made to preserve the standard height of 18-20 inches. If unable, the variation in height of the surface should be indicated and standardized within the practice/facility.
5. **“What if the patient can’t attain the start position?” (i.e. Item 7)**
 - The patient should be instructed: *“Place your feet together and stand without holding on.”* In some individuals, other bony or soft tissue restrictions may limit their ability to stand with the feet together. Instruct the patient to place the heels and toes as close together as possible.
6. **“What if I don’t have a shoe/slipper available? Can I use a box of tissues instead of a slipper or a shoe? Can I use a pen on the floor instead of a slipper?” (i.e. Item 9)**
 - a. Do not substitute with any object that is shorter or taller than a slipper toe box or shoe as this will make the subject bend lower or not as far as the item intended.
7. **“What arm should the patient use to reach forward?” (i.e. Item 8)**
 - a. Where possible, both arms should be used; however, in instances where it is difficult to lift one arm (i.e. hemiparesis, shoulder ROM limitation), the intact arm can be used provided that the patient is not utilizing trunk rotation to achieve further reach.^{1,5,6}
8. **“How do I assess trunk rotation and weight shift in a patient with post-operative spinal precautions?” (i.e. Item 10)**
 - a. If the patient is unable to rotate the trunk due to post-surgical considerations, the patient would score a 0 for this item.
9. **“How high does the step/stool need to be?” (i.e. Item 12)**
 - a. The International Residential Code⁴ states that the recommended maximum height of a riser is 7¾ inches.
 - b. Steffen et al.³ documented the use of a 9-inch step stool.
 - c. A step/stool that is at least 7¾ inches, no greater than 9 inches in height is recommended.
10. **“Does it matter which leg the patient stands on (SLS) or which is in front/back (tandem)?” (i.e. Item 13 & 14)**
 - a. The BBS allows the patient to self-select the limb that they would stand on for both of these items
 - b. In instances where a patient has unilateral impairment, it is recommended that the patient be tested on the involved limb (SLS) by standing on the involved limb and taking the forward step with the uninvolved limb (tandem).⁹
11. **“What if the patient loses their balance trying to get into or hold full tandem? Do I automatically score a 0 for that item?” (i.e. Item 13)**
 - a. The test instructions indicate that a demonstration should be given to the patient showing them the option for tandem stance, and also the foot-ahead stance required to achieve a score of 3. Thus, if a patient attempts tandem and cannot achieve this, the tester can cue the patient to try the alternate position with demonstration.

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Per 2018 discussion, measure reprinted with permission from author Katherine Berg.

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| OVERVIEW | <ul style="list-style-type: none"> The FGA is used to assess postural stability during walking and assesses an individual's ability to perform multiple motor tasks while walking. The tool is a modification of the 8-item Dynamic Gait Index, developed to improve reliability and reduce ceiling effect. |
| NUMBER OF TEST ITEMS | <ul style="list-style-type: none"> 10 items: gait on level surface, change in gait speed, gait with horizontal and vertical head turns, gait with 180° pivot turn, stepping over obstacles, gait with narrow base of support, gait with eyes closed, backwards gait and stairs. |
| SCORING | <ul style="list-style-type: none"> Each item is scored on a 4-point ordinal scale ranging from 0-3, with 0 indicating severe impairment and 3 indicating normal ambulation. All items are summed to calculate a total score (max. 30). <ul style="list-style-type: none"> 3 = normal (no gait or balance impairment, completion of task in a timely manner) 2 = mild impairment 1 = moderate impairment 0 = severe impairment (Cannot perform without assistance, severe gait deviations or imbalance; deviates from walkway, increased time to perform task) |
| EQUIPMENT | <ul style="list-style-type: none"> Stopwatch Measuring device to mark off area Marked walking area = 20 ft (6 m); width 12 in (30.48 cm) Obstacle of 9-in height (22.86 cm) using at least two stacked shoeboxes Set of steps that are 7 ¾ -9 in high with bilateral rails |
| TIME (NEW CLINICIAN) TIME (EXPERIENCED CLINICIAN) | <ul style="list-style-type: none"> Less than 20 minutes 5-10 minutes |
| COST | <ul style="list-style-type: none"> Free |
| ITEM-BY-ITEM | <ul style="list-style-type: none"> A dedicated space or designated pre-measured area is recommended to complete the test to eliminate distractions and disruptions during administration. Re-testing should be performed in the same place/environment. A marked pathway of 20 ft (6 m); width 12 in (30.48 cm) in a designated area over solid flooring is required. Quiet conditions, examiner holds stopwatch in hand to time each item as appropriate Starting Position: Patient is standing quietly in a comfortable position at the start of the 20 ft (6 m) marked walking area, unless specified otherwise below¹ Item 1: Gait Level Surfaces¹ <ul style="list-style-type: none"> Instructions: <i>Walk at your normal speed from here to the next mark (20 ft [6 m])</i> <u>Scoring:</u> <ul style="list-style-type: none"> 3 Normal: Walks 20 ft (6 m) in less than 5.5 seconds, no assistive devices, good speed, no evidence for imbalance, normal gait pattern, deviates no more than 6 in (15.24 cm) outside of the 12-in (30.48-cm) walkway width. 2 Mild Impairment: Walks 20 ft (6 m) in less than 7 seconds but greater than 5.5 seconds, uses assistive device, slower speed, mild gait deviations, or deviates 6-10 in (15.24-25.4 cm) outside of the 12-in (30.48-cm) walkway width. 1 Moderate Impairment: Walks 20 ft (6 m); slow speed, abnormal gait pattern, evidence for imbalance, or deviates 10-15 in (25.4-38.1 cm) outside of the 12-in (30.48-cm) walkway width. Requires more than 7 seconds to ambulate 20 ft (6 m). 0 Severe Impairment: Cannot walk 20 ft (6 m) without assistance, severe gait deviations or imbalance, deviates greater than 15 in (38.1 cm) outside of the 12-in (30.48-cm) walkway width or reaches and touches the wall. |

ITEM-BY-ITEM

o Item 2: Change in Gait Speed

- Instructions: *Begin walking at your normal pace (for 5 ft [1.5 m]). When I tell you "go," walk as fast as you can (for 5 ft [1.5 m]). When I tell you "slow," walk as slowly as you can (for 5 ft [1.5 m]).*

Scoring:

3 Normal: Able to smoothly change walking speed without loss of balance or gait deviation. Shows a significant difference in walking speeds between normal, fast, and slow speeds. Deviates no more than 6 in (15.24 cm) outside of the 12-in (30.48-cm) walkway width.

2 Mild Impairment: Is able to change speed but demonstrates mild gait deviations, deviates 6-10 in (15.24-25.4 cm) outside of the 12-in (30.48-cm) walkway width, or no gait deviations but unable to achieve a significant change in velocity, or uses an assistive device.

1 Moderate Impairment: Makes only minor adjustments to walking speed, or accomplishes a change in speed with significant gait deviations, deviates 10-15 in (25.4-38.1 cm) outside of the 12-in (30.48-cm) walkway width, or changes speed but loses balance but is able to recover and continue walking.

0 Severe Impairment: Cannot change speeds, deviates greater than 15 in (38.1 cm) outside of the 12-in (30.48-cm) walkway width, or loses balance and has to reach for wall or be caught.

o Item 3: Gait with Horizontal Head Turns

- Instructions: *Walk from here to the next mark 20 ft (6 m) away. Begin walking at your normal pace. Keep walking straight; after 3 steps, turn your head to the right and keep walking straight while looking to the right. After 3 more steps, turn your head to the left and keep walking straight while looking left. Continuing alternating looking right and left every 3 steps until you have completed 2 repetitions in each direction.*

Scoring:

3 Normal: Performs head turns smoothly with no change in gait. Deviates no more than 6 in (15.24 cm) outside of the 12-in (30.48-cm) walkway width

2 Mild Impairment: Performs head turns smoothly with slight change in gait velocity (eg, minor disruption to smooth gait path), deviates 6-10 in (15.24-25.4 cm) outside of the 12-in (30.48-cm) walkway width, or uses an assistive device.

1 Moderate Impairment: Performs head turns with moderate change in gait velocity, slows down, deviates 10-15 in (25.4-38.1 cm) outside of the 12-in (30.48-cm) walkway width but recovers, can continue to walk.

0 Severe Impairment: Performs task with severe disruption of gait (eg, staggers 15 in (38.1 cm) outside of the 12-in (30.48-cm) walkway width, loses balance, stops, or reaches for wall)

o Item 4: Gait with Vertical Head Turns

- Instructions: *Walk from here to the next mark 20 ft (6 m) away. Begin walking at your normal pace. Keep walking straight; after 3 steps, tip your head up and keep walking straight while looking up. After 3 more steps, turn your head down and keep walking straight while looking down. Continuing alternating looking up and down every 3 steps until you have completed 2 repetitions in each direction.*

Scoring:

3 Normal: Performs head turns smoothly with no change in gait. Deviates no more than 6 in (15.24 cm) outside of the 12-in (30.48-cm) walkway width.

2 Mild Impairment: Performs task with slight change in gait velocity (eg, minor disruption to smooth gait path), deviates 6-10 in (15.24-25.4 cm) outside of the 12-in (30.48-cm) walkway width or uses assistive device.

1 Moderate Impairment: Performs task with moderate change in gait velocity, slows down, deviates 10-15 in (25.4-38.1 cm) outside of the 12-in (30.48-cm) walkway width but recovers, can continue to walk.

0 Severe Impairment: Performs task with severe disruption of gait (eg, staggers 15 in (38.1 cm) outside of the 12-in (30.48-cm) walkway width, loses balance, stops, reaches for wall).

ITEM-BY-ITEM

o Item 5: Gait and Pivot Turn

- Instructions: *Begin with walking at your normal pace. When I tell you, "turn and stop," turn as quickly as you can to face the opposite direction and stop.*

Scoring:

3 Normal: Pivot turns safely within 3 seconds and stops quickly with no loss of balance.

2 Mild Impairment: Pivot turns safely in greater than 3 seconds and stops with no loss of balance, or pivot turns safely within 3 seconds and stops with mild imbalance, requires small steps to catch balance.

1 Moderate Impairment: Turns slowly, requires verbal cueing, or requires several small steps to catch balance following turn and stop.

0 Severe Impairment: Cannot turn safely, requires assistance to turn and stop.

o Item 6: Step over Obstacle

- Starting Position: Patient is standing quietly in a comfortable position at the start of the 20 ft (6 m) marked walking area with an obstacle (shoeboxes) positioned perpendicular to and halfway down the walkway
- Instructions: *Begin walking at your normal speed. When you come to the shoebox, step over it, not around it, and keep walking.*

Scoring:

3 Normal: Is able to step over two stacked shoe boxes taped together (9 in [22.86 cm] total height) without changing gait speed; no evidence of imbalance.

2 Mild Impairment: Is able to step over one shoe box (4.5 in [11.43 cm] total height) without changing gait speed; no evidence of imbalance.

1 Moderate Impairment: Is able to step over one shoe box (4.5 in [11.43 cm] total height) but must slow down and adjust steps to clear box safely. May require verbal cueing.

0 Severe Impairment: Cannot perform without assistance.

o Item 7: Gait with Narrow Base of Support

- Starting Position: Patient is standing quietly in a comfortable position with arms folded across chest at the start of a hallway allowing for 12 ft (3.6 m)
- Instructions: *Walk on the floor with arms folded across the chest, feet aligned heel to toe in tandem for a distance of 12 ft [3.6 m]. The number of steps taken in a straight line are counted for a maximum of 10 steps.*

Scoring:

3 Normal: Is able to ambulate for 10 steps heel to toe with no staggering.

2 Mild Impairment: Ambulates 7-9 steps.

1 Moderate Impairment: Ambulates 4-7 steps.

0 Severe Impairment: Ambulates less than 4 steps heel to toe or cannot perform without assistance.

o Item 8: Gait with Eyes Closed

- Instructions: *Walk at your normal speed from here to the next mark (20 ft [6 m]) with your eyes closed.*

Scoring:

3 Normal: Walks 20 ft (6 m), no assistive devices, good speed, no evidence of imbalance, normal gait pattern, deviates no more than 6 in (15.24 cm) outside of the 12-in (30.48-cm) walkway width. Ambulates 20 ft (6 m) in less than 7 seconds.

2 Mild Impairment: Walks 20 ft (6 m), uses assistive device, slower speed, mild gait deviations, deviates 6-10 in (15.24-25.4 cm) outside of the 12-in (30.48-cm) walkway width. Ambulates 20 ft (6 m) in less than 9 seconds but greater than 7 seconds.

1 Moderate Impairment: Walks 20 ft (6 m), slow speed, abnormal gait pattern, evidence for imbalance, deviates 10-15 in (25.4-38.1 cm) outside of the 12-in (30.48-cm) walkway width. Requires more than 9 seconds to ambulate 20 ft (6 m).

0 Severe Impairment: Cannot walk 20 ft (6 m) without assistance, severe gait deviations or imbalance, deviates greater than 15 in (38.1 cm) outside of the 12-in (30.48-cm) walkway width or will not attempt task.

| | |
|--|---|
| | <ul style="list-style-type: none"> o Item 9: Ambulating Backwards <ul style="list-style-type: none"> • Starting Position: Patient is standing quietly in a comfortable position at the start of the 20 ft (6 m) marked walking area facing backwards • Instructions: <i>Walk backwards until I tell you to stop.</i> <p><u>Scoring:</u></p> <p>3 Normal: Walks 20 ft (6 m), no assistive devices, good speed, no evidence for imbalance, normal gait pattern, deviates no more than 6 in (15.24 cm) outside the 12-in (30.48-cm) walkway width.</p> <p>2 Mild Impairment: Walks 20 ft (6 m), uses assistive device, slower speed, mild gait deviations, deviates 6-10 in (15.24-25.4 cm) outside of the 12-in (30.48-cm) walkway width.</p> <p>1 Moderate Impairment: Walks 20 ft (6 m), slow speed, abnormal gait pattern, evidence for imbalance, deviates 10-15 in (25.4-38.1 cm) outside of the 12-in (30.48-cm) walkway width.</p> <p>0 Severe Impairment: Cannot walk 20 ft (6 m) without assistance, severe gait deviations or imbalance, deviates greater than 15 in (38.1 cm) outside of the 12-in (30.48-cm) walkway width or will not attempt task.</p> o Item 10: Steps <ul style="list-style-type: none"> • Starting Position: Patient is standing quietly in a comfortable position at the base of the steps • Instructions: <i>Walk up these stairs as you would at home (i.e. using the rail if necessary). At the top turn around and walk down.</i> <p><u>Scoring:</u></p> <p>3 Normal: Alternating feet, no rail.</p> <p>2 Mild Impairment: Alternating feet, must use rail.</p> <p>1 Moderate Impairment: Two feet to a stair, must use rail.</p> <p>0 Severe Impairment: Cannot do safely.</p> |
| <p>ADDITIONAL RECOMMENDATIONS</p> | <ul style="list-style-type: none"> o Test may be performed with or without an assistive device as indicated per each item. Re-test should be completed using the same device. o Individuals should walk without physical assistance of another person o Retest in the same designated area/environment o When administering walking items, do not walk in front of or directly beside the patient, as this “paces” the patient and can influence the speed they walk. Instead, walk at least a half step behind the patient. o To track change, it is recommended that this measure is administered a minimum of two times (admission and discharge), and when feasible, between these periods, under the same test conditions for the patient. o Recommend review of this standardized procedure and, on an annual basis, establish consistency within and among raters using the tool. |

COMMON QUESTIONS AND VARIATIONS

1. “If I only have four steps with bilateral railings is that ok or do I need an entire flight?”

- a. The test can be accomplished with a set of four or more steps. The steps need to have bilateral rails and should be standard step height (approximately 7 ¾ in [20.32 cm]).

2. “What if I don’t have a set of stairs at all?”

- a. If the patient does not attempt all test items, this is a deviation from the standardized procedure, therefore interpretation of the score with use of normative values or cut of scores would not be appropriate.
- b. Any partial score should not be included in any aggregate data analysis, if this data is used for program evaluation, for example.
- c. Completion of only some test items may be useful to the individual patient. For example, the patient may benefit from education on the value of gait speed or a safety strategy during performance of multiple motor tasks. The individual score (partial score) may be used to set an individual goal for a future trial or session.

3. “What if my patient requires assistance?”

- a. If the patient requires assistance to complete any item, the score is recorded as a 0. Per 2018 discussion with developing author Sue Whitney, an orthosis is not considered an assistive device and does not impact the scoring of the item.

4. “What if my patient uses an assistive device?”

- a. Most items specify a specific score based on use of an assistive device. If use of an assistive device is not specified for scoring a particular item, and the patient requires use of that assistive device to complete the item, then the item is scored as a zero.

5. “Can I provide verbal cues or demonstration during the trial, to remind patients when to turn or tilt their head, for example?”

- a. Yes, verbal cues or demonstration are appropriate to the extent that these are needed for the patient to complete the necessary movements. Cues should be kept to a minimum and documented as a condition of the trial(s).

6. “For Item 7: Gait with Narrow Base of Support, is it appropriate to have them walk on the line that marks the walkway?”

- a. Yes. Per 2017 discussion with developing authors Sue Whitney and Diane Wrisley (original authors), tape was used on the ground for this item when the test was first developed.

7. “What if my patient cannot walk?”

- a. If a patient is unable to ambulate, but has the goals and capacity to improve balance, a baseline score of 0 should be documented for the FGA.

8. “What if my patient demonstrates a high score?”

- a. If a patient demonstrates a high score near 30 out of 30, or is likely to do so, the clinician may need to select a more challenging outcome measure to assess change over time.
- b. If a patient scores near the top of the FGA scale, it may not be necessary to re-administer the test.

9. We currently use the Dynamic Gait Index (DGI) in our facility. Can I use this test as a substitution since it is so similar?

- a. The FGA includes three items which are not on the DGI: Gait with Narrow Base of Support, Gait with Eyes Closed, and Ambulating Backwards. The Dynamic Gait Index has one item which is not on the FGA: Step Around Obstacles. Thus, although these tests are similar, they are not interchangeable.
- b. The FGA was selected instead of the DGI for inclusion in the core set for the following reasons: better reliability across acute, chronic stable and chronic progressive populations; inclusion of clinically relevant balance items of gait with narrow base of support, gait with eyes closed, and ambulating backwards; and improved response categories to facilitate consistency in outcome measure administration.

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CORE MEASURE: FIVE TIMES SIT-TO-STAND (5TSTS)

| | |
|--|---|
| OVERVIEW | <ul style="list-style-type: none"> ◦ The Five Times Sit to Stand Test measures one aspect of transfer skill. The test provides a method to quantify functional lower extremity strength and/or identify movement strategies a patient uses to complete transitional movements. |
| NUMBER OF TEST ITEMS | <ul style="list-style-type: none"> ◦ 1 |
| SCORING | <ul style="list-style-type: none"> ◦ The score is the amount of time (to the nearest decimal in seconds) it takes a patient to transfer from a seated to a standing position and back to sitting five times. |
| EQUIPMENT | <ul style="list-style-type: none"> ◦ Standard height chair (43-45 cm, 17-18 inches) with a backrest. ◦ Stopwatch |
| TIME (NEW CLINICIAN) TIME (EXPERIENCED CLINICIAN) | <ul style="list-style-type: none"> ◦ Less than 5 minutes ◦ Less than 5 minutes |
| COST | <ul style="list-style-type: none"> ◦ Free |
| LOGISTICS-SETUP | <ul style="list-style-type: none"> ◦ The chair should be free-standing ◦ Subjects are allowed to place their feet comfortably under them during testing.¹ |
| LOGISTICS-ADMINISTRATION | <ul style="list-style-type: none"> ◦ One trial is administered. ◦ A patient is instructed to sit with arms folded across their chest and with back against the chair. A patient with hemiplegia can have the impaired arm at his/her side or in a sling. ◦ Instruct the patient: "I want you to stand up and sit down five times in a row, as quickly as you can, when I say 'Go'. Be sure to stand up fully and try not to let your back touch the chair back between each repetition. Do not use the back of your legs against the chair." ◦ Time starts when the tester says "Go." ◦ Time stops when the patient's body touches the chair following the fifth repetition. ◦ If individuals are unable to complete the first sit to stand independently, without use of arms, the test is terminated.^{1,2} |
| LOGISTICS-SCORING | <ul style="list-style-type: none"> ◦ Document the time in seconds (to the nearest decimal) required to complete the test. ◦ If the patient cannot perform five stands to complete the test without use of arms, a score of 0 seconds should be documented. When possible within the medical record it is also recommended to note the reason, such as "unable to perform five repetitions." The tester can document the number of stands, time, or compensatory movements for baseline information, but this should not be considered a trial of the 5TSTS Test. |
| ADDITIONAL RECOMMENDATIONS | <ul style="list-style-type: none"> ◦ To track change, it is recommended that this measure is administered a minimum of two times (admission and discharge), and when feasible, between these periods, under the same test conditions for the patient. ◦ Recommend review of this standardized procedure and, on an annual basis, establish consistency within and among raters using the tool. |

COMMON QUESTIONS AND VARIATIONS

1. **“What if I don’t have a chair that is 43-45 cm (17-18 inches) high?”**
 - a. This is the recommended height for completing the test. If the chair used is a different height, the height should be measured, documented and reported as a deviation from this standardized procedure.
 - b. Using the same chair height is recommended for ongoing assessments to capture change in the patient.
 - c. Note that this recommended chair height is different from the recommended chair height in the Berg Balance Scale (18-20 inches).
2. **“What if the individual’s feet don’t touch the floor when they have their back against the backrest?”**
 - a. In this scenario, it is permissible to allow the individual to move forward in the chair until their feet are flat on the floor. It is recommended that the deviation from standardized protocol be documented as well.
3. **“What if the individual is very tall?”**
 - a. It would be appropriate to use a taller chair or apply a seat cushion to bring the hip flexion angle to 90 degrees when in the seated position.³ This condition should be documented as a variation of the standardized procedure.
4. **“What if my patient cannot stand without using his/her hands?”**
 - a. When following the standardized procedure, it would be appropriate to document 0 for the score. While 0 seconds would be the fastest possible time to complete the test, it is also impossible and therefore would be clear in any medical record that the patient was unable to perform the test. When possible within the medical record it is also recommended to note the reason, such as “unable; requires use of hands”. At the point in time when the patient is able to complete 5 sit-to-stands without the use of upper extremities, a baseline 5TSTS score can be recorded.
 - b. Arm and hand position influence the momentum and strategy for the sit to stand transition and influence 5TSTS Test scores.³ If the patient cannot complete the assessment with arms folded, it is permissible to allow the individual to utilize his or her hands to assist. This deviation from standardized protocol should be documented. The standardized protocol score would still be “unable”.
5. **What if my patient does not stand up fully during the test?**
 - a. If the patient does not stand up fully, the test should be discontinued and the patient reoriented to the instructions to make a complete stand with each repetition during the test.
6. **“What if my patient cannot complete five repetitions?”**
 - a. If the patient does not complete five repetitions, a score of 0 seconds should be recorded. When possible within the medical record it is also recommended to note the reason, such as “unable to perform five repetitions”. The clinician can, however, use his or her clinical judgement to record a time for fewer repetitions or provide physical assistance to help the patient complete the assessment, as this information may be valuable to explore change over time for the individual patient.
7. **“What if my patient has a loss of balance and requires physical assistance to prevent a fall?”**
 - a. Providing assistance during the test is a deviation from the standardized procedure, however, it may be necessary to prevent patient injury. If physical assistance is provided, the patient should be given a score of 0. When possible within the medical record it is also recommended to note the reason, such as “unable to complete test without assistance”.
8. **“Should my patient touch their back against the back rest between each repetition of sit to stand?”**
 - a. No, the patient should be encouraged to avoid touching his/her trunk to the backrest between each repetition to minimize utilization of momentum to complete the sit to stand.
9. **“Should I include a practice session or multiple trials?”**
 - a. Yes, a practice session can ensure familiarization with the test.⁴ So, if a clinician feels a practice session is warranted then one may be performed.
 - b. If a patient has limited endurance, consider an abbreviated practice trial of 2 sit to stands to ensure that the patient understands all components of the test.⁵
10. **“Does foot position matter?”**
 - a. Yes, foot position can impact sit to stand time and has been found to be a limitation in some studies exploring the 5TSTS in neurologic populations.^{1,6} A posterior foot position has been shown to have faster sit to stand times in patients with chronic stroke.³
 - b. Foot position should be self-selected by the patient.

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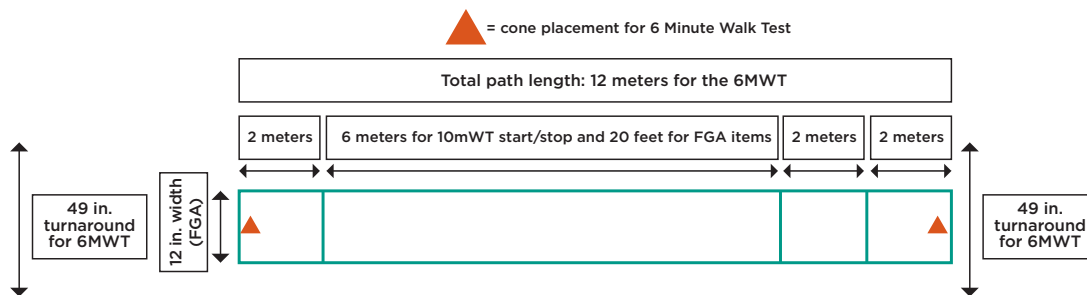
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Did you know? By making small changes in your environment, you can make it easier and more efficient to complete the Core Outcome Measures. Below are some ideas.

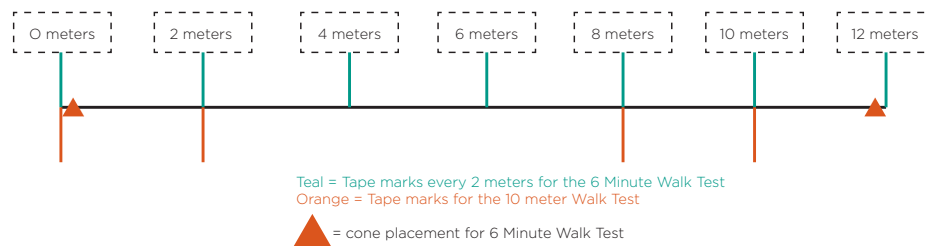
1. Select a Testing Space
 - a. Consider a space in your facility/clinic that is quiet, less busy and that you have access to on a regular basis.
 - b. Try to choose space that is close to where you typically treat.
 - c. Talk with your leadership team, and consider a space that is convenient to everyone.
2. Pre-measure space for the 10 meter Walk Test (10mWT), 6 Minute Walk Test (6MWT) and Functional Gait Assessment (FGA).
 - a. Once you determine a space, mark the distances for the 10mWT, 6MWT and FGA with tape.

Example (bird's eye view):



- b. Can't tape the floor permanently? If you can use small tape marks on a baseboard, you will have quick references for placing cones to mark the distances.

Example (looking at a hallway baseboard):



- c. No tape allowed?
 - i. Be sure to ask about "floor tape" which is made specifically to avoid pulling the finish off the floor.
 - ii. If you have floor or ceiling tiles, you can measure these and use them as quick references for placing cones to mark the distances (e.g.: 1 tile = 12 inches; 20 tiles = length for FGA and timed portion of 10mWT).
 - iii. Use reflective tape/ribbon (you can clean it!) and premeasure the distances, adding marks for each distance. Consider attaching a cone to each end and then easily wrap the measured device up after each use.
 - iv. Use an industrial tape measure with marks written on it for each distance (needs to be at least 40' long).
 - v. Other ideas: use a dry erase marker on tile floors that will wash easily.
3. Use this comprehensive list to have easy access to all the items you might need for any of the core measure tests:

| | |
|--|--|
| <ul style="list-style-type: none"> ✓ Stopwatch ✓ Cones ✓ 2 Standard height chairs with backrests: <ul style="list-style-type: none"> • One with arms one without • Note: a seat height of 18 inches meets the standard for both the 5XSTS (17-18 in.) and Berg (18-20 in.) | <ul style="list-style-type: none"> ✓ Mechanical lap counter or paper/pencil ✓ Step stool (7 ¾ - 9 in. High) ✓ Ruler ✓ Slipper or shoe ✓ 2 stacked shoeboxes (9 in. high) ✓ Stairs with bilateral handrails (7 ¾ - 9 in. step height) |
|--|--|
4. Keep all protocol instructions and/or cut off/MDC/MCID values nearby for quick reference
 - a. Use a binder, clipboard or file folder
 - b. Laminate for longevity and post on the wall

ANPT CORE SET OUTCOME MEASURES – AVAILABLE TECHNOLOGY

iWalkAssess App (University of Toronto)

Six Minute Walk Test

10 Meter Walk Test

Protocol, educational/demonstration videos, normative data

Downloadable toolkit available on website

Available for iOS and Android - FREE

Available at: <http://www.iwalkassess.com/>

Multiple Online Calculators available for:

Activities-Specific Balance Confidence scale

Berg Balance Scale

CLINICAL PRACTICE GUIDELINES

A Core Set of Outcome Measures for Adults With Neurologic Conditions Undergoing Rehabilitation

A CLINICAL PRACTICE GUIDELINE

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ABSTRACT

Background: Use of outcome measures (OMs) in adult neurologic physical therapy is essential for monitoring changes in a patient's status over time, quantifying observations and patient-reported function, enhancing communication, and increasing the efficiency of patient care. OMs also provide a mechanism to compare patient and organizational outcomes, examine intervention effectiveness, and generate new knowledge. This clinical practice guideline (CPG) examined the literature related to OMs of balance, gait, transfers, and patient-stated goals to identify a core set of OMs for use across adults with neurologic conditions and practice settings.

Methods: To determine the scope of this CPG, surveys were conducted to assess the needs and priorities of consumers and physical therapists. OMs were identified through recommendations of the Academy of Neurologic Physical Therapy's Evidence Database to Guide Effectiveness task forces. A systematic review of the literature on the OMs was conducted and additional OMs were identified; the literature search was repeated on these measures. Articles meeting the inclusion criteria were critically appraised by 2 reviewers using a modified version of the COnsensus-based Standards for the selection of health Measurement INstruments. (COSMIN) checklist. Methodological quality and the strength of statistical results were determined. To be recommended for the core set, the OMs needed to demonstrate excellent psychometric properties in high-quality studies across neurologic conditions.

Results/Discussion: Based on survey results, the CPG focuses on OMs that have acceptable clinical utility and can be used to assess change over time in a patient's balance, gait, transfers, and patient-stated goals. Strong, level I evidence supports the use of the Berg Balance Scale to assess changes in static and dynamic sitting and standing balance and the Activities-specific Balance Confidence Scale to assess changes in balance confidence. Strong to moderate evidence supports the use of the Functional Gait Assessment to assess changes in dynamic balance while walking, the 10 meter Walk Test to assess changes in gait speed,

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and the 6-Minute Walk Test to assess changes in walking distance. Best practice evidence supports the use of the 5 Times Sit-to-Stand to assess sit to standing transfers. Evidence was insufficient to support use of a specific OM to assess patient-stated goals across adult neurologic conditions. Physical therapists should discuss the OM results with patients and collaboratively decide how the results should inform the plan of care.

Disclaimer: The recommendations included in this CPG are intended as a guide for clinicians, patients, educators, and researchers to improve rehabilitation care and its impact on adults with neurologic conditions. The contents of this CPG were developed with support from the APTA and the Academy of Neurologic Physical Therapy (ANPT). The Guideline Development Group (GDG) used a rigorous review process and was able to freely express its findings and recommendations without influence from the APTA or the ANPT. The authors declare no competing interest.

Video Abstract available for more insights from the authors (see Video, Supplemental Digital Content 1, available at: <http://links.lww.com/JNPT/A214>).

Key words: *gait disorders, human movement system, nervous system diseases, neurodegenerative diseases, neurologic, neurologic examination, neurologic rehabilitation, outcome and process assessment (health care), outcome assessment (health care), patient care planning, patient outcome assessment, postural balance, practice guideline, psychometrics, reproducibility of results*

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Work stemming from the CPG has been presented at the APTA Combined Sections Meetings in 2015, 2016, and 2017; the IV STEP conference in 2016; American College of Rehabilitation Medicine Conference in 2016; and the Missouri PT Association Conference in 2016.

Dr Moore was the Director of the Rehabilitation Measures database (www.rehabmeasures.org) and has presented on measurement-related topics at many professional conferences. Dr Potter's involvement as a member of the CPG workgroup has included a variety of presentations at the APTA Combined Sections Meeting, IV STEP, and the Missouri PT Association Spring Conference. Dr Blankshain's role as a graduate assistant was to perform administrative and organizational duties for the development of the CPG. Dr Blankshain assisted in presenting information at CSM. Dr Kaplan's role as a methods consultant was limited to the beginning phases of the guideline development process. Her later participation as an author was not financially supported, and she did not participate in the choice of measures or the appraisal of literature. Ms O'Dwyer's participation as an author was

not financially supported. Dr Sullivan has presented on Outcome Measurement for the ANPT, Neuro Recovery Network, and Rock Mountain University of Health Professions. All authors reviewed the CPG manuscript.

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TABLE OF CONTENTS

INTRODUCTION AND METHODS

| | |
|---|-----|
| Levels of Evidence and Grades of Recommendations..... | 178 |
| Summary of Action Statements | 179 |
| Introduction..... | 181 |
| Methods..... | 182 |

OUTCOME MEASURE RECOMMENDATIONS

| | |
|---|-----|
| The Core Set of Outcome Measures for Neurologic Physical Therapy | 191 |
| Action Statement 1: Static and Dynamic Sitting and Standing Balance Assessment... | 191 |
| Action Statement 2: Walking Balance Assessment..... | 195 |
| Action Statement 3: Balance Confidence Assessment..... | 197 |
| Action Statement 4: Walking Speed Assessment..... | 199 |
| Action Statement 5: Walking Distance Assessment..... | 203 |
| Action Statement 6: Transfer Assessment..... | 207 |
| Action Statement 7: Documentation of Patient Goals | 208 |
| Action Statement 8: Use of the Core Set of Outcome Measures..... | 209 |
| Action Statement 9: Discuss Outcome Measure Results and Use Collaborative/Shared Decision-Making With Patients | 211 |
| Guideline Implementation Recommendations..... | 212 |
| Summary of Research Recommendations | 215 |

ACKNOWLEDGMENTS AND REFERENCES

| | |
|----------------------|-----|
| Acknowledgments..... | 217 |
| References..... | 217 |

TABLES

| | |
|--|-----|
| Table 1: Levels of Evidence | 178 |
| Table 2: Grades of Recommendations | 178 |
| Table 3: Outline of the CPG Process | 183 |
| Table 4: Inclusion and Exclusion Criteria for Article Review | 187 |

| | |
|---|-----|
| Table 5: COSMIN Ratings for Strength of Statistics | 189 |
| Table 6: Process Used to Make Recommendations | 190 |
| Table 7: Evidence Table, Berg Balance Scale | 192 |
| Table 8: Evidence Table, Functional Gait Assessment..... | 196 |
| Table 9: Evidence Table, Activities-specific Balance Confidence | 198 |
| Table 10: Evidence Table, 10 meter Walk Test..... | 201 |
| Table 11: Evidence Table, 6-Minute Walk Test..... | 205 |
| Table 12: Evidence Table, 5 Times Sit-to-Stand | 208 |

LEVELS OF EVIDENCE AND GRADE OF RECOMMENDATIONS

This clinical practice guideline (CPG) is intended to be a guide for rehabilitation management of adults with neurologic conditions and to inform outcome measurement research. The CPG applies to all adult patients with neurologic conditions, including those with acute (ie, <6 months since onset/diagnosis), chronic stable (ie, >6 months since onset/diagnosis, but not expected to worsen with time), and chronic progressive (ie, > 6 months since onset/diagnosis, but with the potential to experience additional symptoms or functional changes). Clinicians and organizations should interpret these recommendations in the context of the patient's situation, clinical practice, and potential for harm. The methodology used in this CPG, including the critical appraisal and assignment of levels of evidence and strength of the recommendations, was derived from the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) checklist,¹⁻⁵ recommendations from the APTA, and is in accordance with internationally accepted methodologies for evidence-based practice. This CPG is organized to present the level of evidence definitions and the grades of recommendations (Tables 1 and 2, respectively), clear and implementable recommendations in the form of 9 action statements, an introduction and description of the need for this CPG, and a standardized profile for each action

statement that meets the Institute of Medicine's criteria for transparency of the CPG.⁶ The 9 action statements include recommendations for the core set of measures, use of the core set, and collaborative decision-making. Research recommendations are included in the action statement profiles and summarized at the end of the CPG.

Each article included in this CPG was appraised by 2 reviewers, and assigned a level of evidence by the guideline development group (GDG). The grading criteria to determine the level of evidence that supports the recommendations are described in Table 1. These criteria, recommended by the Academy of Neurologic Physical Therapy (ANPT), were modified to accommodate descriptions of studies of psychometric properties. Levels I and II differentiate stronger from weaker studies by integrating the quality of the research design and/or reporting of the study,⁷ as well as the strength of the psychometric data.^{8,9} The criteria for the grades of recommendation assigned to each action statement are provided in Table 2. The grade reflects the overall strength of the evidence available to support the action statement. Throughout the CPG, each action statement is preceded by a letter grade indicating the strength of the recommendation, followed by the statement and summary of the supporting evidence.

TABLE 1. Levels of Evidence

| | |
|-----|--|
| I | <i>Level of evidence rating I:</i> Evidence obtained from at least one high-quality (>50% critical appraisal score) study of psychometric properties |
| II | <i>Level of evidence rating II:</i> Evidence obtained from multiple, lesser quality (<50% critical appraisal score) studies of psychometric properties |
| III | <i>Level of evidence rating III:</i> Evidence obtained from one lesser quality (<50% critical appraisal score) study of psychometric properties |
| IV | Not applicable to studies of psychometric properties |
| V | Expert opinion (or best practice) |

TABLE 2. Grades of Recommendations

| GRADE | RECOMMENDATION | STRENGTH OF RECOMMENDATION |
|-------|-------------------|--|
| A | Strong evidence | A preponderance of level I studies, but least 1 level I study directly on the topic supports the recommendation |
| B | Moderate evidence | A preponderance of level II studies, but at least 1 level II study directly on the topic supports the recommendation |
| C | Weak evidence | A preponderance of level III studies, but at least 1 level III study directly on the topic supports the recommendation |
| P | Practice | Best practice based on expert opinion (review papers, white papers, consensus documents) developed by various methodologies (e.g., Delphi and RAND) and the clinical experience of the guideline development group |
| R | Research | An absence of research on the topic, or conclusions from existing studies on the topic are in disagreement |

SUMMARY OF ACTION STATEMENTS

A. Action Statement 1: STATIC AND DYNAMIC SITTING AND STANDING BALANCE ASSESSMENT.

Clinicians should use the Berg Balance Scale (BBS) for adults with neurologic conditions who have goals to improve static and dynamic sitting and standing balance and have the capacity to change in this area. The BBS should be administered under the same test conditions using the protocol recommended by the CPG Knowledge Translation (KT) Committee at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: I; recommendation strength: strong
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

B. Action Statement 2: WALKING BALANCE ASSESSMENT.

Clinicians should use the Functional Gait Assessment (FGA) for adults with neurologic conditions who have goals to improve balance while walking and have the capacity to change in this area. The FGA should be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: I; recommendation strength: strong
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: moderate

A. Action Statement 3: BALANCE CONFIDENCE ASSESSMENT.

Clinicians should use the Activities-specific Balance Confidence (ABC) Scale to assess self-reported changes in balance confidence in adults with neurologic conditions who have goals and the capacity to change in this area. The ABC should be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, discharge, and, when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: I; recommendation strength: strong
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

B. Action Statement 4: WALKING SPEED ASSESSMENT.

Clinicians should use the 10 meter Walk Test (10mWT) for adults with neurologic conditions who have goals to improve walking speed and have the capacity to change in this area. The 10mWT should be administered (per the protocol by Steffen and Seney,¹⁰ as adapted by the CPG KT Committee) under the same test conditions at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: V; recommendation strength: best practice
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

B. Action Statement 5: WALKING DISTANCE ASSESSMENT.

Clinicians should use the 6-Minute Walk Test (6MWT) for adults with neurologic conditions who have goals to improve walking distance and the capacity to change in this area. The 6MWT should be administered (per the Quinn et al protocol,¹¹ as adapted by the CPG KT Committee) under the same test conditions at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: V; recommendation strength: best practice
- Chronic stable conditions: Evidence quality: I; recommendation strength: moderate
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

P. Action Statement 6: TRANSFER ASSESSMENT.

Clinicians should document the transfer ability of adults with neurologic conditions who have goals to improve transfers and have the capacity to change. Documentation should include the type of transfer, level of required assistance, equipment or context adaptations, and time to complete. In patients who have goals and the capacity to improve sit-to-stand transfers, the 5 Times Sit-to-Stand (5TSTS) may be used. The 5TSTS and documentation of other transfers may be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, and discharge, and when feasible, between these periods for adult patients with neurologic conditions (Evidence quality: V; recommendation strength: best practice).

P. Action Statement 7: DOCUMENTATION OF PATIENT GOALS.

Clinicians should document patient-stated goals and monitor changes in individuals with neurologic conditions, using an outcome measure (OM) such as the Goal Attainment Scale (GAS), reporting the task, the performance conditions, and the time to complete or level of independence desired. Patient goals should be documented at least 2 times, at admission and discharge, and, when feasible, between these testing periods (Evidence quality: V; recommendation strength: best practice).

B. Action Statement 8: USE OF THE CORE SET OF OUTCOME MEASURES.

Clinicians should use and document the OMs in the core set to assess changes over time. The core set includes the BBS, FGA, ABC, 10mWT, 6MWT, and 5TSTS, and the recommended patient goal assessment for adults who are undergoing neurologic physical therapy. The core set should be administered with patients who have goals and the capacity to improve transfers, balance, and/or

gait. In cases when a patient cannot complete one or more core set OMs (eg, a patient who is unable to walk; thus, cannot complete the 10mWT or the 6MWT), a score of 0 should be documented. The core set should be administered under the same test conditions at least 2 times, at admission and discharge, and when feasible between these periods (Evidence quality: II; recommendation strength: moderate).

P. Action Statement 9: DISCUSS OUTCOME MEASURE RESULTS AND USE COLLABORATIVE/SHARED DECISION-MAKING WITH PATIENTS. Clinicians should discuss the purpose of OMs, OM results, and how these results influence treatment options with patients

undergoing neurologic physical therapy. Collaboratively, the clinician and the patient should decide how these data should inform the plan of care (Evidence quality: V; recommendation strength: best practice).

These guidelines were issued in 2018 based on the scientific literature published before March 2016. These guidelines will be considered for review by 2023, or sooner if new evidence becomes available. The ANPT will oversee the process and methodology for updating the CPG. The GDG will work collaboratively with the ANPT Evidence-Based Guideline Committee. Any updates to the guidelines in the interim period will be noted on the ANPT Web site.

INTRODUCTION

Purpose of Clinical Practice Guidelines

The APTA and the ANPT support the use of CPGs, as they provide therapists with evidence-based recommendations to guide clinical decision-making.¹² This CPG pertains to the examination of patients with neurologic conditions. Per the *Guide to Physical Therapist Practice*,¹³ the physical therapy examination consists of 3 components: history, systems review, and tests and measures. Using standardized tests and measures is recommended, and selection of these measures is informed by their psychometric properties and clinical utility. Standardized tests and measures may be used to predict and diagnose, discriminate, and assess changes over time. Measuring outcomes is also emphasized in the *Guide to Physical Therapist Practice*.¹³ The term “outcome measure” is used to refer to a standardized test or measure that is used to monitor changes in a specific construct (eg, gait function) during an episode of care. Various terms are used in the literature related to OMs, including standardized assessments, instruments, and tools. OMs exist and can be used for assessment at any level of the International Classification of Function, Disability, and Health (ICF),¹⁴ including body function and structure, activity, and participation. The focus of this CPG is to describe evidence that supports the use of specific standardized measures (both performance-based and self/patient-reported),^{15,16} and the term “OM” is used to describe these measures. Furthermore, this CPG identifies gaps in the research related to OMs that may be used in adult neurologic rehabilitation.

The recommendations presented in this CPG follow the efforts of the ANPT to develop measurement recommendations as part of the Evidence Database to Guide Effectiveness (EDGE) initiative. From 2009 to 2015, 6 ANPT EDGE task forces identified standardized tests and measures, including OMs, for use in several patient populations (stroke, multiple sclerosis, Parkinson disease, traumatic brain injury, spinal cord injury, and vestibular dysfunction). These task forces aimed to enhance the quality of care and decrease unwarranted variation in practice by recommending standardized tests and measures for each condition. The EDGE process included a literature review, and a synthesis of psychometric properties and clinical utility data. Using a modified Delphi process, recommendations were made for the use of 243 standardized measures in clinical practice, education, and research. Each task force developed recommendations for specific patient subgroups (eg, acute, subacute, and chronic stroke) and across a variety of health care settings.¹⁷⁻²¹ This work may have enhanced the quality of rehabilitation by providing clinicians with a substantial amount of summarized information for each OM for the target patient population. However, due to the large number of OMs reviewed and recommended, it is unlikely that the goal of decreasing unwarranted variation in practice was achieved. Furthermore, the recommendations provided by each task force were focused on specific patient populations and not intended for use across all populations of patients with neurologic conditions.

Background and Need for a Core Set of OMs

In 2012, the Institute of Medicine recommended that health care organizations build a learning health system that collects and analyzes standardized measurement data in clinical practice to measure patients’ perspectives, improve care delivery, increase transparency of outcomes, link clinicians’ performance to patient outcomes and internal and external benchmarks, manage patient care, improve processes, strengthen public health, and generate knowledge.²² The core set of OMs recommended in this CPG provides a first and necessary step toward achieving the learning health system vision in neurologic physical therapy. Using OMs throughout a patient’s episode of care is considered good clinical practice²³ and may enhance care by contributing to a more thorough examination and tailored care plan.²⁴ OMs can be used to monitor changes in a patient’s status over time, quantify observations and patient-reported function over time, enhance communication between care settings,^{15,16} and increase the efficiency of the delivery of patient care.²⁵ OMs can also help managers measure costs,²⁶ identify “at-risk” patients,²⁷ enhance reimbursement,²⁸ and compare outcomes among clinicians and settings.²⁷ Use of a common set of OMs promotes best practice by allowing direct comparisons of outcomes associated with different interventions.²⁹ Widespread adoption of a core set of OMs across clinical settings would support the Institute of Medicine recommendations, and may enable robust data collection efforts to rapidly advance clinical practice through the development of practice-based evidence.³⁰

Despite reports describing the benefits of routine use of OMs, they are inconsistently used in rehabilitation.^{23,24,31} Reported barriers include time, available equipment, perceptions of patient burden, clinician attitude/knowledge/skill, lack of financial compensation, and poor availability of measures.^{24,32-36} Current practice is characterized by great variation in the use of OMs, few mandates for the use of specific OMs, and a lack of recommendations for a core set of OMs across neurologic conditions. With the exception of the Functional Independence Measure, which is required in inpatient rehabilitation, no measure (or group of measures) is required for all patients with neurologic conditions receiving physical therapy. Yet, the Centers for Medicare & Medicaid Services (CMS) now requires the use of objective measures of function in outpatient physical therapy practice.³⁷ The APTA, through PTNow, has identified multiple OMs that can be used to meet the requirements set by CMS.³⁸ However, to date, a core set of OMs has not been identified for use in neurologic physical therapy practice; thus, the primary purpose of this CPG is to identify a core set of OMs for use with adults who have neurologic conditions.

Scope

This CPG aims to standardize practice by providing rehabilitation clinicians with recommendations for a core set of OMs for adults with neurologic conditions that should be routinely used in all settings. Based on input provided by physical therapists (PTs) and consumers of physical therapy, the core set focuses on the highest priority constructs of balance, gait, transfers, and patient-stated goals. Use of the core

set should increase standardization of OM selection and administration and provide the ability to measure changes in a patient's status over time. In addition, greater standardization of OMs should enhance effective communication among providers and with patients/caregivers, facilitate intervention effectiveness analysis and programmatic assessment within and among facilities, and may improve reimbursement. This CPG focuses on adult patients (older than 18 years), of either sex, who are undergoing physical therapy services for treatment of a neurologic condition (eg, an injury or disease to the central or peripheral nervous system). The CPG action statements apply:

- When examining balance, gait, transfers, and when setting patient goals.
- In all health care settings or contexts, across the continuum of care settings, including but not limited to acute care hospitals, inpatient and outpatient rehabilitation, skilled nursing facilities, and home health care.

The specific goals of this CPG are to:

1. Standardize the use of a core set of OMs to assess changes over time in neurologic physical therapy within and among facilities.
2. Facilitate comparison of outcomes across interventions, providers, and patients within and among diagnostic groups through the use of a common set of measures.
3. Facilitate the development of practice-based evidence by standardizing the use of OMs for patients with neurologic conditions to enable the creation and analysis of large data sets.
4. Improve quality of care by standardizing data elements to answer important clinical questions (eg, identification of treatment responders vs nonresponders).
5. Ensure systematic and standardized documentation of OMs to help justify a patient's need for therapy and to inform policy. Improved documentation of OMs could be used to clarify and improve policies related to reimbursement and access to care.
6. Identify gaps in the literature related to OMs in adult neurologic rehabilitation. This may prompt researchers to rigorously study the psychometric properties of untested OMs or develop new measures to meet clinical needs.
7. Enhance the education of future rehabilitation providers by informing curricular decisions about the core set of OMs to include in entry-level and residency physical therapy education.

Statement of Intent

Primarily intended for application in adult neurologic rehabilitation, this CPG may be useful to rehabilitation professionals including PTs, physical therapist assistants (PTAs), occupational therapists, and occupational therapy assistants who select and administer OMs; therapeutic recreation therapists, physicians, and nurses who are interested in understanding the use of OMs in rehabilitation; educators who make decisions about academic curricula; researchers who select or study OMs; regulatory bodies and policy makers; professional associations (eg, the APTA, APTA Academies of Neurology and Geriatrics, Canadian Physiotherapy

Association, and World Confederation of Physical Therapy); consumer organizations and associations (eg, the National Stroke Association and the Multiple Sclerosis Society); health care administrators, and third-party payers. This CPG does not serve as a legal standard of care or mandate. It provides recommendations for the use of a core set of OMs in clinical practice, based on a rigorous systematic review and critical appraisal process. Adherence to these guidelines will not guarantee a positive outcome in care; however, it is anticipated that the CPG will improve quality of care when implemented. Furthermore, this CPG does not provide a comprehensive review of all OMs. Rather it focuses exclusively on OMs in the constructs of balance, gait, transfers, and patient-stated goals. The appropriate use of the recommended OMs in clinical practice is ultimately the decision of each clinician and patient/significant other. If these OMs are not used, the rationale for the use of other OMs should be documented. We intend for the OM results to be shared with patients and significant others during adult neurologic rehabilitation. Collaboratively, clinicians and patients should decide how the results should guide the plan of care.

METHODS

The steps outlining the process of review and determination of the core set are shown in Table 3. The GDG consisted of 3 PTs (J.M., K.P., and J.S.) with expertise in outcome measurement. Two of the team leaders (J.S. and K.P.) served as Chair of the ANPT's EDGE task forces for stroke¹⁸ and multiple sclerosis,¹⁷ respectively. The third (J.M.) led the development of the Rehabilitation Measures Database³⁹ and has expertise in knowledge translation. The GDG proposed the CPG on the core set of OMs to the ANPT's Board of Directors, who approved the proposal. The GDG attended the APTA Clinical Practice Guideline Workshop in July 2013 and received funding from the APTA in December 2013 to support the CPG's development.

The GDG recruited 2 consultants including a methodologist (S.K.) to provide advice on conducting the systematic review and writing the CPG, and a psychometrician (C.H.C.—see Acknowledgments) to assist with survey development, modifying COSMIN to create a critical appraisal tool, and data analysis. A medical reference librarian (L.O.) led the literature search process and assisted with writing the CPG. A doctor of physical therapy student (K.B.) functioned as a graduate assistant who assisted with the development and management of article and data storage systems, coordinated communication between the GDG and article reviewers, and assisted with data analysis and writing of the CPG.

The GDG also recruited an expert panel consisting of an international and diverse group of stakeholders who provided feedback about the scope, process, and final CPG recommendations. The expert panel, identified in the Acknowledgments, included consumers (ie, patients) who had received neurologic physical therapy; PTs (novice and experienced) who were members of the ANPT; other rehabilitation professionals (neurologists, occupational therapists, speech/language pathologists, neuropsychologists); representatives of professional associations; health care administrators; journal

TABLE 3. Outline of the CPG Process

| STEP | GENERAL PROCESS | SPECIFIC TASKS |
|------|--|---|
| 1 | Team recruitment | Recruitment of consultants, medical librarian, graduate assistant, and expert panel members. |
| 2 | Identification of CPG scope and focus | Development of surveys to identify scope and focus of the CPG; IRB approval obtained. |
| 3 | | Administered surveys to consumers and PTs; analyzed data to determine the CPG scope in areas of balance, gait, transfers, and patient-stated goals. |
| 4 | Initial identification of OMs considered for the CPG | Identification and evaluation of OMs reviewed by the 6 EDGE task forces. The measures met the following criteria to be considered for inclusion in the core set: (a) received a rating of ≥ 2 by the EDGE task force(s); (b) generic (eg, not condition-specific); (c) relevant to the scope of the CPG (balance, gait, transfers, and patient-stated goals); (d) availability of data in at least 2 neurologic populations; (e) able to track patient change over time; (f) high clinical utility (ie, free, <20 min to administer, and no specialized equipment); (g) published data on reliability and data to assess change (coincided with the literature review, described later). |
| 5 | Literature reviews, identification of additional OMs, and review of OMs for inclusion in the CPG | Literature search for articles pertaining to the OMs reviewed by EDGE task force(s) with databases searched from article inception through April 2015. |
| 6 | | Title and abstract review. Two members of the GDG reviewed each article (third member serving as tie breaker when needed). Inclusion criteria included English language, subjects older than 18 years with adult-onset neurologic condition, studied reliability and/or psychometric properties that assess change, and sample size ≥ 30 (or power analysis conducted and sample size met). |
| 7 | | Full-text article review using inclusion criteria described previously. One member of the GDG reviewed each article, sorting each into folders in accordance with the OM studied (eg, Berg Balance Scale) and the psychometric property studied. Inclusion criteria described previously. |
| 8 | | Review of literature for newly identified OMs. Literature search for articles pertaining to the additional OMs identified with databases searched from article inception through April 2015. |
| 9 | | Title and abstract review of articles pertaining to additional OMs identified; process described previously. |
| 10 | | Full-text article review of articles pertaining to additional OMs identified; process described previously. |
| 11 | | Final literature search to identify articles published between April 2015 and March 2016; articles reviewed using the process described previously. |
| 12 | Use and modification of COSMIN to rate article methodological quality | COSMIN selected and modified to meet the needs of the CPG and process for scoring COSMIN was established. |
| 13 | Article reviewer recruitment and training | Article reviewers recruited. |
| 14 | | Online program developed to train article reviewers to use modified COSMIN. Each potential reviewer completed the training program and analyzed one article using modified COSMIN; those achieving a score of 80% were invited to serve as an article reviewer. |
| 15 | Critical appraisal of articles | Two reviewers scored each article using modified COSMIN administered via SurveyMonkey. |
| 16 | | Graduate assistant exported data from SurveyMonkey to Excel spreadsheet and compared data from the 2 reviewers. Inconsistencies addressed by initial reviewers when able; if continued inconsistencies existed, the GDG member solved the conflict. |
| 17 | Scoring of article methodological quality | Scores for each section of COSMIN were calculated. Total article methodological score calculated based on lowest section score received for the given article. Level I or II article rating determined. |
| 18 | Scoring of psychometric properties | COSMIN recommendations for scoring strength of psychometrics adopted and used to score reliability and measurement error from each article for each OM. |

(continues)

TABLE 3. Outline of the CPG Process (*Continued*)

| STEP | GENERAL PROCESS | SPECIFIC TASKS |
|--|-------------------------------------|---|
| 19 | Analysis of OM data across articles | The GDG identified process for review of OM data for inclusion in core set and set criteria for strong vs moderate recommendations. |
| 20 | | Combined information from all articles on a given measure, as related to psychometric properties studied, strength of psychometric data, patient population studied, and category (acute, chronic stable, and chronic progressive). |
| 21 | Recruitment of KT team | KT team recruited. |
| 21 | Action statement profile generation | Action statements creation using BridgeWiz. |
| 22 | Review of CPG | CPG reviewed by ANPT Evidence-Based Documents Advisory Committee and CPG Expert Panel, and will be reviewed APTA PTNow using Appraisal of Guidelines, Research, and Evaluation (AGREE II) tool. |
| 23 | | CPG reviewed by KT committee using Guideline Implementability Appraisal Tool (GLIA) |
| 24 | | Public review of the CPG with feedback submitted through SurveyMonkey. |
| Abbreviations: AGREE, Appraisal of Guidelines for Research and Evaluation; COSMIN, Consensus-based Standards for the Selection of Health Measurement Instruments; CPG, clinical practice guideline; EDGE, Evidence Database to Guide Effectiveness; GDG, guideline development group; IRB, institutional review board; KT, Knowledge Translation; OM, outcome measure; PT, physical therapist. | | |

editors; and experts in OMs, knowledge translation, policy, and reimbursement.

Methods to Determine the CPG Scope

To identify the scope and focus of the CPG, the GDG developed and administered separate online surveys to consumers of neurologic physical therapy services and to ANPT members. Surveys were administered via SurveyMonkey and focused on the use of OMs during physical therapy examination and care. Before dissemination, the surveys were approved by the Institutional Review Boards at Northwestern University (Chicago, Illinois) and Rockhurst University (Kansas City, Missouri).

Consumer Survey

An invitation to consumers of neurologic physical therapy was distributed through the Clinical Neuroscience Research Registry at the Rehabilitation Institute of Chicago and Northwestern University, Heartland Chapter of the National Parkinson's Disease Foundation, and the Mid America Chapter of the National Multiple Sclerosis Society. Participants included individuals with email access who were registered in the research and/or email databases of these organizations. Approximately 828 people with stroke, 395 with spinal cord injury (SCI), 11 635 with multiple sclerosis (MS), and 2500 with Parkinson disease (PD) received an invitation to participate. The invitation provided a link to the survey, and indicated that participation was optional. To be eligible, consumer participants were required to have a medically diagnosed neurologic condition, have received physical therapy services, be 18 years or older, English-speaking, and have email access. Participants confirmed that they met these inclusion criteria and provided informed consent on the first page of the survey.

The 21-item survey included questions pertaining to neurologic physical therapy, including the:

- reason for seeking services;
- frequency, duration, and setting of services;

- perceived importance of improving function in various areas (eg, gait and decrease fatigue);
- constructs (eg, balance) examined using tests performed by the PT;
- formats of tests used in clinical settings (eg, questionnaires and performance tests);
- frequency and duration of testing;
- information provided by the PT regarding the purpose and results of tests;
- perceived importance of the tests;
- recommendations for therapy time that should be dedicated to testing; and
- satisfaction with services and information received about the tests conducted.

Academy of Neurologic Physical Therapy Member Survey

Approximately 5000 PT and PTA members of the ANPT were invited to participate in the survey. Inclusion criteria required that the PT or PTA be licensed, college educated, and have email access. A link to the survey was sent via e-mail through the ANPT's listserv and electronic newsletter. Survey participation was optional and the respondent provided informed consent prior to survey initiation.

The ANPT member survey included a maximum of 65 questions; the number and type of questions answered varied by the participant's responses. Survey logic ensured that questions received by each respondent were relevant to the individual's role (eg, clinician or educator/researcher/other). The survey consisted of 3 sections: demographic data, a core set needs assessment, and use of OMs in practice. Demographic data included primary and professional roles, experience (eg, number of years of experience, certifications, and training on OMs), APTA and ANPT membership, education, primary employment setting, and willingness to use a core set of OMs. The core set needs assessment questions captured the respondent's understanding of core sets and their use; importance of having a core set; types of OMs recommended for

the core set; representation of the ICF domains and specific items (eg, aerobic capacity) in the core set; time and money to support use of the core set; and benefits and potential impact of the core set. Lastly, questions inquired about use of OMs in practice. Clinician respondents were asked about current use of OMs in practice, whereas the educators, researchers, and other respondents (eg, managers) were asked to provide their thoughts on what should be measured in practice.

De-identified aggregate data from both surveys were analyzed using descriptive statistics. Data were used to inform the scope and focus of the CPG, particularly to identify the highest priorities for each sample group.

Survey Results

A total of 518 individuals completed the survey (303 PTs and 215 consumers). The PT respondents reported their primary position as either a clinician (69%) or educator (24%). They were experienced, with 45% having greater than 15 years of experience and 54% holding American Board of Physical Therapy Specialties certification. The majority were employed either in an outpatient (46%) or inpatient rehab setting (28%). The neurologic conditions experienced by the consumers included MS (49%), stroke (34%), or SCI (14%). Most received outpatient physical therapy (70%), and some received services in inpatient rehabilitation (21%).

Survey results showed that 94% of clinicians use OMs in clinical practice. The majority reported having 30 to 60 minutes to conduct examinations at admission (78%), interim (53%), and discharge (52%). Almost all (98%) reported that a core set is either *essential* (65%) or *desirable* (33%), and 91% indicated they were *very willing* (58%) or *willing* (33%) to incorporate a core set of OMs into practice. Regarding the maximum amount of time that should be used to administer OMs, the greatest number (43%) answered 15 to 29 minutes. All stated the core set should include OMs related to the ICF domain of activity, with 98% scoring this as *essential*. Clinicians scored the following constructs as *essential* to include in the core set: balance (98%), gait (95%), patient-stated goals (82%), and transfers (81%).

Results from the consumer survey showed that they also value the use of tests in their care; 59% scored tests as *very important* and 35% as *somewhat important*. Of note, consumers identified that they were referred to physical therapy due to walking (83%) and balance difficulties (68%), with approximately 90% indicating it was *very important* to improve walking and balance.

Survey results indicated that OMs that assess changes in balance and gait are important to both clinicians and consumers and should be included in the core set. In addition, the PT survey indicated OMs related to patient-stated goals and transfers were also important for inclusion in the core set.

Selection of Measures to Consider for the CPG

Two sets of measures were evaluated for the inclusion in the CPG—(1) all measures ($n = 243$) that had been reviewed by the 6 ANPT EDGE task forces,¹⁷⁻²¹ and (2) new measures ($n = 67$) identified during the literature search—that were not originally reviewed by the EDGE task forces and were studied in any adult neurologic population. During each step of the review process, the GDG reached consensus on decisions about measure inclusion.

Appendix 1 provides a list of measures reviewed for inclusion in the CPG (see Supplemental Digital Content 2, Appendix 1, available at: <http://links.lww.com/JNPT/A215>). Details about the literature search are provided in the section titled *Literature Search*.

EDGE-Reviewed Measures

Step 1. Identification of Standardized Measures With EDGE Ratings of 2 to 4/4

All 243 standardized measures reviewed by the ANPT EDGE task forces were considered for inclusion in the CPG. The EDGE task forces used a 1- to 4-point rating scale to make recommendations for measures in categories such as condition acuity, severity, and site of care.²¹ A rating of “4” indicated that the measure had excellent psychometric properties and clinical utility in the target condition; a “1” rating indicated poor psychometrics (inadequate reliability or validity) or limited clinical utility (extensive testing time, unusual or expensive equipment, costs to administer, etc).^{17,18} In step 1, measures that received a “1” rating across all categories and EDGE groups were eliminated. A total of 222 standardized measures were retained.

Step 2. Identification of Generic/Not Condition-Specific Standardized Measures

To identify measures that could be used across neurologic populations, condition-specific measures (eg, Stroke Impact Scale) were eliminated. One hundred forty-six of the 222 standardized measures were retained.

Step 3. Identification of Standardized Measures That Address the CPG Target Constructs

The remaining measures were evaluated relative to the constructs of balance, gait, transfers, and patient-stated goals. A measure was eliminated if fewer than 75% of the items or questions assessed these constructs. Fifty-four of the 146 measures were retained.

Step 4. Identification of Standardized Measures Used in 2 or More Neurologic Populations

To identify OMs that were appropriate for use across neurologic conditions, measures were eliminated that did not have published psychometric data in at least 2 neurologic populations. Forty-one of the 54 standardized measures were retained.

Step 5. Identification of Standardized Measures That Evaluate Change

Each measure was evaluated to determine whether it could be used to demonstrate changes over time. The availability of psychometric properties that assess changes (eg, minimum detectable change and minimum clinically important difference) for each measure was ascertained. All 41 standardized measures were retained.

Step 6. Identification of Measures With Excellent Clinical Utility

Approximately 85% of PT survey respondents indicated that 45 minutes or less should be spent on OM administration, with 63% indicating the maximum time spent on measure

administration should be less than 30 minutes. In addition, 71% indicated the OM should cost \$100 or less. Therefore, the GDG decided that, to be included, an OM had to be free, require equipment commonly available in a clinic, and take 20 minutes or less to administer. Thirty-five of the 41 OMs were retained.

Step 7. Identification of Candidate OMs

Step 7 followed a literature search of the 35 OMs that met the criteria described in steps 1 through 6. Following the literature search, title/abstract screening, and full-text review, each OM was evaluated to determine whether reliability and data to support interpretation of results (eg, minimal detectable change [MDC] and minimal clinically important difference [MCID]) were available in at least one article that met inclusion criteria for the CPG. The remaining 16 measures and relevant literature proceeded to a critical appraisal with data extraction via the modified COSMIN checklist⁵ by the trained reviewer pool.

New Measures

During the initial literature search (including the title/abstract and full-text review), the GDG identified 67 additional measures that were not previously reviewed by EDGE. These measures were reviewed using the process described in steps 2 through 7 previously. The measures retained during each step are described next.

Step 1: Not applicable because these measures were not reviewed by the EDGE task forces.

Step 2: 65 of the 67 new measures were retained; 2 were excluded because they were condition-specific.

Step 3: 52 of the 65 measures were retained; 13 were excluded because fewer than 75% of the test items pertained to gait, balance, transfers, and patient-stated goals.

Step 4: 13 of the 52 measures were retained; 39 were excluded because there were no published data in 2 or more neurologic populations.

Step 5: 12 of the 13 measures were retained; 1 was excluded because there were no data on psychometric properties that indicated the measure could detect changes over time.

Step 6: 10 of the 12 measures were retained; 2 were excluded because they did not meet the clinical utility criteria.

Step 7: 2 of the 10 measures were retained and relevant literature proceeded to a full-text review and data extraction by the trained reviewer pool using the modified COSMIN checklist.⁵ Eight were eliminated because they lacked data demonstrating reliability and supporting interpretation of the results (eg, MDC and MCID).

Literature Search

A medical librarian (L.O.) collaborated with the GDG to develop the search strategies to identify articles related to each of the OMs of interest. The study types included meta-analyses, systematic reviews, and psychometric studies in the following databases: PubMed MEDLINE, Embase, Cochrane Central Register of Controlled Trials, and CINAHL. Search strategies for the Embase, CENTRAL, and CINAHL databases were adapted from the PubMed MEDLINE search strategy. A validated search filter, developed by COSMIN for finding studies on OMs, in conjunction with the search

strategies in PubMed, was used.⁴⁰ A validated version of the filter was also used for the Embase search (developed by E. P. Jansma, Medical Library, VU University, Amsterdam, the Netherlands). The search strategy is depicted in Appendix 2 (see Supplemental Digital Content 3, available at: <http://links.lww.com/JNPT/A216>).

The initial searches focused on articles pertaining to the EDGE-reviewed OMs and were performed in April 2015, October 2015, and December 2015, resulting in a total of 18 007 articles. All databases were searched back to their inception, and no language or date limits were applied. This literature review is depicted in Appendix 2. After duplicates were removed, 12 088 articles remained. To be included, the study was published in English, studied the English language version of the OM, and assessed reliability and/or values support interpretation of the results (eg, standard error of measurement [SEM], MDC, and MCID). In accordance with COSMIN, the sample size needed to be a minimum of 30; articles with a sample size less than 30 were acceptable if a power analysis was done and the required sample size was met. Lastly, study participants needed to be adults (18 years or older) with a neurologic condition. Table 4 outlines the inclusion and exclusion criteria.

The titles and abstracts of the 12 088 articles were reviewed by 2 of 3 GDG members, and reviewer pairs were rotated within the GDG. The third member played the role of tie breaker where disagreement on an article's inclusion occurred between the 2 initial reviewers. Following the title and abstract review, 11 548 articles were excluded. Full-text reviews were conducted on the remaining 540 articles; each was reviewed by 1 GDG member using the same criteria. A second GDG member assessed articles if questions or concerns about an article were identified. Lastly, the graduate assistant reviewed the reference lists in each article to identify any additional relevant articles. None was identified.

Follow-up literature searches using the strategies described previously were performed in March 2016 to identify any new articles published since April 2015; 403 articles were identified after duplicate removal. After title and abstract review, 365 articles were excluded, leaving 38 additional articles for review. The PRISMA diagram (Figure) illustrates the article search processes used; 64 articles were included for full-text review (see Supplemental Digital Content 4, Figure, available at: <http://links.lww.com/JNPT/A218>).

Critical Appraisal Tool Development

To determine the methodological quality of the articles, the original version of the COSMIN^{8,9,41,42} was modified (COSMIN-M). COSMIN^{1,3-5} provides a standard for evaluation of the study design and statistical analysis of the psychometric properties, including sections representing these psychometric properties: internal consistency, reliability, measurement error, content validity, construct validity, structural validity, hypothesis-testing, cross-cultural validity, criterion validity, responsiveness, and interpretability. During an article review using COSMIN-M, only the sections appraising properties assessed in the study were completed by reviewers, using a dichotomous (eg, yes or no) scale. For example, if a study only reported on reliability, reviewers only completed COSMIN-M sections on reliability and general methodology.

TABLE 4. Inclusion and Exclusion Criteria for Article Review

| CRITERION | INCLUSION | EXCLUSION |
|--|---|---|
| Language of article | Published in English | Published in language other than English |
| Language of OM | OM studied is not the English version | OM studied is the non-English version |
| Sample size | n = ≥30 or n < 30, but power analysis done and sample size met | Sample size <30 and no power analysis done Sample size <30 but insufficient to meet power analysis requirements |
| Conditions | Acquired neurologic conditions for entire sample If a mixed (neuro; nonneuro) must report data separately for neuro and must meet sample size requirement for neuro subset | Adults with congenital neuro conditions Study focuses on nonneuro populations Study includes subjects with neuro and nonneuro conditions, but data reported in aggregate Dementia Study includes only community-dwelling elders |
| Age | Minimum of 18 y old | Sample includes individuals younger than 18 y |
| Purpose of article | OM on our list Psychometrics assessed | Systematic review Meta-analysis Intervention study |
| Psychometrics | Study examined one or more of the following: Internal consistency Reliability MDC MCID SEM Ceiling and/or floor effects | Does not assess one of the target psychometric properties |
| Abbreviations: MCID, minimal clinically important difference; MDC, minimal detectable change; OM, outcome measure; SEM, standard error of measurement. | | |

Although the original COSMIN rating scale has been modified to incorporate a 4-point scale (poor, fair, good, and excellent), the GDG selected the original version to facilitate ease of scoring and higher reliability of the reviewers.

In consultation with the methodologists, to focus on the purpose and intent of this CPG, the following modifications were made to the COSMIN tool by the GDG. We retained COSMIN questions about statistical techniques used and results, and questions about the presence of potential study flaws. However, the sections on internal consistency, reliability, interpretability, and generalizability were modified to reduce the number of items and include only those that were of utmost importance to determining the methodological quality of the study. Questions relevant to the development of the core set were also retained. For example, questions pertaining to psychometric variables that measure changes, such as MCID, MDC, and SEM, were retained, as these can be used to set goals and determine treatment effectiveness. Additional questions about specific psychometric values, such as intraclass correlation coefficients (ICCs), and the location of that data in the manuscript were added. Appendix 3 provides a list of measurement terms used in the CPG with definitions (see Supplemental Digital Content 5, Appendix 3, available at: <http://links.lww.com/JNPT/A217>). The COSMIN-M generalizability section included questions pertaining to the neurologic condition of the population studied (eg, stroke and PD), acuity and stability (progressive and nonprogressive) of the condition, age and sex, and the setting in which the study took place. A new section, labeled “general methodology,” related to sample size, missing data, and rater

training and experience was included. Reviewers completed the COSMIN-M via an online survey Web site (SurveyMonkey).⁴³ Appendix 4 provides a copy of the COSMIN-M. Two members of the GDG reviewed each article to determine and document any reported adverse events (see Supplemental Digital Content 6, Appendix 4, available at: <http://links.lww.com/JNPT/A219>).

Reviewer Selection and Training

Article reviewers were recruited at the 2015 APTA Combined Sections Meeting and via postings on the ANPT’s e-newsletter and listserv. All applicants completed an online reviewer training course developed by the GDG using Articulate Storyline 2™. The training program consisted of an overview of the CPG and the COSMIN-M, followed by a detailed description of the methods for completing each section of the COSMIN-M (internal consistency, reliability, interpretability, generalizability, and general methodology). Lastly, information was provided outlining the CPG process and reviewer expectations.

The GDG selected one article for reviewer training and testing, and 2 GDG members first completed the online COSMIN-M for the article. The third GDG member served as a tiebreaker to resolve any conflicts. The GDG’s final ratings were used as a basis for the testing score agreement with article reviewers. Each potential reviewer completed the COSMIN-M review for 2 measures studied in this article. To successfully complete the training and begin reviewing articles, a reviewer needed to score 80% or more agreement with the GDG score. If needed, reviewers were allowed

a second chance to resubmit the review on the same article (without any feedback on the previous review) and achieve a score of 80% or more; 23 individuals successfully completed the training to review articles.

Scoring of Methodological Quality

Two reviewers assessed the methodological quality of each article using the online COSMIN-M (Appendix 4), for each OM reported in the article. To avoid redundancy, each reviewer completed the general methodology section only once for each article. The graduate assistant exported COSMIN-M data into an Excel spreadsheet to compare data from the 2 reviewers. When inconsistencies were identified, reviewers were asked to reevaluate the question and confirm or change the original response. When inconsistencies continued, a GDG member resolved the conflict.

Once the results were finalized, the score for each section was calculated using the percentage of “yes” responses to the questions. Section scores were compared to inform the overall article quality score, which reflected the score received by the lowest scoring section. For example, if an article received 80% for reliability and 60% for measurement error, the article would receive an overall quality score of 60%. If the overall quality score was 50% or more, the article received a level I rating. If the score was < 50%, the article could not receive higher than a Level II rating.

The strength of the psychometric data was determined in accordance with COSMIN (Table 5). Relevant statistical results from each article were evaluated to determine whether they exceeded the threshold established by COSMIN (Table 5). If the article received a level I rating and had strong psychometric properties, the article received a psychometric property rating of *strong* (+++). A rating of strong (---) was used for level I studies where the psychometric properties were below the COSMIN threshold. Level II articles received a score of *moderate* (++) if the psychometric properties met the psychometric threshold and a *moderate* (--) if the psychometric properties were below the threshold. Ratings of *strong* (?) or *moderate* (?) were assigned if specific psychometric properties were not studied (eg, where MDC was calculated, but not minimal important change [MIC]). After this step, each article was assigned a level of evidence and statistical strength score.

Finally, information from multiple articles on each OM was combined, including level of evidence, strength of psychometric property, the patient population studied, and the condition category (acute, chronic stable, and chronic progressive) as depicted in Table 6 (step 4). The *acute* category was defined as participants who had the condition for less than 6 months; this applied to individuals with new conditions that were expected to improve (eg, peripheral vestibular hypofunction) or to those with potentially long-lasting, but recently diagnosed conditions (eg, stroke, SCI, and brain injury). The *chronic stable* category was defined as more than 6-month duration, but not expected to progress with time, applying to participants with conditions such as stroke, SCI, or brain injury diagnosed more than 6 months ago. The *chronic progressive* category was defined as more than 6 months in duration, but with potential to experience additional symptoms or functional decline (eg, amyotrophic lateral sclerosis, MS, or PD).

Recommended Action Statements

Using BridgeWiz for APTA 3.0, action statements were generated that include clear and implementable recommendations, consistent with the Institute of Medicine recommendations for transparency.⁴⁴ The first step was to identify OMs that demonstrated level I evidence of excellent internal consistency and/or reliability and SEM/MDC data in 2 or more populations and 3 condition categories (acute, chronic stable, and chronic progressive). If a construct area did not have an OM that met this first criterion, other OMs that demonstrated level I evidence of excellent internal consistency and/or reliability and SEM/MDC data in 2 or more populations and 2 categories were considered. Because the aim of this CPG was to recommend a core set of OMs for use in adult neurologic conditions, when more than one OM in a construct area had substantial supporting evidence, the OM with the strongest psychometric properties across diagnostic groups was selected. For the construct of gait, measures of speed and endurance were considered separately, as these represent 2 different, yet important, aspects of gait performance. Similarly, for balance, both performance-based and patient-reported measures were considered separately. Only one OM for the construct of transfers met the criteria for consideration in the core set. Because this was a priority area identified in our surveys, and the OM had some data to support inclusion in the core set, a best practice recommendation was made and documentation standards were recommended for other types of transfers.

For patient-stated goals, no OMs were identified with sufficient literature for recommendation in the core set. Instead, general recommendations for documentation standards were developed. To standardize administration of OMs in clinical practice, recommendations related to the general OM use and OM timing were also generated. Lastly, recommendations were made related to the sharing of OM-related information and decisions with patients. Research recommendations (designated by R) were generated to identify missing or conflicting evidence related to using the psychometric variables studied in the CPG, for OMs that should be studied across more condition categories, and regarding study of recommended administration protocols.

Guideline Review

1. This CPG underwent 4 formal reviews. The first review was conducted by the GDG using 2 tools:
 - The Appraisal of Guidelines for Research and Evaluation (AGREE II)⁴⁵ an instrument used to assess CPG quality with 23 items in 6 domains. Each item is rated using a 7-point rating scale that includes specific rating criteria.
 - The Guideline Implementability Appraisal v 2.0 (GLIA)⁴⁶ to assess each action statement across 8 dimensions of implementability including executability, decidability, validity, flexibility, effect on care processes, measurability, novelty/innovation, and computability.
2. A second review included completion of the AGREE II by the ANPT Evidence-Based Documents committee and CPG expert panel. Eight reviewers completed the AGREE II. The aggregate score was 94%. The GLIA tool was completed by each member of the ANPT-appointed Knowledge Translation Task Force

TABLE 5. COSMIN Ratings for Strength of Statistics^{a8}

| LEVEL | COSMIN RATING | CRITERIA |
|--|---------------|---|
| I | Strong (+++) | <i>Level of evidence rating I:</i> Evidence obtained from a high-quality ($\geq 50\%$ critical appraisal score) study of psychometric properties |
| | | <i>Psychometric property rating (+++):</i> |
| | | Internal consistency: Cronbach $\alpha \geq 0.7$ |
| | | Reliability: ICC or weighted $\kappa \geq 0.70$; Pearson's $r \geq 0.80$ |
| | | Measurement error: MIC > SDC or MIC outside the LOA |
| | | Responsiveness: Floor or ceiling effect <15% |
| | Strong (---) | <i>Level of evidence rating I:</i> Evidence obtained from a high-quality ($\geq 50\%$ critical appraisal score) study of psychometric properties |
| | | <i>Psychometric property rating (---):</i> |
| | | Internal consistency: Cronbach $\alpha < 0.7$ |
| | | Reliability: ICC or weighted $\kappa < 0.70$; Pearson's $r < .80$ |
| | | Measurement error: MIC \leq SDC or MIC inside the LOA |
| | | Responsiveness: Floor or ceiling effect $\geq 15\%$ |
| | Strong (?) | <i>Level of evidence rating I:</i> Evidence obtained from a high-quality ($\geq 50\%$ critical appraisal score) study of psychometric properties |
| | | <i>Psychometric property rating (?):</i> |
| | | Internal consistency: Cronbach α not determined |
| Reliability: Neither ICC or weighted κ , nor Pearson's r determined | | |
| Measurement error: MIC not defined | | |
| II | Moderate (++) | <i>Level of evidence rating II:</i> Evidence obtained from a lesser quality (<50% critical appraisal score) study of psychometric properties |
| | | <i>Psychometric property rating (++):</i> |
| | | Internal consistency: Cronbach $\alpha \geq 0.7$ |
| | | Reliability: ICC or weighted $\kappa \geq 0.70$; Pearson's $r \geq 0.80$ |
| | | Measurement error: MIC > SDC or MIC outside the LOA |
| | | Responsiveness: Floor or ceiling effect <15% |
| | Moderate (--) | <i>Level of evidence rating II:</i> Evidence obtained from a lesser quality (<50% critical appraisal score) study of psychometric properties |
| | | <i>Psychometric property rating (--):</i> |
| | | Internal consistency: Cronbach $\alpha < 0.7$ |
| | | Reliability: ICC or weighted $\kappa < 0.70$; Pearson's $r < 0.80$ |
| | | Measurement error: MIC \leq SDC or MIC inside the LOA |
| | | Responsiveness: Floor or ceiling effect $\geq 15\%$ |
| | Moderate (?) | <i>Level of evidence rating II:</i> Evidence obtained from a lesser quality (<50% critical appraisal score) study of psychometric properties |
| | | <i>Psychometric property rating (?):</i> |
| | | Internal consistency: Cronbach α not determined |
| Reliability: Neither ICC or weighted κ , nor Pearson's r determined | | |
| Measurement error: MIC not defined | | |
| Abbreviations: COSMIN, Consensus-based Standards for the Selection of Health Measurement Instruments; ICC, intraclass correlation coefficient; LOA, limits of agreement; MIC, minimal important change; SDC, smallest detectable change. ^a From Terwee. ⁸ | | |

TABLE 6. Process Used to Make Recommendations

| STEP | DESCRIPTION | CRITERIA |
|--|---|--|
| 1. Score articles | Review and score methodological quality for the study of psychometric properties (internal consistency, reliability, measurement error, and responsiveness) | Quality of each psychometric property scored Article assigned score of the lowest scoring section Level I if $\geq 50\%$ criteria met Level II if $< 50\%$ criteria met |
| 2. Score strength of psychometric properties | Review statistical results from articles, score the psychometric property while considering the article level of evidence | Statistical strength criteria listed in Table 5. |
| 3. Combine results by OM | Compile data by OM to view amount and quality of literature, and strength of psychometric property | Considered data for each OM for level of evidence, strength of psychometric, condition, and category (acute, chronic progressive, chronic stable) |
| 4. Select OMs for consideration of core set | Compare the amount and strength of literature available for each OM. If an OM met the criteria listed, it was compared with other OMs in the same construct area. | Prioritized OMs that met the following criteria: Level I evidence in ≥ 2 populations and 3 categories (acute, chronic stable, and chronic progressive) AND Internal consistency and/or reliability (strong +++) in 2 populations and 3 categories AND Standard error of measurement and/or minimum detectable change data (strong +++)/(strong ?) in 2 populations and 3 categories In cases in which a measurement construct did not have an OM with this level of evidence, we considered OMs that met the following criteria: Level I evidence in ≥ 2 populations and 3 categories (acute, chronic stable, and chronic progressive) AND Internal consistency and/or reliability (strong +++) in 2 populations and 2 categories AND Standard error of measurement and/or minimum detectable change data (strong +++)/(strong ?) in 2 populations and 2 categories |

Abbreviation: OM, outcome measure.

(n = 8). The aggregate score was 88%. Feedback from the reviewers on the AGREE II and GLIA reviews was integrated in the final CPG. It is anticipated that a further review would result in a comparable/higher score.

3. A revised draft of the CPG was posted for public comment on the ANPT, APTA, and Academy of Geriatric Physical Therapy Web sites by the ANPT Director of Practice. Notices of the public comment period were distributed via email to CPG reviewers and others who inquired about the CPG while it was in development. An electronic newsletter and social media posting disseminated the public comment notice to ANPT members. The posting was also made available on a web-based

listserv of PTs who treat individuals with neurologic conditions. Listserv subscribers included members and nonmembers of the ANPT. During the public comment period, reviewers identified the following strengths of the CPG: usefulness, value, clarity, comprehensiveness of the literature review, and format. There were some comments for improvement that the GDG determined were beyond the scope of the CPG. Numerous suggestions for dissemination were forwarded to the CPG KT Committee.

4. The fourth review was completed by 2 *Journal of Neurologic Physical Therapy* peer reviewers prior to publication.

Document Structure

The action statements are organized under the following headings: the core set of OMs, discussing results of OMs, and shared decision-making. After the action statement profiles, a section that describes implementation recommendations for all action statements is included. Lastly, acknowledgments and references are provided.

THE CORE SET OF OUTCOME MEASURES FOR NEUROLOGIC PHYSICAL THERAPY

A. Action Statement 1: STATIC AND DYNAMIC SITTING AND STANDING BALANCE ASSESSMENT. Clinicians should use the BBS for adults with neurologic conditions who have goals to improve static and dynamic sitting and standing balance and have the capacity to change in this area. The BBS should be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: I; recommendation strength: strong
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

Aggregate Evidence Quality and Strength: Level I; strong. Based on 16 level I studies (see Supplemental Digital Content 7, Appendix 5, available at: <http://links.lww.com/JNPT/A220>).

Benefits:

- The BBS demonstrates excellent internal consistency and reliability, and data exist to assist in interpretation and measuring changes, in individuals with acute, chronic progressive, and chronic stable neurologic conditions. Floor and ceiling effects and information to assist in OM result interpretation, such as MDC and MCID, are available for individuals with acute, chronic stable, and chronic progressive neurologic conditions.
- The BBS has high clinical feasibility, as it requires minimal equipment, is free, and requires less than 20 minutes to administer.
- Ninety-seven percent of PTs surveyed reported that a balance assessment is an *essential* component for the core set.
- Initial costs of purchasing equipment (eg, stopwatches and measuring device) are minimal and the required equipment is commonly available in clinical settings. The time cost to administer the test is less than 20 minutes.

Risk, Harm, and Cost:

- No adverse events were documented in research studies.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments: The GDG emphasizes the importance of using standardized administration and scoring procedures for measuring patients in the clinic. While there is not a universally accepted protocol for the BBS, we recommend that each clinical site adopt the testing protocol developed by the CPG KT Committee

(<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>). We recommend review of the standardized procedures and, on an annual basis, establishing consistency within and among raters using the BBS.

Intentional Vagueness: The BBS has demonstrated a ceiling effect in individuals with acute,⁴⁷⁻⁵⁰ chronic stable,^{50,51} and chronic progressive conditions.⁵² The BBS only includes one item that assesses sitting balance. Therefore, if a patient has a primary goal to improve sitting balance, the BBS should be administered in addition to a sitting balance measure.

Role of Patient Preferences:

- Sixty-eight percent of consumers surveyed reported that balance was a common reason for seeking a PT referral.
- Clinicians should consider the degree to which improvements in balance are achievable and important to each patient.

Exclusions:

- For patients who do not have explicit goals to improve static and dynamic sitting and standing balance, the clinician should document that the BBS was not administered and provide a rationale (eg, not applicable due to the patient's current and expected functional capability or not applicable due to a lack of related patient goals).
- Patients who have a high level of balance ability (eg, able to walk without an assistive device at a gait speed >1.0 m/s) may experience a ceiling effect on the BBS.

Quality Improvement:

- Organizations may use BBS results to assess balance outcomes of individuals and groups with neurologic conditions receiving rehabilitation.
- The physical therapy profession may use BBS scores to describe the effectiveness of physical therapy services for adults with neurologic conditions.

Implementation and Audit:

- The measurement error of the BBS may vary throughout the scale. It may be more difficult to achieve high reliability on individuals who score between 20 and 44.^{53,54} Measurement error has not been established for individuals with an average score of less than 20, thus it is unknown.⁵⁴ Additional efforts may be needed to standardize and improve reliability of BBS administration in clinical practice for patients who score less than 44.
- The BBS has demonstrated a ceiling effect in individuals with acute,⁴⁷⁻⁵⁰ chronic stable,^{50,51} and chronic progressive conditions.⁵² In patients who perform well on the BBS, and score near the top of the scale, it may not be necessary to readminister the test.
- Clinics and organizations should establish administration consistency within and among clinicians prior to using the BBS, and this should be repeated annually.

Supporting Evidence and Clinical Interpretation (Table 7)

Administration and Conditions: The BBS is a 14-item clinician-rated scale that assesses sitting and standing, static and dynamic balance.⁵⁵ Considered one of the most commonly used measures in adult neurologic rehabilitation,⁵⁶ the

TABLE 7. Evidence Table, Berg Balance Scale

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|---|--|-------------------|-------------------------------|--|--------------------------------------|--|---|
| Berg Balance Scale, acute samples | | | | | | | |
| Chinsongkram et al ⁶⁰ | Stroke | I | NT | NT | NT | 0% | 4.3% |
| Gustavsen et al ⁴⁷ | Stroke; subacute rehabilitation | I | NT | NT | NT | NT | 36% (admission) |
| Lemay and Nadeau ⁴⁸ | SCI; AIS D; 15 paraplegia, 17 tetraplegia | I | NT | NT | NT | NT | 37.5% |
| Mao et al ⁴⁹ | Stroke | I | Cronbach $\alpha = 0.92-0.98$ | Interrater ICC = 0.95 (total score); weighted k = 0.92 (individual items) | NT | 14 d 35%; 30 d = 17.3%; 90 d = 6.5%; 180 d = 5% | 14 d = 4.9%; 30 d = 11.8%; 90 d = 21.5%; 180 d = 28.8% |
| Pickenbrock et al ⁵⁷ | Stroke; acute care facility | I | NT | Interrater: Mean difference between raters 0.13; LOA < ± 1 point (-0.25, 0.51) | NT | NT | NT |
| Salter et al ⁵⁹ | Stroke; inpatient rehabilitation | I | NT | NT | NT | 0% | 0% |
| Stevenson ⁵⁸ | Stroke | I | NT | Test-retest ICC = 0.92 | MDC 90% = 6; MDC 95% = 7; SEM = 2.49 | NT | NT |
| Berg Balance Scale, chronic stable samples | | | | | | | |
| Hiengkaew et al ⁶³ | Stroke; outpatient clinic | I | NT | Test-retest ICC = 0.95 | SEM = 1.68 MDC = 4.66 | NT | NT |
| Liaw et al ⁶⁴ | Stroke | I | NT | Interrater ICC = 0.98 | SEM = 2.4; MDC = 6.7 | NT | NT |
| Tsang et al ⁵¹ | Stroke | I | NT | NT | NT | 0% | 32.10% |
| Wirz et al ⁶⁵ | SCI AIS 4.8% A, 4.8% B, 83.3% C, 7.1% D | I | NT | Interrater ICC = 0.953 | NT | NT | NT |

(continues)

TABLE 7. Evidence Table, Berg Balance Scale (Continued)

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|---|---|-------------------|-------------------------------|---|---|---------------------------------|-----------------------------------|
| Berg Balance Scale, chronic progressive samples | | | | | | | |
| Leddy et al ⁶² | PD; UPDRS/MDS mean 72.6 (25-135); mean Hoehn and Yahr 2.45 (4-66) | I | NT | Intrater ICC = 0.95; test-retest ICC = 0.79 (student PT), 0.80 (PT) | NT | NT | NT |
| Paltamaa et al ⁶⁶ | MS EDSS median 2.0 (0-6.5) | NA | NT | NT | MIC-deterioration (clinician anchor) = -0.60; MIC-deterioration (patient anchor) = -1.41 | NT | NT |
| Quinn et al ¹¹ | HD (various stages) | I | NT | Test-retest ICC = 0.86-0.97 | MDC premanifest HD = 1; manifest HD = 5, early-stage HD = 4, middle-stage HD = 5, late-stage HD = 5 | NT | NT |
| Schlenstedt et al ⁵² | n = 85; PD; Hoehn and Yahr mean 2.4; UPDRS mean 40.1; 33% female, 67% male; mean age 67.2 (40-82) | I | NT | Test-retest = 0.95 | NT | 0% | 17.6% |
| Steffen and Seney ¹⁰ | PD; Hoehn and Yahr 1-4 (median 2) | I | Cronbach α = 0.86-0.87 | Test-retest ICC = 0.94 | MDC = 5 | NT | NT |
| Berg Balance Scale, acute and chronic stable mixed samples | | | | | | | |
| Knorr et al ⁵⁰ | Stroke, first data at average of 3.3 mo poststroke, second data collection at average 8.2 mo poststroke | I | NT | NT | NT | 0% at baseline, 0% at follow-up | 15% at baseline, 21% at follow-up |

Abbreviations: AIS, American Spinal Injury Association Impairment Scale; d, day; EDSS, Expanded Disability Status Scale; HD, Huntington's disease; ICC, intraclass correlation coefficient; LOA, limits of agreement; MCID, minimal clinically important difference; MDC, minimal detectable change; MDS, Movement Disorder Society; MIC, minimal important change; MS, multiple sclerosis; NA, not applicable; NT, not tested; PD, Parkinson disease; PT, physical therapist; SCI, spinal cord injury; SEM, standard error of measurement; UPDRS, Unified Parkinson's Disease Rating Scale.

BBS has been well studied in research and widely used in research and clinical practice. A standardized testing form with administration instructions is available, and commonly available equipment (chair, stopwatch, ruler, and step) is used during testing. Each of the 14 items requires that the patient perform a specific activity to challenge balance. The patient's ability to complete each item is rated on a 0- to 4-point scale, with 0 representing the inability to complete the task and 4 reflecting independent item completion. The total score is calculated by summing the scores of the 14 items, with the maximum score of 56 and the minimum score of 0.⁵⁶

Populations: The BBS can be applied across adult neurologic conditions. This action statement is based on 16 level I studies that reported data in 7 acute samples (6 stroke)^{47,49,57-60} and 1 SCI,⁴⁸ 4 chronic progressive samples (1 Huntington's disease [HD]¹¹ and 3 PD),^{10,52,62} 4 chronic stable samples (3 stroke^{51,63,64} and 1 SCI),⁶⁵ and 1 study that included a mixed acute and chronic stable sample (stroke).⁵⁰

Psychometric Data: Reliability: Three level I studies examined reliability in individuals with acute stroke and demonstrated excellent interrater reliability. Mao et al⁴⁹ assessed the total score (ICC = 0.95) and individual item interrater reliability (weighted κ = 0.92). Using a Bland-Altman plot, Pickenbrock et al⁵⁷ demonstrated a mean difference among raters of 0.13. While this demonstrates high interrater reliability, the article received a *strong* (?) reliability rating because of the statistics used in the study.⁵⁷ Excellent test-retest reliability has been demonstrated in individuals with stroke, with an ICC = 0.92.⁵⁸

Three level I studies assessed reliability in chronic stable conditions. Excellent interrater reliability (ICC = 0.953) was demonstrated in individuals with chronic SCI.⁶⁵ Test-retest reliability results were also excellent in individuals with stroke, with ICCs of 0.95⁶³ and 0.98.⁶⁴

Four level I studies examined reliability in individuals with chronic progressive conditions. Quinn et al¹¹ studied test-retest reliability of the BBS in individuals with HD, which resulted in ICCs of 0.86 to 0.97 across 5 manifestations of HD from premanifest to late-state HD.¹¹ Three additional studies of the BBS in PD suggest excellent interrater reliability (ICCs of 0.95⁶² to 0.98),⁵² and good to excellent test-retest reliability (ICCs of 0.94,¹⁰ 0.95,⁵² and 0.79-0.80) in PD.⁶²

Internal Consistency: Two level I studies demonstrated excellent internal consistency of the BBS in acute and chronic progressive conditions, with a Cronbach α of 0.92 to 0.98 in individuals with acute stroke⁴⁹ and 0.86 to 0.87 in individuals with PD.¹⁰

SEM, MDC, MCID, Ceiling, and Floor Effects: Five level I studies assessed SEM or MDC for the BBS; however, none simultaneously reported an MIC or MCID. Thus, measurement error was rated as a *strong* (?) across the 5 studies. In participants with acute stroke, the SEM was 2.49 points,⁵⁸ whereas in chronic stroke the SEM varied from 2.4⁶⁴ to 1.68 points.⁶³ In individuals with HD (chronic progressive), the SEM was used to calculate the MDC, but was not explicitly stated in the article.¹¹ In participants with PD (chronic progressive), Hoehn and Yahr classification of 1 to 4 (median = 2), the SEM was used to calculate an MDC, but it was not explicitly reported.¹⁰

Five studies reported an MDC for the BBS. In participants with acute stroke, Stevenson⁵⁸ reported an MDC₉₅ of 7. In chronic stroke, the MDC₉₅ varied from 4.66⁶³ to 6.7 points.⁶⁴ In chronic progressive conditions, the MDC₉₅ varied based on the condition and severity. In participants with HD, the MDC varied from 1 in individuals with premanifest HD to 4 to 5 in individuals with other stages of HD.¹¹ Similarly, a study of individuals with PD demonstrated an MDC₉₅ of 5.¹⁰ Only one study reviewed determined an MIC for the BBS. In participants with MS, the MIC-deterioration with clinician and patient anchors was -0.60 and -1.41, respectively.⁶⁶

Six level I studies assessed the floor effects of the BBS. No floor effects were identified in 2 studies of individuals with acute stroke.^{59,60} In contrast, Mao et al⁴⁹ identified the presence of a floor effect that varied by time poststroke, depending on the level of acuity as follows: 14 days = 35% (of sample), 30 days = 17.3%, 90 days = 6.5%, and 180 days = 5%. Studies conducted on individuals with chronic stroke and PD (mean Hoehn and Yahr = 2.4) indicated no floor effect.^{51,52} Knorr et al⁵⁰ did not find a floor effect at 3.3 and 8.2 months poststroke.

Eight level I studies assessed ceiling effects of the BBS. In individuals with acute conditions, the presence of a ceiling effect varied by study. Ceiling effects of 36%⁴⁷ and 15%⁵⁰ of the sample were identified in subacute stroke, and 37.5%⁴⁸ in the SCI-ASIA Impairment Scale D. However, these results conflict with other data that identified 0%⁵⁹ to 4.3%⁶⁰ ceiling effect in a similar stroke population. A finding by Mao et al⁴⁹ may provide a potential reason for these conflicts, as they determined the ceiling effect varies by time poststroke, with 4.9% at 14 days, 11.8% at 30 days, 21.5% at 90 days, and 28.8% at 180 days. In individuals with chronic stroke, ceiling effects of 21%⁵⁰ and 32.1%⁵¹ have been identified. A ceiling effect of 17.6% was also identified in individuals with PD.⁵²

The strong recommendation for the BBS is based on level I evidence of internal consistency and/or reliability data, availability of information to assist in assessing changes, and floor and ceiling effect data across acute, chronic stable, and chronic progressive conditions.

Related Outcome Measures: While several other balance OMs were assessed in this CPG, the only other OM that assessed static and dynamic sitting balance in acute, chronic stable, and chronic progressive conditions was the Trunk Impairment Scale (TIS) (see Supplemental Digital Content 8, Appendix 6, available at: <http://links.lww.com/JNPT/A221>). This 10-item measure requires that a patient perform various activities in a sitting position. Two publications, including samples of acute and chronic brain injury⁶⁷ and MS,⁶⁸ demonstrated excellent reliability and established an SEM in MS. Other psychometric properties were not established. Because of the lack of psychometric evidence across categories, the TIS was not included in the core set.

Shorter BBS versions were considered (eg, BBS-3P, BBS 9, and BBS-Short form). While decreasing BBS administration time is desirable, these versions included different items and none had sufficient evidence to support use across patient populations. The FGA and other OMs that assess balance while walking were also reviewed, and have been discussed later in this CPG.

R. Research Recommendation 1: Researchers should further examine the BBS to determine its psychometric properties in neurologic conditions other than stroke, SCI, PD, HD, and MS. Properties such as SEMs, MDCs, and MCIDs/MICs should be established for individuals with scores throughout the range of the scale in all adult neurologic conditions. Specific information regarding the functional levels of individuals who may benefit from the BBS, and when to start with or transition to another OM, is needed. Determination of optimal administration timing would assist clinicians in administering the BBS within a reasonable time frame of when “real change” would be expected. Development and comprehensive testing of a BBS-Short form would decrease administration burden.

R. Research Recommendation 2: Studies on OMs that provide a comprehensive assessment of sitting balance across acute, chronic progressive, and chronic conditions are needed. These should aim to determine the psychometric properties, including reliability, and to identify information to assist in interpretation, such as MDCs and MIC/MCIDs.

B. Action Statement 2: WALKING BALANCE ASSESSMENT. Clinicians should use the Functional Gait Assessment (FGA) for adults with neurologic conditions who have goals to improve balance while walking and have the capacity to change in this area. The FGA should be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: I; recommendation strength: strong
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: moderate

Aggregate Evidence Quality and Strength: Level I; moderate. Based on 5 level I and 1 level II studies (see Supplemental Digital Content 7, Appendix 5, available at: <http://links.lww.com/JNPT/A220>).

Benefits:

- The FGA demonstrates excellent internal consistency in individuals with acute and chronic stable neurologic conditions and excellent reliability in individuals with acute, chronic progressive and chronic stable neurologic conditions. Floor and ceiling effects, and data to assist in interpretation and measuring change, such as MDC and MCID, are available for individuals with acute and chronic stable neurologic conditions.
- The FGA has high clinical feasibility, as it requires minimal equipment, is available for free, and requires less than 20 minutes to administer.
- Initial costs of purchasing equipment (eg, stopwatches and measuring device) are minimal and the required equipment is commonly available in clinical settings. The time to administer the test is less than 20 minutes.

Risk, Harm, and Cost:

- No adverse events were documented in research studies.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments: The GDG emphasizes the importance of using standardized administration and scoring procedures for measuring patients in the clinic. While no single protocol has been validated for the FGA, the GDG recommends that each facility adopt the testing protocol developed by the KT committee for this CPG (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>). We recommend review of the standard procedures and, on an annual basis, establishing consistency within and among raters using the FGA.

Intentional Vagueness: The FGA has not been assessed for internal consistency, measures of change (eg, MDC, SEM, and MCID), and floor or ceiling effects in individuals with chronic progressive neurologic conditions.

Role of Patient Preferences:

- Sixty-eight percent of consumers surveyed reported that balance was an important goal and a primary reason for seeking physical therapy services.
- Clinicians should consider the degree to which improvements in balance are achievable and important to individual patients when determining whether to administer the FGA.

Exclusions:

- Clinicians should use discretion when applying the FGA with patients who do not have explicit goals to improve balance while walking. Dynamic balance may be required to perform other related tasks that are stated in the patient’s goals; in these cases, the FGA would be appropriate to administer.
- The FGA should not be administered with patients who do not have the capacity to walk. A score of 0 should be documented in these instances.

Quality Improvement:

- Organizations may use FGA data to assess balance outcomes of individuals and groups with neurologic conditions receiving rehabilitation.
- FGA scores may be used to describe the effectiveness of physical therapy services for adults with neurologic conditions.

Implementation and Audit:

- The FGA is intended to assess balance while walking, and has demonstrated a ceiling effect in individuals with balance and vestibular deficits seen in a tertiary care center.⁶⁹ If a patient demonstrates a high score (near 30 out of 30), or is likely to do so, the clinician may need to select a more challenging OM to assess changes over time.
- If a patient is unable to ambulate, but has goals and capacity to improve balance, a baseline score of 0 should be documented on the FGA.
- For patients who perform well on the FGA and score near the top of the scale, it may not be necessary to readminister the test.
- Clinics and organizations should establish administration consistency within and among clinicians prior to using the FGA, and this should be repeated annually.

Supporting Evidence and Clinical Interpretation (Table 8)

Administration and Conditions: The FGA is a 10-item clinician-rated test that assesses balance while walking. The items are rated on a 0- to 3-point scale, with 0 indicating severe impairment and 3 indicating normal ambulation. To score the FGA, the items are summed and a maximum total score is 30. A testing form with administration instructions is available,⁷⁰ and commonly available equipment (obstacles, stopwatch, and steps) is used during testing.

Populations: The majority of the studies reviewed for this CPG examined acute and chronic stable conditions, with only one level I study examining individuals with PD (chronic progressive).⁶² Studies reviewed included level I studies on individuals with acute and chronic stroke,⁷¹ acute and chronic vestibular dysfunction,⁷² and a level II study on acute vestibular dysfunction.⁶⁹

Psychometric Data: Reliability: Interrater, intrarater and test-retest reliability were assessed in articles reviewed for this CPG. Leddy et al⁶² demonstrated excellent interrater reliability (ICC = 0.93) in patients with PD with a mean Hoehn and Yahr score of 2.45. A lower, but acceptable, interrater reliability (ICC = 0.73) was demonstrated in a mixed sample of individuals with acute or chronic vestibular dysfunction.⁷² Excellent intrarater reliability was found in acute and chronic vestibular dysfunction (ICC = 0.94).⁷² Leddy et al⁶² found that student PTs had a slightly lower, but still excellent interrater reliability, with ICC = 0.80 as compared

with practicing PTs (ICC = 0.90). Excellent test-retest reliability (ICC = 0.95) was also demonstrated in a mixed sample of individuals with acute or chronic stroke.⁷¹

Internal Consistency: Two studies (levels I and II) assessed internal consistency of the FGA. Both studies demonstrated excellent internal consistency, with a Cronbach α of 0.86 in acute vestibular dysfunction⁶⁹ and 0.88 in a mixed acute and chronic vestibular population.⁷⁰

SEM, MDC, MCID, Ceiling, and Floor Effects: Two studies of levels I and II evidence assessed the MDC and/or MDC% of the FGA, but neither study reported an MCID; the methodological quality ratings were *strong* (?)⁷¹ and *moderate* (?),⁶⁹ respectively. In participants with mixed acute and chronic stable conditions, Lin et al⁷¹ calculated an MDC of 4.2. In individuals with acute vestibular dysfunction, the SEM was utilized to determine the MDC of 6; however, the SEM was not explicitly reported.⁶⁹

Two studies (one level I and one level II) assessed the FGA for ceiling and/or floor effects. In individuals with acute vestibular dysfunction, the ceiling effect was 25%.⁶⁹ A much lower ceiling effect of 0% to 5.7% and a floor effect of 0% to 2% were found in a mixed sample of individuals with acute or chronic stroke.⁷¹ It is important to note that these studies were both completed in outpatient care settings. The presence of floor or ceiling effects in an inpatient setting has not been assessed.

The core set recommendation for the FGA was based on levels I and II evidence in acute conditions, and level I

TABLE 8. Evidence Table, Functional Gait Assessment

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|---|--|-------------------|--------------------------|--|--------------------------------|---------------|-----------------|
| Functional Gait Assessment, acute samples | | | | | | | |
| Marchetti et al ⁶⁹ | Vestibular (tertiary care center) | II | Cronbach $\alpha = 0.86$ | NT | MDC = 6 | NT | 25% |
| Functional Gait Assessment, chronic progressive samples | | | | | | | |
| Leddy et al ⁶² | PD (mean Hoehn and Yahr 2.45) | I | NT | Interrater ICC = 0.93 Test-retest ICC = 0.80 (student), 0.91 (PT) | NT | NT | NT |
| Functional Gait Assessment, mixed acute and chronic stable samples | | | | | | | |
| Lin et al ⁷¹ | Stroke (outpatient rehabilitation) | I | NT | Test-retest ICC = 0.95 | MDC = 4.2 MDC% = 14.1 | 0%-2% | 0%-5.7% |
| Nilsagård et al ⁷² | Vestibular | I | Cronbach $\alpha = 0.88$ | Intrarater ICC = 0.94 Interrater ICC = 0.73 | NT | NT | NT |
| Abbreviations: ICC, intraclass correlation coefficient; MCID, minimal clinically important difference; MDC, minimal detectable change; NT, not tested; PD, Parkinson disease; PT, physical therapist. | | | | | | | |

evidence in chronic stable and chronic progressive conditions. Data to assist with measuring change are lacking in chronic progressive conditions. Therefore, the FGA received an aggregate recommendation rating of moderate.

Related Outcome Measures: Several OMs that assess balance while walking were reviewed for this CPG, and 4 had sufficient evidence to be considered for the core set. While the FGA had the highest-quality evidence across patient categories, the Dynamic Gait Index (DGI), Mini-Balance Evaluation Systems Test (Mini-BESTest), and Timed Up and Go (TUG) were also considered. The level of evidence for each measure is available (see Supplemental Digital Content 7, Appendix 5, available at: <http://links.lww.com/JNPT/A220>). The DGI (see Supplemental Digital Content 9, Appendix 7, available at: <http://links.lww.com/JNPT/A222>) met the criteria for the core set, but there were conflicting results from reliability studies. In a level I study with individuals with acute vestibular deficits, interrater reliability of the DGI was a κ of 0.64, with individual items ranging from 0.35 to 1.0,⁷⁴ whereas studies on PD⁷⁵ and stroke⁷¹ demonstrated test-retest ICCs of 0.84⁷⁵ and 0.94.⁷¹ The FGA was developed as a modification of the DGI; both OMs include the following items: gait level surfaces, changes in gait speed, gait with horizontal head turns, gait with vertical head turns, gait with pivot turn, step over obstacle, and stairs. Unlike the DGI, the FGA includes gait with narrow base of support, gait with eyes closed, and ambulating backward. The DGI includes step around obstacles, not included in the FGA. The FGA provides more specific operational definitions for its items. For example, the DGI indicates that the patient must have “good speed” to achieve a score of 3/3, but the FGA indicates the item must be completed in less than 5.5 seconds. A modified version of the DGI⁷⁶ was also assessed in this CPG; however, it did not have enough evidence to be considered for the core set. In summary, the FGA was selected instead of the DGI for inclusion in the core set for the following reasons: better reliability across acute, chronic stable and chronic progressive populations; inclusion of clinically relevant balance items of gait with narrow base of support, gait with eyes closed, and ambulating backward; and improved response categories to facilitate consistency in OM administration.

The Mini-BESTest (see Supplemental Digital Content 10, Appendix 8, available at: <http://links.lww.com/JNPT/A223>) was considered for inclusion in the core set of OMs; however, it did not meet the established criteria. Data existed from 1 level I study in acute conditions,⁶⁰ 2 level I studies in chronic progressive conditions,^{52,77} and 1 level I study in a chronic stable condition.⁵¹ No data were available on internal consistency, reliability, and measures of change (eg, MDC and MCID) in participants with acute conditions. Reliability was studied in chronic progressive conditions, but internal consistency and measures of change (eg, MDC and MCID) were not examined.

The TUG (see Supplemental Digital Content 11, Appendix 9, available at: <http://links.lww.com/JNPT/A224>) was considered for the core set, with a total of 9 level I studies meeting review requirements. Although the majority of the evidence was from participants with chronic progressive conditions (HD,¹¹ MS,⁷⁸ PD,^{10,75,79} and postpoliomyelitis),⁸⁰ the TUG showed excellent reliability. In participants with stroke,^{50,63,81} 3 articles described the reliability, MDC,

or ceiling and floor effects of the TUG. In participants with acute stroke,⁵⁰ only floor and ceiling effects of the TUG were established. Furthermore, the TUG includes a sit-to-stand transfer, walking speed, and turning, all of which are represented in other core set measures. Given the lack of reliability data in acute conditions and the overlap with other core set measures, the TUG was not selected for the core set.

R. Research Recommendation 3: Specific information regarding the functional levels of individuals who may benefit from the FGA and when to start with or transition to another OM is needed. Determination of optimal administration timing would assist clinicians in administering the FGA within a reasonable time frame of when real change can be expected. Development and psychometric testing of a FGA short-form would decrease administration burden.

R. Research Recommendation 4: Studies are needed to examine other OMs, such as the Mini-BESTest and the TUG, in individuals with acute, chronic progressive, and chronic stable neurologic conditions. While the FGA had enough evidence to support its inclusion of the core set, more comprehensive measures of standing and walking balance should be tested to ensure a complete comparison against the FGA. Properties such as reliability, internal consistency, measurement error, floor and ceiling effects, MDCs, and MIC/MCIDs should be established across neurologic conditions.

A. Action Statement 3: BALANCE CONFIDENCE ASSESSMENT. Clinicians should use the ABC Scale to assess self-reported changes in balance confidence in adults with neurologic conditions who have goals and the capacity to change in this area. The ABC should be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: I; recommendation strength: strong
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

Aggregate Evidence Quality and Strength: Level I; strong. Based on 3 level I studies (see Supplemental Digital Content 7, Appendix 5, available at: <http://links.lww.com/JNPT/A220>).

Benefits:

- The ABC demonstrates excellent internal consistency and has data to assist in measuring changes in individuals with acute, chronic progressive, and chronic stable neurologic conditions. Reliability has been assessed in a chronic progressive condition. Floor and ceiling effects, and information to assist in test result interpretation (eg, MDC), are available for individuals with acute, chronic progressive, and chronic stable neurologic conditions.
- The ABC has high clinical feasibility, as it is a patient-reported measure, requires only a writing utensil, is free to administer, and requires minimal time (5-10 minutes⁸²).

- The time cost associated with this measure is minimal, as patients may be able to independently complete the ABC prior to their initial clinical visit.

Risk, Harm, and Cost:

- No adverse events or financial costs were documented in research studies.
- There may be a potential burden to patients, as the ABC is a patient-reported measure.
- The tool is available in English, Turkish, and Spanish, so there is a risk of misinterpretation of items for those who are not fluent in these languages.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments:

- The GDG emphasizes the importance of using standardized administration and scoring procedures for measuring patients in the clinic. While no single protocol has been used for the ABC, we recommend that each clinical site adopt the testing protocol developed by the CPG KT Committee (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>). We recommend review of the standard procedures and, on an annual basis, establishing consistency within and among raters using the ABC.
- Standardization procedures should be reviewed on an annual basis.
- Administration of both clinician-rated and patient-reported measures may provide a more comprehensive assessment of balance confidence than administering only a clinician rated measure.¹⁵

Intentional Vagueness:

- The ABC asks individuals to rate confidence in balance while doing several tasks at home and community. Individuals with a recently diagnosed neurologic condition may not have experience with these specific tasks since the onset of the condition. Clinicians should begin administering the ABC when it is appropriate for the patient.
- Individuals with lack of insight into impairments may have difficulty accurately answering the ABC questions.

In these cases, clinicians should use their judgment to determine appropriateness of administering this test.

- Patients with hand impairments may require assistance with recording their responses to the ABC.

Role of Patient Preferences:

- Sixty-eight percent of consumers surveyed reported that balance was a common reason for seeking a PT referral.
- Clinicians should consider the degree to which improvements in balance are achievable and important to their individual patients when determining whether to administer the ABC.

Exclusions:

- Clinicians should use discretion when applying the ABC with patients undergoing neurologic rehabilitation who do not have goals to improve balance confidence.

Quality Improvement:

- Use of a single measure across clinical settings will facilitate communication among clinicians and more accurately reflect changes in a patient’s perceived balance confidence over time.
- Organizations may use data collected from the ABC to assess changes in balance confidence in individuals with neurologic conditions receiving rehabilitation.
- ABC scores may be used to describe the effectiveness of physical therapy services for increasing balance confidence perceptions in adults with neurologic conditions.

Implementation and Audit:

- While the ABC did not demonstrate a substantial ceiling effect, if a patient demonstrates a score near 100%, the clinician may stop using the OM for the purpose of measuring change over time.

Supporting Evidence and Clinical Interpretation (Table 9)

Administration and Conditions: The ABC is a patient-reported OM that assesses a person’s perceived confidence in performing functional activities without becoming unsteady or falling. The stem, “How confident are you that you will

TABLE 9. Evidence Table, Activities-specific Balance Confidence

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|--|---|-------------------|----------------------------------|-----------------------------|--------------------------------|---------------|-----------------|
| Activities-specific Balance Confidence, chronic progressive samples | | | | | | | |
| Jonasson et al ⁸³ | PD % self-rated severity mild 24%, moderate 64%, severe 13% | I | Cronbach $\alpha = 0.98$ | Test-retest ICC = 0.86 | SEM = 11% | 0% | 4.9% |
| Steffen and Seney ¹⁰ | PD Hoehn and Yahr 1-4 (median 2) | I | Cronbach $\alpha = 0.95-0.96$ | Test-retest ICC = 0.94 | MDC = 13; SDD = 30.5% | NT | NT |
| Activities-specific Balance Confidence, acute and chronic stable mixed samples | | | | | | | |
| Salbach et al ⁸⁴ | Stroke | I | Cronbach $\alpha = 0.94$ | NT | SEM = 5.05 | 0% | 0% |
| Abbreviations: ICC, intraclass correlation coefficient; MCID, minimal clinically important difference; MDC, minimal detectable change; NT, not tested; PD, Parkinson disease; PT, physical therapist; SEM, standard error of measurement; SDD, smallest detectable difference. | | | | | | | |

not lose your balance or become unsteady when you ...?" leads to 16 items. Each item is rated on a 0% to 100% scale, and the total score is calculated by adding item scores and dividing by 16 (eg, the number of items). The resulting scores range from 0% to 100% and reflect overall perceived confidence. The ABC is a self (patient)-report measure; however, questions can be read to an individual and the responses recorded. One study used a mailed version of the ABC, but did not provide any details about instructions related to the methods to complete the scale.⁸³ Two studies were conducted in a laboratory setting, but did not provide details about the ABC test administration.^{10,84}

Populations: The ABC has been tested in individuals with acute, chronic progressive, and chronic stable conditions. Two level I studies examined individuals with PD,^{10,83} and 1 level I study included a mixed sample of individuals with acute and chronic stroke.⁸⁴

Psychometric Data: *Reliability:* Test-retest reliability was assessed in individuals with PD in 2 level I studies; both demonstrated excellent reliability, with ICCs ranging from 0.86⁸³ to 0.94.¹⁰ Reliability has not been assessed in acute or chronic stable conditions.

Internal Consistency: In a sample with acute or chronic stroke, Salbach et al⁸⁴ demonstrated excellent internal consistency (Cronbach $\alpha = 0.94$). In 2 studies on individuals with PD of various levels of impairment, the Cronbach α ranged from 0.95 to .96⁸⁰ to 0.98.⁸³

SEM, MDC, MCID, Ceiling, and Floor Effects: SEM was assessed in 3 level I studies, with results stated in 2 studies. In individuals with mixed acute and chronic stable conditions, the SEM was 5.05.⁸⁴ In PD, Steffen and Seney¹⁰ identified an SEM of 13% and the smallest detectable difference of 30.5%. Jonasson et al⁸³ calculated an MDC of 11%. While this MDC was relatively close to the SEMs reported in individuals with PD, Steffen and Seney¹⁰ reported a substantially higher MDC of 30% in a similar sample. When applying these data in clinical practice, the patient should be similar to the sample studied.

Floor and ceiling effects of the ABC have been reported in individuals with acute and chronic stroke and in PD. In a mixed sample of individuals with acute or chronic stroke, no floor or ceiling effects were identified (0%).⁸⁴ In individuals with PD (self-rated severity, mild 25%, moderate 64%, severe 13%), no floor effects and minimal ceiling effects (4.9%) were identified.⁸³

The strong recommendation for the ABC is based on level I evidence of internal consistency and/or reliability data, and availability of data to assist in measuring change across acute, chronic stable, and chronic progressive conditions.

Related Outcome Measures: No other patient-reported OMs of balance had sufficient literature to be considered for the core set. The Falls Efficacy Scale-International had evidence to support its use in acute and chronic progressive conditions (see Supplemental Digital Content 12, Appendix 10, available at: <http://links.lww.com/JNPT/A225>). In 3 separate level I studies, reliability, internal consistency, and data to assist in measuring changes were established.^{83,85,86} Floor and ceiling effects and MDCs have also been published. This OM has also been translated and tested in many different languages. Because of the lack of evidence to support the

use of this measure with individuals who have chronic stable conditions, it was not recommended for the core set.

R. Research Recommendation 5: Studies are needed to determine the psychometric properties (eg, reliability) of the ABC in acute, chronic progressive, and chronic stable neurologic conditions. Furthermore, information to assist clinicians in interpreting the results of the ABC, such as MDCs and MIC/MCIDs, should be established across neurologic conditions. Specific information regarding the characteristics of individuals who may benefit from the ABC is needed.

R. Research Recommendation 6: Studies are needed to examine other OMs, such as the Falls Efficacy Scale International, in individuals with acute, chronic progressive, and chronic stable neurologic conditions. While evidence supports the inclusion of the ABC in the core set, other patient-reported measures of balance should be studied to ensure a comprehensive comparison to the ABC. Properties such as reliability, internal consistency, measurement error, floor and ceiling effects, MDCs, and MIC/MCIDs should be established across neurologic conditions.

B. Action Statement 4: WALKING SPEED ASSESSMENT. Clinicians should use the 10 meter Walk Test (10mWT) for adults with neurologic conditions who have goals to improve walking speed and have the capacity to change in this area. The 10mWT should be administered (per the protocol by Steffen and Seney¹⁰ as adapted by the CPG KT Committee) under the same test conditions at admission, discharge, and, when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: V; recommendation strength: best practice
- Chronic stable conditions: Evidence quality: I; recommendation strength: strong
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

Aggregate Evidence Quality and Strength: Level I; strong. Based on 8 level I studies reporting reliability and/or data to assist in measuring changes in acute, chronic stable, and/or chronic progressive conditions, 2 level I studies reporting ceiling and floor effect data in acute, and 1 study reporting only MIC data in a chronic progressive condition (see Supplemental Digital Content 7, Appendix 5, available at: <http://links.lww.com/JNPT/A220>).

Benefits:

- The 10mWT demonstrates excellent reliability in individuals with chronic progressive and chronic stable neurologic conditions. Data to assist in interpretation and measuring change exists in acute, chronic progressive, and chronic stable populations.
- Floor and ceiling effects have been assessed in individuals with acute neurologic conditions. Information to assist in test result interpretation, such as MDC and MIC, is available for individuals with acute, chronic stable, and chronic progressive neurologic conditions.
- The 10mWT requires minimal equipment (eg, stopwatch and equipment for measuring walkway distance),

which is likely available in clinical settings or can be purchased at a low cost. There is a minimal time cost associated to administer the test (<5 minutes).

Risk, Harm, and Cost:

- No adverse events were documented in research studies.
- Administering the 10mWT has minimal risks, provided the patient's vital signs are monitored and appropriate guarding is used.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments:

- The GDG emphasizes the importance of using standardized administration and scoring procedures for measuring patients in the clinic. While no single protocol has been used for the 10mWT, Quinn et al¹¹ and Steffen and Seney¹⁰ described standardized procedures. The GDG recommends the protocol by Steffen and Seney because both comfortable and fast speeds were tested, providing an assessment of the patient's ability to alter gait speed. In addition, Steffen and Seney used a shorter walkway (the 10-m as compared with the 14m walkway used by Quinn et al), which may be more feasible in smaller spaces. This protocol has also been adapted by the ANPT CPG KT Committee (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>). We recommend review of the standard procedures and, on an annual basis, establishing consistency within and among raters using the 10mWT.
- Walking safety may be more of a priority in acute and subacute rehabilitation to prepare for discharge, whereas walking speed may be a higher priority thereafter.
- Community ambulation requires the ability to ambulate at various speeds. The 10mWT enables the assessment of comfortable and fast walking; therefore, it is a useful measure to determine a patient's ability to resume community ambulation.

Intentional Vagueness: It is possible that authors of the studies reviewed used different administration procedures, resulting in some variability in the 10mWT protocols used among studies.

Role of Patient Preferences: Eighty-eight percent of consumers surveyed expressed that it was *important to improve walking* and 83% reported that *difficulty with walking* was a primary reason for seeking physical therapy.

Exclusions: The 10mWT is not appropriate for patients who do not have the capacity to walk. The GDG recommends that a score of 0 m/second be documented for patients who are unable to walk at a given point in time, but who have goals and the capacity to walk in the future.

Quality Improvement:

- Use of a single measure across clinical settings will facilitate communication among clinicians and enable assessment of changes in a patient's gait speed over time.
- Identifying a patient's capacity to return to specific activities requiring various gait speeds may be enhanced when using the 10mWT.

- Standardizing a gait speed measure for patients with neurologic conditions within and across clinical settings will enable comparative outcomes for quality improvement initiatives. Because scores may differ based on testing protocol, it may be difficult to compare data collected in different facilities unless the protocol is also specified. Individual organizations should use the CPG-recommended standardized protocol by Steffen and Seney¹⁰ to assess aggregate data for their patients. In cases when the protocol cannot be used, the modifications to the OM administration should be documented.

Implementation and Audit:

- The GDG recommends that clinicians use the protocol by Steffen and Seney,¹⁰ which has been adapted by the CPG KT Committee.
- For patients who are unable to walk at admission but have goals and the capacity to improve in this area, a score of 0 m/second should be documented to track patient change as ambulatory ability improves.
- The distance of the 10mWT is short and the use of assistive devices is permitted, which facilitates its use across functional levels and environments (eg, home). The type of device must be documented.
- Clinics and organizations should establish administration consistency within and among clinicians prior to using the 10mWT, and this should be repeated annually.

Supporting Evidence and Clinical Interpretation (Table 10)

Administration and Conditions: The 10mWT involves measuring the time it takes for a person to walk the distance, with results typically reported in meters/second (m/s). The patient's ability to walk at both comfortable and fast speeds can be measured, and assistive devices can be used. Quinn et al¹¹ and Steffen and Seney¹⁰ have described detailed administration procedures. Both used a walkway length of 10 m, but varied in their measurement of the entire walkway¹¹ versus the central 6 m.¹⁰ Quinn et al¹¹ also measured the number of steps taken during the test. Both Quinn et al¹¹ and Steffen and Seney¹⁰ administered 2 trials; Quinn et al¹¹ reported separate time data on each trial whereas Steffen and Seney¹⁰ averaged the time from the 2 trials.

The 10mWT protocol by Steffen and Seney¹⁰ is recommended by the GDG. This protocol assesses the time to the nearest 100th of a second to walk the central 6 m of a 10-m walkway at the patient's comfortable and fast walking speeds. The time starts when any part of the foot crosses the plane of the tapeline and ends when any part of the foot crosses the plane at the 6-m mark. Two trials are administered at the comfortable speed, with the instruction "walk at your own comfortable speed and stop when you reach the far line," followed by 2 trials at the fast speed, with the instruction "walk as fast as you can safely walk." The 2 trials, for each speed, are averaged and the 2 gait speeds are documented in meters/second. Use of an assistive device is permitted and should be documented. CPG KT Committee adaptations are located online at: <http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg/core-measures>.

TABLE 10. Evidence Table, 10 meter Walk Test

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCS AND MCDs | FLOOR EFFECTS | CEILING EFFECTS |
|---|---|-------------------|----------------------|---|---|------------------------------------|-----------------|
| 10 meter Walk Test acute samples | | | | | | | |
| Lemay and Nadeau ⁴⁸ | SCI; AID D | I | NA | NT | NT | NT | 0% |
| Perera et al ⁸⁸ | Stroke | I | NA | NT | “Substantial meaningful change” (decline) = 0.01 m/s (anchor-stairs) or 0.10 m/s (anchor-walk block) (depending on anchor); SEM = 0.04 m/s | NT | NT |
| Scrivener et al ⁸⁷ | Stroke—assessed within 48 h | I | NA | NT | NT | On admission 67%; on discharge 26% | NT |
| 10 meter Walk Test chronic stable samples | | | | | | | |
| Htiengkaew et al ⁶³ | Stroke | I | NA | Test-retest ICC = 0.96 | MDC = 0.18 m/s | NT | NT |
| Scivoletto et al ⁸⁹ | SCI; mean time since onset 24 mo; 20 nontraumatic; 12 tetraplegia, 25 paraplegic; 35 AIS D, 2 AIC C | I | NA | Intrater ICC = 0.98-0.99; interrater ICC = 0.95-0.98 | NT | NT | NT |
| 10 meter Walk Test chronic progressive samples | | | | | | | |
| Nilsagård et al ⁷⁸ | MS; EDSS 3-6 | I | NA | Test-retest ICC = 0.97 | Smallest % difference change = -23/+30 | NT | NT |
| Paltamaa et al ⁶⁶ | MS; median EDSS 2.0 (0-6.5); 88% relapsing-remitting | NA (MIC only) | NA | NT | MIC self-paced-deterioration (patient anchor) = -0.14 m/s; MIC fast-paced deterioration (clinician anchor) = -0.19 m/s; MIC fast-paced deterioration (patient anchor) = -0.11 m/s | NT | NT |
| Quinn et al ¹¹ | HD from premanifest to late state | I | NA | Test-retest ICC = 0.92-0.97 | MDC-pre-manifest HD = 0.23 m/s; manifest HD = 0.34 m/s; early-stage HD = 0.20 m/s; middle-stage HD = 0.46 m/s; late-stage HD = 0.29 m/s | NT | NT |
| Steffen and Seney ¹⁰ | PD; Hoehn and Yahr 1-4 (median 2) | I | NA | Test-retest ICC = 0.96 (comfortable speed) -0.97 (fast speed) | MDC comfortable = 0.18 m/s; fast = 0.25 m/s | NT | NT |

(continues)

TABLE 10. Evidence Table, 10 meter Walk Test (Continued)

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|--|---|-------------------|----------------------|---|--|---------------|-----------------|
| Stolwijk-Swuste et al ⁸⁰ | Postpolio with mean duration of new symptoms 10.3 y | I | NA | Test-retest ICC = 0.95 (preferred and maximum) | SDC = 1.9 m/s (preferred); 1.7 m/s (fast) | NT | NT |
| 10 meter Walk Test mixed chronic stable and chronic progressive samples | | | | | | | |
| Rossier and Wade ⁹⁰ | Various neurologic conditions; primarily BI (8); stroke (21); tumor (3); myelopathy (3); and HD (3) | I | NA | Test-retest ICC = 0.93 | NT | NT | NT |

Abbreviations: AIC, Akaike information criterion; AIS, American Spinal Injury Association Impairment Scale; BI, brain injury; EDSS, Expanded Disability Status Scale; HD, Huntington's disease; ICC, intraclass correlation coefficient; MCID, minimal clinically important difference; MDC, minimal detectable change; MS, multiple sclerosis; NA, not applicable; NT, not tested; PD, Parkinson disease; SCI, spinal cord injury; SDC, smallest detectable change.

Populations: Ten level I studies on the 10mWT across all categories were reviewed: 3 acute (1 SCI⁴⁸ and 2 stroke^{87,88}), 4 chronic progressive (1 MS⁷⁸, 1 HD¹¹, 1 PD¹⁰, and 1 postpolio⁸⁰), 2 chronic stable (stroke⁶³ and SCI⁸⁹), and a mixed sample with acute stable, and chronic progressive conditions.⁹⁰ Meaningful change data have been reported in acute (stroke)⁸⁸ and chronic progressive (MS⁶⁶) populations. Reliability has not been determined in acute neurologic conditions. Floor and ceiling effects have not been studied in individuals with chronic progressive and chronic stable neurologic conditions.

Psychometric Data: Reliability: Intrarater (ICC = 0.98-0.99) and interrater (0.95-0.98) reliabilities were reported in one study in participants with SCI (chronic stable).⁸⁹ Test-retest reliability was established (ICC = 0.96) in patients with stroke (chronic stable).⁶³ Four studies examined test-retest reliability in individuals with chronic progressive conditions, including HD (ICCs ranged from 0.92 to 0.97 across manifestations of HD),¹¹ MS (ICC = 0.97),⁷⁸ PD (ICC = 0.96 and 0.97 for comfortable and fast speeds, respectively),¹⁰ and postpolio (ICC = 0.95 for both preferred and maximum speeds).⁸⁰ In a mixed population of chronic stable and chronic progressive participants, the test-retest reliability was ICC = 0.93.⁹⁰ Collectively, these studies indicate excellent reliability of the 10mWT.

Only one study assessed interrater and intrarater reliability; this emphasizes the importance of establishing the consistency within and among clinicians within their own practice.⁸⁹ The high test-retest reliability across individuals with various neurologic conditions suggests that the 10mWT can be administered with consistent results across 2 time periods. No article established the reliability of the 10mWT in individuals with acute neurologic conditions. The reason for the lack of focus on speed in the acute phase may be related to a higher priority and emphasis on walking recovery and patient safety.

SEM, MDC, MCID, Ceiling, and Floor Effects: Data to assist in interpretation and measuring changes were reported in chronic stable (stroke; MDC = 0.18 m/s)⁶³ and chronic progressive conditions, including MS (smallest % difference change = -23/+30),⁷⁸ HD (MDC = 0.20 m/s to 0.46 m/s across HD manifestations),¹¹ PD (MDC = 0.18 m/s for comfortable and 0.25 m/s for fast speeds),¹⁰ and postpolio (smallest detectable change [SDC] = 1.9 m/s for preferred and 1.7 m/s for fast speeds).⁸⁰ A measurement error rating score of *strong* (?) was assigned to each study, due to the lack of MIC/MCID data. "Substantial meaningful change" and SEM data were established in acute stroke ("substantial meaningful change" decline = 0.01-0.10) depending on the anchor used.⁸⁸ MIC was determined in MS⁷⁸ (chronic progressive) (MIC = -0.11 to -0.19 m/s) depending on the anchor. Values for MDC vary across patient populations and within a given neurologic condition as can be seen by reviewing our evidence table. Similarly, MIC values vary depending on the selected anchor.⁶⁶ Thus, clinicians should avoid generalizing the results of one patient population to another when considering MDC and MIC. These data can assist clinicians when interpreting results of a patient's 10mWT.

Related Outcome Measures: The Rivermead Mobility Index (RMI) (see Supplemental Digital Content 13, Appendix 11, available at: <http://links.lww.com/JNPT/A226>) is a

measure that examines balance, transfers, and gait. It includes 1 performance-based item and 14 self-report items. Five level I studies on the RMI included 2 in acute stroke, reporting on internal consistency (Cronbach $\alpha = 0.93$)⁹¹ and interrater reliability (ICC = 0.92).⁹² In acute stroke, there is a floor effect (30%) at admission to inpatient rehab,⁹¹ but not at 5 weeks. Hsueh et al⁹² reported a floor effect at 14 days (40.4%), but not at 30 and 90 days; no ceiling effect was found. Test-retest reliability has been established in chronic stable (stroke; ICC = 0.96),⁹³ chronic progressive (HD; ICC ranged from 0.81 to 0.98 across HD manifestations),¹¹ and a mixed chronic stable and chronic progressive group (ICC = 0.96).⁹⁰ A smallest real difference of 2.2 was reported in stroke (chronic stable)⁹¹ and chronic progressive populations, with MDCs ranging from 1 to 5 across HD manifestations.¹¹ One level II study established a SEM of 0.49 in MS.⁹⁴ Although RMI data are available across categories, the RMI is composed of 15 items, only 5 of which pertain to gait (on level, unlevel, and stair surfaces). Thus, the RMI is not solely a measure of gait. Because consumers reported that gait was of importance, the GDG selected a gait-specific measure for the core set. Hence, the RMI was not included.

The Timed 25 Foot Walk (see Supplemental Digital Content 14, Appendix 12, available at: <http://links.lww.com/JNPT/A227>) is a measure of gait speed (eg, the time to walk 25 ft). Eight level I studies on persons with MS (chronic progressive) establish its reliability in this population, with intrarater and interrater ICC values of 0.98 and 0.99, respectively.⁹⁵ Six studies⁹⁶⁻¹⁰¹ established test-retest ICC values ranging from 0.92⁹⁶ to 0.991.⁹⁷ In addition, MIC values (ranging from -0.01 to -3.55 seconds)¹⁰² have been reported, as have SEM, MDC, and MDC% (= 1 second, 2.7 seconds, and 36%, respectively).⁹⁷ While the Timed 25 Foot Walk could have broad applicability, there is less evidence overall to support its use across populations as compared with the 10mWT.

The Walk-12 is a self-report walking measure that assesses the impact of a person's neurologic condition on walking capability. One level I study reported internal consistency (Cronbach $\alpha = 0.94$), and floor (21.7% at admission and 0.9% at discharge) and ceiling effects (0.9% at admission and 0% at discharge) in a mixed chronic stable and chronic progressive sample.¹⁰³ Further research would be beneficial, as the Walk-12 would complement the performance-based measures of gait included in the CPG.

R. Research Recommendation 7: Studies are needed to explore the reliability and clinically important change (eg, MCID) of the 10mWT in individuals with acute neurologic conditions. Clinically important change should also be determined in chronic stable conditions. Studies to determine the presence of floor and ceiling effects should be conducted in persons with chronic progressive and chronic stable conditions.

R. Research Recommendation 8: Studies are needed to examine the Walk-12 in individuals with acute, chronic progressive, and chronic stable neurologic conditions. Properties such as reliability, internal consistency, measurement error, floor and ceiling effects, MDCs, and MIC/MCIDs should be established across neurologic conditions.

B. Action Statement 5: WALKING DISTANCE ASSESSMENT. Clinicians should use the 6 Minute Walk Test (6MWT) for adults with neurologic conditions who have goals to improve walking distance and the capacity to change in this area. The 6MWT should be administered (per the Quinn et al¹¹ protocol as adapted by the CPG KT Committee) under the same test conditions at admission, and discharge, and when feasible, between these periods for patients with:

- Acute conditions: Evidence quality: V; recommendation strength: best practice
- Chronic stable conditions: Evidence quality: I; recommendation strength: moderate
- Chronic progressive conditions: Evidence quality: I; recommendation strength: strong

Aggregate Evidence Quality and Strength: Level I; moderate. Based on 5 level I studies, reporting both reliability and/or data to assist in measuring changes in chronic progressive conditions; 3 level I studies in chronic stable populations that reported reliability, but no data to assist in measuring change; and, in acute populations, 1 level I study reporting "substantial meaningful change" and SEM, but no studies that examined reliability (see Supplemental Digital Content 7, Appendix 5, available at: <http://links.lww.com/JNPT/A220>).

Benefits:

- The 6MWT demonstrates excellent reliability in patients with chronic progressive and chronic stable neurologic conditions.
- Data to assist in measuring change (eg, MIC, SEM, and MDC) have been assessed in individuals with chronic progressive neurologic conditions, and "substantial meaningful change" and SEM are available for individuals with acute conditions.
- The 6MWT has high clinical feasibility: it requires minimal equipment typically available in most settings and can be used for patients who walk with assistive devices. Only one trial is needed, limiting the time to administer the 6MWT.¹⁰⁴ Standardized procedures for test administration exist, as discussed later.
- Initial costs of purchasing equipment (eg, stopwatches, cones, and distance measuring device) are minimal and equipment is likely available in most settings. The time to instruct the patient and administer the test is less than 10 minutes, which can be minimized if the location and landmarks for conducting the test are standardized within each clinical setting.

Risk, Harm, and Cost:

- No adverse events were documented in research studies reviewed for this CPG.
- Administering the 6MWT has minimal risks, provided the patient's vital signs are monitored and appropriate guarding is used.

Benefit-Harm Assessment: Preponderance of benefit.
Value Judgments:

- The GDG emphasizes the importance of measurement reliability. Various protocols have been used for the 6MWT. To standardize administration and scoring, the GDG recommends the protocol described by Quinn et al.¹¹ This protocol has also been adapted by the

ANPT CPG KT Committee (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>). We recommend review of the standard procedures and, on an annual basis, establishing consistency within and among raters using the 6MWT.

- Home and community ambulation requires the ability to walk for lengthy periods and distances. The 6MWT can help determine a patient's ability to resume activities requiring home and community ambulation.

Intentional Vagueness: The GDG assigned an aggregate quality rating of *moderate* to this action statement because of the lack of data to assist in measuring change (eg, MDC, SEM, and MCID) in acute and chronic stable conditions, and the absence of reliability data in acute populations.

Role of Patient Preferences: Eighty-eight percent of consumers surveyed reported that it was *important to improve walking*, and 83% reported that gait difficulties were a primary reason for seeking physical therapy.

Exclusions:

- The 6MWT is not appropriate for patients who do not have the capacity to walk. The GDG recommends that a score of 0 m be documented for patients who are unable to walk at a given point in time, but who have goals and the capacity to walk.
- The 6MWT may have limited feasibility in certain settings, such as a hospital room or home environment with limited walkway space or fixed environmental barriers. Thus, clinicians will need to determine the feasibility and appropriateness of the 6MWT in specific situations. If unable to administer due to limited feasibility, the clinician should document "unable to administer" and provide an explanation in the patient's medical record.

Quality Improvement:

- Use of a single measure across clinical settings will facilitate communication among clinicians and more accurately reflect changes in a patient's walking endurance over time.
- A clinician's ability to determine a patient's capacity to return to activities requiring ambulation over long distance (eg, community settings) may be enhanced by using the 6MWT.
- Standardizing a walking endurance OM for patients with neurologic conditions within and across clinical settings will enable comparative outcomes for quality improvement initiatives. Because scores may differ based on pathway, it may be difficult to compare data collected in different facilities.

Implementation and Audit:

- The GDG recommends that clinicians use the protocol described by Quinn et al¹¹ and adapted by the CPG KT Committee described later under Administration and Conditions. The recommended walkway length of 12 m is recommended for use by the GDG as longer walkways (eg, 30-m recommended by the American Thoracic Society)¹⁰⁵ are unlikely to be feasible in all environments (eg, small clinics or a patient's home). A shorter walkway length may facilitate continued

administration of the 6MWT as a patient transitions from one service to another (eg, inpatient rehabilitation to home).

- Any deviation from the recommended protocol, including use of encouragement and physical assistance, should be documented.¹⁰⁶
- For patients who are unable to walk at admission but have goals and the capability to improve ambulatory capability, a score of 0 m should be documented. This will capture changes over time as the patient's ambulatory capability improves.
- Only one trial of the 6MWT is necessary, as there is no practice effect when administering 2 trials.¹⁰⁴
- Clinics and organizations should establish administration consistency within and among clinicians prior to using the 6MWT, and this should be repeated annually.

Supporting Evidence and Clinical Interpretation (Table 11)

Administration and Conditions: The 6MWT measures the distance an individual can walk in 6 minutes. A systematic review of timed walking tests for persons with stroke identified 36 protocols for the 6MWT.¹⁰⁶ Studies varied in regard to walkway lengths (ranging from 10 to 85 m), shape (rectangular, oval, and circular), and tested speed (fast vs comfortable). The use of encouragement during the administration of the 6MWT varied and the impact is unclear.

Only Quinn et al¹¹ described standardized procedures for the 6MWT and the protocol recommended by the GDG. The test is performed in a 12-m-long straight and unobstructed walkway located in a quiet hallway or open area. A turnaround point should have clear markings at each end, about 124-cm wide (eg, 2 cones width). The patient should be well rested before this test. With the patient seated, the test is explained as specified by Quinn et al,¹¹ contraindications are checked, and resting heart rate is measured. The patient is instructed to walk up and down the walkway continuously without slowing, as able, for 6 minutes. Mobility aids may be used and must be documented. The patient stands and resting dyspnea (using the Borg scale) is measured. Encouragement (eg, "you're doing a good job and you have 5 minutes left") is given after each minute of the test; no other communication should occur during the test. The patient may rest at any time, but the stopwatch remains running and the number of rests and the total rest time are recorded. Distance in meters, walked at 1, 3, and 6 minutes, is recorded, as is the patient's heart rate before and after the test.

Various walkway lengths, ranging from 10 to 50 m, have been used.⁸⁹ Pathway distance has been shown to impact distance walked, with longer walkways resulting in greater distances walked,⁸⁹ suggesting the importance of using a consistent pathway within and across patients in a given clinical setting.

Administration procedures for the 6MWT are clinically feasible with minimal low-cost equipment required (eg, stopwatch and equipment for measuring walkway distance), typically available in most clinical settings. Patients may use assistive devices during the 6MWT, which enables use of the measure across patients at various functional levels. Only one trial is required, as there is no practice effect of 2 trials.¹⁰⁴

TABLE 11. Evidence Table, 6-Minute Walk Test

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|--|---|-------------------|----------------------|---|--|---------------|-----------------|
| 6-min Walk Test acute samples | | | | | | | |
| Perera et al ⁸⁸ | Stroke; subacute | I | NA | NT | “Substantial meaningful change” = 21 m (anchor-stairs); = 54 m (anchor-walk block); SEM = 22 m | NT | NT |
| 6-min Walk Test chronic stable samples | | | | | | | |
| Liu et al ¹⁰⁴ | Stroke | I | NA | Test-retest ICC = 0.98 | NT | NT | NT |
| Ng and Hui-Chan ⁸¹ | Stroke | I | NA | Test-retest ICC = 0.98 | NT | NT | NT |
| Scivoletto et al ⁸⁹ | SCI | I | NA | Intrarater ICC = 0.99; Interrater ICC = 0.99 | NT | NT | NT |
| 6-min Walk Test chronic progressive samples | | | | | | | |
| Baert et al ¹⁰² | MS; mild to severe | I | NA | NT | MIC improvement (patient anchor): 21.56 m (whole group); 26.86 m (EDSS ≤4; 17.39 m (EDSS 4.5-6.5); SRC _{individual} 67.22 m (whole group); 42.86 m (EDSS ≤4; 75.42 m (EDSS 4.5-6.5). MIC improvement (clinician anchor) = 9.06 m (whole group); 6.90 m (EDSS ≤4; 9.87 m (EDSS 4.5-6.5); SRC _{individual} = 68.32 m; (whole group); 56.53 m (EDSS ≤4; 73.98 m (EDSS 4.5-6.5) | NT | NT |
| Learmonth et al ⁹⁷ | MS (79% relapsing remitting; 12% secondary progressive; 9% primary progressive); mean disease duration 11.8 (0.5-32); mean EDSS 3.5 (range 0-6.5) | I | NA | Test-retest ICC = 0.959 | SEM = 32 m; MDC = 88 m; MDC = 20% | NT | NT |
| Modl et al ⁹⁸ | MS; 82% RR | I | NA | Test-retest ICC = 0.959 | NT | NT | NT |

(continues)

TABLE 11. Evidence Table, 6-Minute Walk Test (Continued)

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|---------------------------------|--|-------------------|----------------------|-----------------------------|---|---------------|-----------------|
| Paltamaa et al ⁶⁶ | MS; median EDSS 2.0 (0-6.5); 88% relapsing-remitting | NA (MIC only) | NA | NT | MIC-deterioration (clinician anchor) = -55.06 m; MIC-deterioration patient anchor) = -53.35 m | NT | NT |
| Quinn et al ¹¹ | HD from premanifest to late state | I | NA | Test-retest ICC = 0.86-0.98 | MDC-premanifest HD = 39.22 m; manifest HD = 86.57 m; early-stage HD = 56.6 m; middle-stage HD = 126.14 m; late-stage HD = 70.65 m | NT | NT |
| Steffen and Seney ¹⁰ | PD; Hoehn and Yahr 1-4 (median 2) | I | NA | Test-retest ICC = 0.96 | MDC = 82 m | NT | NT |

Abbreviations: EDSS, Expanded Disability Status Scale; HD, Huntington's disease; ICC, intraclass correlation coefficient; MCID, minimal clinically important difference; MDC, minimal detectable change; MIC, minimal important change; MS, multiple sclerosis; NA, not applicable; NT, not tested; PD, Parkinson disease; RR, risk ratio; SCI, spinal cord injury; SEM, standard error of measurement; SRC, smallest real change.

Populations: The 6MWT is appropriate for use in patients with any neurologic condition. Nine level I studies reported data on the 6MWT, including 5 samples with chronic progressive conditions (1 HD,¹¹ 1 PD,¹⁰ and 3 MS^{97,98,102}), 3 samples with chronic stable conditions (1 SCI⁸⁹ and 2 stroke^{81,104}), and 1 in acute populations.⁸⁸ One study reported “substantial meaningful change” and SEM in acute (stroke) populations;⁸⁸ another reported MIC in chronic progressive (MS)⁶⁶ populations.

Psychometric Data: Reliability: Intrarater and interrater reliability (both ICCs = 0.99) were reported in participants with SCI (chronic stable).⁸⁹ Test-retest reliability has been established in chronic progressive conditions, including HD (ICCs ranged from 0.86 to 0.98 across manifestations of HD),¹¹ PD (ICC = 0.96),¹⁰ and MS (ICC = 0.959).^{97,98} Two studies established ICCs = 0.98 in participants with stroke (chronic stable).^{81,104} Collectively, these studies indicate excellent reliability of the 6MWT, with the great majority achieving the preferred reliability of 0.90 or better.

Only one study⁸⁹ assessed both interrater and intrarater reliability; this emphasizes the importance of establishing the administration consistency within and among clinicians within their own practice. The high test-retest reliability across participants with various neurologic conditions suggests that the 6MWT can be administered with consistent results across 2 time periods. The reliability of the 6MWT in individuals with acute neurologic conditions was not assessed in any study.

SEM, MDC, MCID, Ceiling, and Floor Effects: “Substantial meaningful change” and SEM data have been reported in participants with acute stroke.⁸⁸ SEM and/or smallest real change (SRC) data have been reported in individuals with chronic progressive conditions, including HD,¹¹ PD,¹⁰ and MS.^{97,102} Paltamaa et al⁶⁶ reported MIC data in persons with MS. Only one study¹⁰² was rated *strong*, as both SRC and MIC data were reported; the other studies^{10,11,97} were rated *strong* (?) due to the lack of MIC/MCID data. Nevertheless, data exist to assist clinicians when determining changes in a patient's 6MWT score. Values for interpreting change (eg, MDC and MIC) can vary across patient populations, within a given neurologic condition, or depending on the anchor used, as is seen in Table 11. This suggests that clinicians should avoid generalizing the results of one patient population to another population when considering data to assess patient change.

Data for use in assessing patient change have not been reported in individuals with chronic, stable neurologic conditions. No studies reported data for floor or ceiling effects in any category, or reliability in acute populations, although “substantial meaningful change” and SEM data exist in persons with acute stroke.⁸⁸ Therefore, the 6MWT should be used with caution in individuals with chronic stable neurologic conditions.

Related Outcome Measures: The 2-Minute Walk Test (2MWT) (see Supplemental Digital Content 15, Appendix 13, available at: <http://links.lww.com/JNPT/A228>) was reviewed, as it is a clinically feasible measure of walking distance and has applicability across patients with neurologic conditions, especially those with fatigue (eg, persons with MS). Four

level I studies provide data on persons with stroke (chronic stable), including test-retest reliability (ICC = 0.98) and MDC (13.4 m).⁶⁵ In chronic progressive samples, excellent test-retest reliability (ICC = 0.95) exists in persons with postpolio,⁸⁰ and MIC (6.81 m) and SRC (26.64 m) have been established in MS.¹⁰² Rossier and Wade⁹⁰ established the test-retest reliability (ICC = 0.97) in a mixed chronic stable and chronic progressive sample.⁹⁰ No studies reported data on the 2MWT in acute populations. The 2MWT has comparable test-retest reliability and the availability of data to interpret change, but there was less evidence overall to support its use across populations than the 6MWT.

R. Research Recommendation 9: Studies are needed to determine the intrarater and interrater reliability, and clinically important change (eg, MCID), of the 6MWT in individuals with acute neurologic conditions. Data to assist in measuring change (eg, MDC, SEM, and MCID) are needed in individuals with acute and chronic stable neurologic conditions.

P. Action Statement 6: TRANSFERASSESSMENT. Clinicians should document the transfer ability of patients who have goals to improve transfers and have the capacity to change. Documentation should include the type of transfer, level of required assistance, equipment or context adaptations, and time to complete. In patients who have goals and the capacity to improve sit-to-stand transfers, the 5 Times Sit-to-Stand (5TSTS) may be used. The 5TSTS and documentation of other transfers may be administered under the same test conditions using the protocol recommended by the CPG KT Committee at admission, discharge, and, when feasible, between these periods for adult patients with neurologic conditions. (Evidence quality: V; recommendation strength: best practice).

Aggregate Evidence Quality and Strength: Level V; best practice. Based on the GDG clinical expertise, informed by related evidence and the results of the clinician survey.

Benefits:

- Use of the 5TSTS will standardize one aspect of transfer skill across patients and may provide information about the methods a patient uses to complete the sit-to-stand transfer.
- Initial costs of purchasing equipment (eg, stopwatches) are minimal and the required equipment (eg, standard chair) is commonly available in clinical settings. The time to administer the test is less than 5 minutes.

Risk, Harm, and Cost:

- No adverse events relative to the use of the 5TSTS were documented in studies reviewed for this CPG.
- Using an OM of transfers may extend the length of the session.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments:

- 77% of clinicians surveyed indicated that transfers are an *important* construct to measure.
- Transfers (ie, moving from one position to another, such as sit to stand or wheelchair to mat) are a fundamental skill for daily life and an important component of the physical therapy care provided to patients with neurologic conditions.

- The use of OMs of transfers to assess and monitor changes in individuals with neurologic conditions reflects best practice and is consistent with the APTA Guide to PT Practice.
- The GDG emphasizes the importance of using standardized administration and scoring procedures for measuring patients in the clinic. While there is not a universally accepted protocol for the 5TSTS, we recommend that each clinical site adopt the testing protocol developed by the CPG KT Committee (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>). We recommend review of the standard procedures and, on an annual basis, establishing consistency within and among raters using the 5TSTS.

Intentional Vagueness:

- No single transfer OM had sufficient literature to support a strong or moderate recommendation for the core set; the 5TSTS received a best practice recommendation.
- Clinicians and organizations need to determine the feasibility and utility of using an OM to measure transfers in view of their patient population, facility-specific requirements and resources, and payer requirements.

Role of Patient Preferences: Consumers of neurologic physical therapy surveyed indicated that the use of standardized OMs is *very important* (58%) or *important* (35%) to their care.

Exclusions: None.

Quality Improvement: Consistent use of a transfer OM may enable clinicians and administrators to monitor the patient's change at an individual, unit, organization, or system level.

Implementation and Audit:

- Procedures for administering the 5TSTS should be standardized for use by clinicians in the facility. The GDG recommends the standard procedure developed by the CPG KT Committee for administration of the 5TSTS. The procedure is located on the ANPT Web site (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>).
- Clinics and organizations should establish administration consistency within and among clinicians prior to using the 5TSTS, and this should be repeated annually.

Supporting Evidence and Clinical Interpretation (Table 12)

Administration and Conditions: The 5TSTS measures the time it takes an individual to transfer from a seated to a standing position and back to sitting 5 times. A patient is instructed to sit with arms folded across their chest and with back against the chair. Patients with stroke may have their impaired arm at their side or in a sling. Chair heights of 43 to 45 cm have been reported in the literature. The patient is instructed to stand up and return to sitting 5 times as quickly as possible. Timing starts when the therapist says "go" and ends when the patient's body touches the chair following the fifth repetition. Administration procedures for the 5TSTS are clinically feasible with minimal low-cost equipment required (eg, stopwatch and chair), typically available in most clinical settings.

TABLE 12. Evidence Table, 5 Times Sit-to-Stand

| AUTHOR | PRIMARY POPULATION AND IMPAIRMENT LEVEL (IF AVAILABLE) | LEVEL OF EVIDENCE | INTERNAL CONSISTENCY | RELIABILITY (TYPE, RESULTS) | STANDARD ERROR; MDCs AND MCIDs | FLOOR EFFECTS | CEILING EFFECTS |
|--|--|-------------------|----------------------|-----------------------------|--------------------------------|---------------|-----------------|
| 5 Times Sit-to-Stand chronic progressive samples | | | | | | | |
| Paul et al ⁷⁹ | Parkinson disease | I | NA | Test-retest ICC = 0.91 | SEM = 0.6 s | NT | NT |
| Abbreviations: ICC, intraclass correlation coefficient; MCID, minimal clinically important difference; MDC, minimal detectable change; NA, not applicable; NT, not tested; SEM, standard error of measurement. | | | | | | | |

Populations: The 5TSTS has been studied in individuals with chronic progressive conditions (PD).⁷⁹

Psychometric Data: Reliability: One level I study reported test-retest reliability (ICC = 0.91) in chronic progressive conditions (PD).⁷⁹ Reliability has not been assessed in individuals with acute or chronic stable populations; therefore, the 5TSTS should be used with caution in these groups.

SEM, MDC, MCID, Ceiling, and Floor Effects: SEM was reported to be 0.6s in individuals with chronic progressive conditions (PD)⁷⁹; however, data are lacking to assist with measuring changes in acute or chronic stable neurologic conditions. No studies reported data for floor or ceiling effects in any category. Therefore, the 5TSTS should be used with caution in individuals with acute and chronic stable neurologic conditions.

Related Outcome Measures: The Rivermead Mobility Index-Modified (RMI-Mod) and the 30-second Chair Stand Test (30SCST) were reviewed for this CPG. The 30SCST was excluded because it did not have at least one article on reliability and data to interpret changes in neurologic populations.

Three articles supported the RMI-Mod,¹⁰⁷⁻¹⁰⁹ and these included participants with acute stroke^{107,109} and a mixed population of adults with acute and chronic progressive, but not chronic stable neurologic conditions (see Supplemental Digital Content 16, Appendix 14, available at: <http://links.lww.com/JNPT/A229>).¹⁰⁸ All articles examining the RMI-Mod were level I articles and reported internal consistency values between 0.80 and 0.96 and reliability between 0.93 and 0.99. Data to assist with measuring the change is lacking. While the RMI-Mod met the initial criteria of at least 75% of the test items matching the constructs of interest, only 50% of the test items matched the construct of transfers. For these reasons, the RMI-Mod was not recommended as a transfer OM.

R. Research Recommendation 10: Studies are needed that explore the feasibility and psychometric properties of the 5TSTS to objectively describe the transfer abilities of adults with neurologic conditions, especially those other than individuals with PD, across the continuum of care and spectrum of acuity. Further study of the 30SCST is warranted, particularly relative to reliability and data to interpret changes in individuals with neurologic conditions.

P. Action Statement 7: DOCUMENTATION OF PATIENT GOALS. Clinicians should document patient-stated goals and monitor changes in individuals with neurologic conditions using an OM such as the Goal Attainment Scale (GAS), reporting the task, the performance conditions, and the time to complete or level of independence desired. Documentation of patient goal measures should be administered under the same test conditions at least 2 times, at admission and discharge, and, when feasible, between these testing periods. (Evidence quality: V; recommendation strength: best practice)

Aggregate Evidence Quality and Strength: Level V; best practice. Based on the clinical expertise of the GDG and informed by related evidence and the results of the clinician survey.

Benefits:

- Seventy-nine percent of PTs surveyed for this CPG indicated that patient-stated goals are an *important* construct to measure.
- Using an OM of patient-stated goals will provide an opportunity for patients and clinicians to share their beliefs and values.
- An OM that assesses a patient's goals may capture activities or constructs not included in other OMs, but are important to the patient.
- Use of an OM of patient-stated goals may assist clinicians in identifying and addressing discrepancies between perceived and actual performance.

Risk, Harm, and Cost: No adverse events were documented in studies reviewed for this CPG.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments: The GDG believes that the use of OMs that assess and monitor changes in patient-stated goals in patients with neurologic conditions:

- Facilitates a patient-centered approach by integrating the patient's goals, priorities, and values into the plan of care.
- Will encourage patient engagement in the rehabilitation process.

Intentional Vagueness: No patient-stated goal OM had sufficient literature to support use across adults with neurologic conditions.

Role of Patient Preferences: Using an OM of patient-stated goals will allow patients to clearly state their preferences for the focus of physical therapy.

Exclusions: In some situations, such as patients with impaired consciousness, cognition, and/or communication,

it may be challenging to ascertain the patient's goals. A caregiver may be able to provide a proxy response.¹¹⁰⁻¹¹²

Quality Improvement: Consistent use of a patient-stated goal OM may enable clinicians to monitor the patient's perspective of change, and administrators to monitor the degree to which patients perceive change at an individual, unit, organization, or system level.

Implementation and Audit:

- Because a specific patient-stated goal OM was not recommended, the GDG recommends that each organization select an appropriate OM to assess patient-stated goals in regard to its patient population, facility-specific requirements, and resources. The GAS, a measure that was assessed during the CPG review process, has been studied in other populations (eg, pediatric and geriatric) and may be applied to adults with neurologic conditions.
- Administration procedures (eg, interview structure and use of a proxy) for the organization's chosen patient-stated goal OM could be standardized for use in the facility. Standardization regarding assessment and documentation of this construct should include reporting the task, the performance conditions, and the time to complete or level of independence desired. Patient goals should be assessed at least 2 times, at admission and discharge, and preferable in between these time periods under the same test conditions.
- When a discrepancy exists between perceived goals and actual performance or capacity, clinicians should provide education for the patient and caregiver and review the goal expectations.

Supporting Evidence and Clinical Interpretation

General Overview: Patients' and clinicians' health beliefs frequently lack agreement, affirming the need for discussions about goals and shared decision-making with patients.¹¹³ Many OMs make the theoretical assumption that all clients have similar goals leading to the challenge of capturing the unique goals of individual clients.¹¹⁴ OMs have been developed, which allow the clinician and the patient to collaboratively and systematically establish individualized goals and reach agreement on the scaling of these goals.

Patient-Stated Goals OM Considered in This CPG:

Three measures of patient-stated goals, the GAS, Canadian Occupational Performance Measure, and Patient-Specific Functional Scale, were reviewed for this CPG. The Canadian Occupational Performance Measure was excluded because it is proprietary and requires payment for use. The Patient-Specific Functional Scale was excluded because it did not have at least one citation each to support reliability and assessment of change over time. Two citations for the GAS were identified. One citation was excluded, as the subject population included a mixed geriatric population, rather than participants exclusively with neurologic conditions.¹¹⁵ A final citation used the GAS with a neurologic population (brain injury and stroke); the standardized response mean (2.2) was reported, but data were lacking for reliability.¹¹⁶ One article reported on participants with MS, but failed to meet the sample size required for inclusion in this CPG;¹¹⁷ others did not focus on adults with neurologic conditions.^{118,119}

R. Research Recommendation 11: Studies should explore the feasibility and psychometric properties, including reliability and data to assist in interpreting change (eg, MDC and MCID/MIC) of the GAS and other OMs that capture the individual goals of adults with neurologic conditions across the continuum of care and spectrum of acuity.

B. Action Statement 8: USE OF THE CORE SET OF OUTCOME MEASURES. Clinicians should use and document the OMs in the core set to assess change over time. The core set includes the Berg Balance Scale (BBS), Functional Gait Assessment (FGA), Activities-specific Balance Confidence Scale (ABC), 10 meter Walk Test (10mWT), 6 Minute Walk Test (6MWT), and 5 Times Sit-to-Stand (5TSTS) and the recommended patient goal assessment for adults who are undergoing neurologic physical therapy. The core set should be administered with patients who have goals and the capacity to improve transfers, balance, and/or gait. In cases when a patient cannot complete one or more core set OMs (eg, a patient who is unable to walk; thus, cannot complete the 10mWT or 6MWT), a score of 0 should be documented. The patient goal assessment should be administered to all adults undergoing neurologic physical therapy. The core set should be administered under the same test conditions at least 2 times, at admission and discharge, and when feasible between these periods (Evidence quality: II; recommendation strength: moderate).

Aggregate Evidence Quality and Strength: Level I; moderate. Based on 41 level I studies for the 6 OMs collectively (ABC, Berg, FGA, 6MWT, 10mWT, and 5TSTS) and 1 level II moderate study (FGA). Level I studies provide moderate to strong evidence, supporting the use of the BBS, FGA, ABC, 10mWT, and 6MWT for patients with chronic stable and chronic progressive conditions. Best practice recommendations support the use of the 10mWT (2 level I studies) and the 6MWT (1 study reporting MIC) in patients with acute conditions. A best practice recommendation was made for the 5TSTS based on 1 level I study in patients with chronic progressive conditions. In addition, a best practice recommendation was made that clinicians document patient-stated goals and monitor changes using an OM. In the survey to determine the scope of the core set, the PTs indicated that balance (97%), gait (94%), patient-stated goals (79%), and transfers (77%) were important to address, and 94% of PTs indicated they were *willing* or *very willing* to use a core set of OMs.

The aggregate strength of moderate was given because the core set measures have not been studied collectively.

Benefits:

- Consumers of PT and clinicians were in agreement that the constructs of gait, balance, transfers, and patient-stated goals are important to assess. In addition, the recovery of balance, gait, and transfers facilitate improved independence for adults with neurologic conditions. Therefore, a core set of OMs that captures these constructs addresses the needs of patients and practitioners. A comprehensive examination of all constructs, for which a patient has goals and the capacity to improve in these goals, reflects best practice.

- Use of the core set OMs for all patients with neurologic conditions and in all settings will facilitate collection of practice-based evidence to compare interventions and programs.
- Use of the core set OMs across settings will facilitate measurement of patient progress over time and across the continuum of care. For example, as a patient moves from acute care to inpatient rehabilitation to outpatient services, or as a patient's neurologic condition changes over time due to recovery or its progressive nature, the core set will reflect performance changes for the highest priority domains.
- Results of the core set of OMs can facilitate a comprehensive examination of balance, gait, and transfers to assist with clinical decision-making, including the selection of treatment interventions, modification of the plan of care, and discharge decisions.
- Standardization of entry-level DPT and residency education that includes training on the core set.

Risk, Harm, and Cost:

- No adverse events relative to the use of any of the measures in the core set were reported in studies reviewed for this CPG.
- Organizational costs to administer the core set of OMs may include the cost to alter the medical record to include data fields, time for staff training and test administration, and the cost of testing forms and equipment.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments: The GDG believes that the use of a core set of OMs will enhance patient outcomes because they will standardize measures across settings. The core set will contribute to the advancement of neurologic physical therapy through the development of a learning health system and the ability to do comparative effectiveness research.

Intentional Vagueness:

- The time frames for administration of the core set (eg, admission, interim, and discharge) may vary depending on facility-specific requirements and length of stay.
- The GDG recommends administration of the core set and sharing the measurement results with providers at the next level of care. This is particularly important when it is not feasible to administer the core set more than once within a given setting.
- The measures in the core set were assessed primarily in patients with central nervous system conditions. Therefore, clinicians should use caution when applying these measures to patients with peripheral nervous system conditions.
- Although evidence supports the use of each measure in the core set, the use of the measures collectively has not been studied.

Role of Patient Preferences:

- Consumers surveyed reported that OMs were *very important* (60%) and *somewhat important* (36%) to their care.
- Selection of the appropriate OMs for an individual patient should be based on a patient's prognosis and rehabilitation goals.

Exclusions:

- The OMs in the core set were assessed for reliability and the ability to measure change over time. They were

not assessed for other purposes (eg, prediction or impairment classification).

- In an acute care setting, in situations where a patient's length of stay is short, or when the patient is abruptly discharged from a given setting, administration of the core set at interim and discharge time frames may not be feasible.
- If a patient does not have goals or a prognosis to improve in specific construct areas, OMs should not be collected in the specific goal areas. When an OM in the core set cannot be administered (eg, due to a patient's current abilities or the patient does not have the capacity to improve or goals in the area), the clinician should document that the OM was not administered and provide a rationale (eg, not applicable due to the patient's current and expected functional capability or not applicable due to a lack of related patient goals).

Quality Improvement:

- The core set will facilitate monitoring of an individual patient's status across time and settings, and the degree to which patients change in aggregate. The data collected could be used to increase transparency of outcomes; study clinician performance relative to patient outcomes and internal and external benchmarks; improve health care processes; and generate new knowledge.

Implementation and Audit:

- The leadership of health care facilities and organizations should prioritize use of the core set and actively support implementation.¹²⁰
- Clinical facilities and organizations should standardize the administration procedures (eg, equipment, instructions, and scoring) of the core set. Efforts should be taken to standardize administration procedures and to determine the consistency within and among clinicians prior to using the core set OMs.
- Documentation of the core set should be standardized to incorporate the following designated fields into electronic health records: the BBS, FGA, Activities-specific Balance Confidence Scale, 10mWT, 6MWT, and 5TSTS. Fields to document the total score and individual items on the OM should be included. In addition, the following items may be documented when assessing transfers: transfer ability of patients who have goals to improve transfers and have the capacity to change, inclusive of type of transfer, level of required assistance, equipment or context adaptations, and time to complete. When documenting patient goals, the following items should be included: the task, the performance conditions, and the time to complete and/or level of independence desired.
- When a patient continues care at another level of service, the core set results should be shared between facilities/organizations.
- Organizations should audit documentation regularly to determine adherence to core set recommendations. If adherence levels are not acceptable, audit and feedback, use of other knowledge translation interventions, or quality improvement initiatives may improve routine administration of the core set.

Supporting Evidence and Clinical Interpretation

The concept of a core set of OMs for use in neurologic rehabilitation has been discussed for over 10 years. The APTA EDGE task forces made condition-specific recommendations for use of OMs in practice.¹²¹ The development, use, and benefits of core sets, including those organized by condition and construct, have been described.¹⁶ Measurement core sets have been described/developed for clinical and research use with individuals with stroke,¹⁰⁶ MS,¹²² cerebral palsy,¹²³ vertigo and dizziness,¹²⁴ and cerebellar ataxia.¹²⁵ Other authors have advocated for OM core sets organized by construct such as balance¹²⁶ or gait.¹⁰⁶ Most published core sets have been developed by a consensus approach, such as a Delphi process.^{123,126,127} While a modest amount has been written in support of the development of OM core sets, the literature on the demonstrated benefits of use in physical therapy is extremely limited.¹²⁸ Therefore, research is needed on the impact of the core set on patients, organizations, and the profession.

The use of OMs, including a core set of OMs, will create the foundation for learning health care in adult neurologic physical therapy, as recommended by the Institute of Medicine.²² The OMs in the core set have value individually as well as when used collectively in the care of adults with neurologic conditions. All OMs, with the exception of the 5TSTS, have documented evidence of strong internal consistency/reliability and data to assist in measuring change (eg, SEM, MDC, and MCID) from multiple level I articles across neurologic conditions and categories. Collectively, the core set OMs capture the client's status across constructs that both PTs and consumers indicated to be important or related to primary reasons for seeking physical therapy services. Furthermore, the use of patient goal assessment will provide standard reporting guidelines for patient goals. The core set will facilitate a comprehensive examination of important constructs in a patient's care and support decision-making, plan of care development, and achievement of outcomes collaboratively set by the patient and the clinician.

R. Research Recommendation 12: Studies are needed that explore the impact of using the core set of OMs on rehabilitation outcomes, including factors related to implementation (eg, time and cost). Studies should explore the impact of using the core set of OMs to support clinical decision-making across neurologic conditions and categories. Future measurement studies should be designed to meet the COSMIN requirements for excellent methodology with regard to sample size, design, and rigor of statistical analysis of psychometric properties.^{8,9,40,42}

R. Research Recommendation 13: The CPG KT Committee is developing standardized administration procedures for all 6 OMs in the core set. Studies are needed to determine the psychometric properties of these protocols across acute, chronic progressive, and chronic conditions in clinical practice.

P. Action Statement 9: DISCUSS OUTCOME MEASUREMENT RESULTS AND USE COLLABORATIVE/SHARED DECISION-MAKING WITH PATIENTS. Clinicians should discuss the purpose of OMs, results, and

how these results influence treatment options with patients undergoing neurologic physical therapy. Collaboratively, the clinician and the patient should decide how these data should inform the plan of care (Evidence quality: V; recommendation strength: best practice).

Aggregate Evidence Quality and Strength: Level V; best practice. Based on the GDG clinical expertise and informed by the consumer survey results and references in other medical fields.

Benefits: Discussing the results of OMs with patients may result in:

- Patients being more informed and engaged in rehabilitation.
- Better alignment of the plan of care with the patient's goals, preferences, and measurement results.

Risk, Harm, and Cost:

- No adverse events relative to the discussion of the results OMs were documented in the reviewed studies or in a Cochrane review on the use of decision aids (eg, interventions that support patients in shared decision-making) to inform patients about care.¹²⁹
- A discussion of the OM results may extend the length of the session. Decision aid use to support shared decision-making has been shown to mildly increase (<3 minutes) the length of a patient's consultation with a health care provider.¹¹³
- When the results of OMs are not positive and/or patients have difficulty understanding the results, patients may experience stress/discomfort and the discussions may add time to the treatment session.

Benefit-Harm Assessment: Preponderance of benefit.

Value Judgments:

- In a Cochrane review on decision aids (eg, interventions that support patients in shared decision-making), some benefits identified include increased participants' knowledge, accuracy of risk perceptions, improved alignment of values and care choices, and decreased decisional conflict from feeling uninformed.¹²⁹
- The GDG believes discussing the OM results and sharing (eg, collaboratively) decision-making would benefit patients undergoing neurologic physical therapy.

Intentional Vagueness: The time frames (eg, admission, interim, and discharge) for clinicians discussing the results of OMs and sharing decisions with patients who have neurologic conditions may vary depending on facility-specific requirements, patient length of stay, etc.

Role of Patient Preferences: The majority of the consumers surveyed reported that test results were *very important* (60%) or *important* (35%) to them.

Exclusions: In some situations (eg, a patient with an impaired level of consciousness, cognition, or communication impairment), it may be challenging to discuss the results of OMs with a patient. A caregiver may be able to participate in these discussions and decisions as a proxy.

Quality Improvement:

- Mechanisms (eg, time and space for conversation) should be developed to enable clinicians to share OM-related information with patients and caregivers.

- Sharing OM results and their impact on the plan of care may help to:
- Engage and motivate a patient in his/her physical therapy.
- Facilitate shared decision-making regarding goals and the plan of care.

Implementation and Audit:

- Organizations should develop procedures and documentation for the discussion of OM between the clinician and the patient. Articles are available to guide implementation of shared decision-making in clinical practice, and may be applied to rehabilitation clinics.¹³⁰
- Education and training on methods to discuss OM results and share decision-making may be required.
- A routine audit and feedback of documentation should be performed to ensure adherence to the recommendations of sharing OM results and decision-making with the patient.

Supporting Evidence and Clinical Interpretation

Shared decision-making is an approach in which patients and clinicians make decisions collaboratively using the patient's health information, their values and preferences, and the best available evidence. Patients are encouraged to consider examination and treatment options and communicate preferences. The clinician should collaborate with the patient to assist in selecting the best plan of care. This approach differs from one in which a clinician makes decisions on behalf of patients, and is intended to respect patient autonomy and promote engagement.^{130,131} Sixty-percent of consumers surveyed for this CPG reported that test results were “*very important*” to them. However, 13% did not recall whether their PT conducted tests and 25% reported that tests were conducted only at admission and discharge, but not in between these 2 periods. It is possible that OMs were not consistently used in the patients' care, but these data may also indicate that the consumers were not consistently informed about the use of OMs. The majority of consumers reported that the PT discussed the purpose (80%) and results (76%) of the OMs used and that the PTs explained how the OM results informed the plan of care (53%). Only 37% reported being “*very satisfied*” with the information they received. The consumers were not asked whether they shared decision-making regarding the plan of care.

These data suggest that there is a need to improve the provision of OM-related information to patients and to share decision-making about the plan of care. Providing meaningful information and sharing decisions throughout each patient's episode of care ensure that needs are met and the patient understands the role of physical therapy in his/her health care. This is particularly important, as patients' and clinicians' health beliefs may lack agreement, confirming the need for shared decision-making between clinicians and patients.¹¹³

A recent Cochrane review¹²⁹ concluded that decision aids, which provide evidence-based information to inform patients and support shared decision-making, can have a positive effect on communication between the provider and the patient. Decision aids can inform patients and improve knowledge (high-quality evidence), increase the patient's involvement in care (moderate-quality evidence), and integrate a patient's

values with care decisions (low-quality evidence). Although this review focused on decision aids for medical interventions, it may have relevance for rehabilitation practice. Similar outcomes (eg, enhanced patient involvement and knowledge) may be achieved by providing patients with explicit information about their OM results and collaboratively making decisions about their care.

R. Research Recommendation 14: Research is needed on the impact of discussing OM results and shared decision-making with patients receiving neurologic physical therapy, including the development and impact of OM-related information (eg, OM-related decision aids) on the understanding and involvement of a patient in his/her care and on the achievement of patient goals. Furthermore, studies should develop and test the use of decision aids that incorporate the core set.

Limitations

There are several limitations to this CPG. As stated, this CPG focused only on OMs to assess patient change over time. Thus, other OM uses (eg, prediction) were not considered. When critically appraising the articles, the focus was on the strength of the psychometric properties of OMs, not available administration protocols. Our review of OMs reflected the name of the measure (eg, BBS and 10mWT), not the construct (ie, of balance or gait speed). Thus, it is possible that some articles that may have been identified by construct, rather than OM name, were not identified and reviewed. In addition, it is possible that authors of the studies reviewed used different administration procedures, resulting in some variability in the protocols used among studies.

GUIDELINE IMPLEMENTATION RECOMMENDATIONS

Overview: Implementation of the action statements contained in this guideline is integral to the process of knowledge translation (KT). KT has been defined as “the dynamic and iterative process that includes the *synthesis, dissemination, exchange and ethically sound application* of knowledge to improve health, provide more effective health services and products, and strengthen the health care system.”¹³² This complex process is impacted by many variables and is most effective when efforts are multifaceted and sustained, and when they target barriers to the recommended practice. Efforts at the individual, organizational, and societal levels to support KT are critical to ensure rapid and successful CPG implementation. Organizations and clinicians should assess their own barriers and facilitators to using the CPG action statements and develop a KT plan that is tailored to overcome the identified barriers. The GDG considered the literature and input from key stakeholders related to barriers to the CPG (eg, time, cost, and training needed to administer the core set; equipment) when selecting OMs for the core set. The recommendations given next may facilitate adoption and successful use of the core set in practice. Use of KT frameworks can provide a theoretical foundation for implementation, and may lead to successful KT initiatives.¹³³⁻¹³⁷

Recommendations for Health Care Organizations and Clinicians: The GDG recommends that organizations adopt specific standardized practices related to use of this core set of OMs and documentation of patient goals in clinical practice.

- First, the core set should be used when a person undergoing neurologic physical therapy has goals and potential to improve balance, gait, or transfers.
- Patient goal documentation should adhere to the CPG recommendations. The OMs should be administered to a patient when evaluated in any setting. If a patient is unable to perform a test, but will likely be able to perform some or all of the OM at some point in the future, the patient should receive a zero on the initial test. This provides an opportunity to capture data at a later point in time, reflecting change that occurred.
- Follow-up measures should be administered at least twice, with ideal administration time being the middle of treatment and at discharge. While it is recommended to collect the core set at least once between the admission and discharge assessment, the decision to use the OMs for interim measurements is left to the discretion of the clinician and the organization. Factors such as length of stay, facility requirements, and reimbursement may impact the ability to administer the core set at times other than admission and discharge. However, an interim assessment will provide important information about whether the patient's status is changing during the episode of care and may inform intervention modifications. In cases when administration of the OMs multiple times is not feasible (eg, in acute care), the GDG recommends that the clinician administers the OM once and provide the measurement results to the next level of care.
- In health systems with several levels of care, the core set should be used throughout a patient's episode of care and measurement results should be provided to the next level of care.
- Clinicians should utilize data from the core OM set to describe progress to other health professionals (eg, letters to insurance companies, physicians, and team conference reporting).
- Documentation of the OMs should be standardized within the facility based on the recommended methods and incorporated into designated fields in the electronic health record.
- Information, such as SEMs, MDCs, and MCIDs, should be used to support decisions to alter the course of treatment and discharge from care.
- Implementation of this core set may require time for learning about the CPG and the recommended practices, comparing current practice with recommended actions, and creating a plan for CPG implementation within the organization.^{138,139} Specific protocols for administering the core set have been recommended by the GDG and CPG KT Committee (<http://www.neuropt.org/professional-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg>).

Organizations and clinicians should determine interrater and intrarater reliability of each core set measure annually

and strive to achieve an agreement of more than 0.90 reliability.¹⁴⁰⁻¹⁴² OMs with a test-retest or interrater reliability of less than 0.70 should not be used for individual patients.^{140,141} Establishing the reliability of clinicians in a clinical setting should facilitate consistent measurement of a patient's performance (eg, when more than one clinician conducts a given test on an individual patient) or when measures are taken over time (eg, at admission and discharge), and enhance a clinician's and organization's confidence in the OM results. In addition, increased reliability when using OMs may improve the clinician's ability to identify changes in function, reduce measurement error, and improve the development and modification of the plan of care. Training to ensure standardization of OM administration and skills assessment may enhance reliability.

To promote adoption of the core set, organizations should consider the use of KT interventions.¹⁴³ A copy of the CPG action statements should be kept in a location that is easy to reference. Equipment and space to administer the core set should be kept in an easily accessible location. Examination forms should be adapted to include facility-specific information, such as the location of equipment and local adaptation to testing paths, and electronic and printed versions should be made available. Initial training on administration of the core set, how to use data to guide decision-making, and methods to use core set data to collaboratively determine a plan of care with patients (eg, shared decision-making) may be required. This content should also be provided during new hire orientation. Audit and feedback¹⁴⁴ may facilitate adherence to the recommendation that OM administration occurs at admission and discharge, and preferably, at least once in between. Audit criteria should include adherence to recommended administration timing and documentation of OM interpretation and shared decision-making. Tools to assist with auditing will be developed by the CPG KT Committee, and added to the ANPT Web site. Incorporating a requirement to adhere to use of the core set into performance appraisals will promote the use of the core set as a clinical and professional expectation. Whenever possible, core set reminder systems and decision-support tools should be integrated into the electronic health system. These and other KT strategies may be used to promote adoption throughout a health care organization.

Integration With EDGE Recommendations: Six ANPT EDGE task forces predated the development of this CPG. The OM recommendations from those groups were focused on individuals with a specific neurologic condition (eg, stroke). It is the intent of the GDG that, when caring for an individual with a specific condition, clinicians integrate the core set with the recommendations from the relevant EDGE task force. The core set may be viewed as a "starting point" for measure selection, with additional condition-specific measures as recommended by the EDGE task force used to provide insight into issues specific to their patient's health condition.

ANPT KT Taskforce Will Support CPG Implementation: In collaboration with the GDG, the ANPT has developed a KT task force made up of PTs practicing in different levels of care: experts, early career PTs, supervisors, researchers, patients, and educators. Their role is to support clinicians and organizations in the dissemination and implementation

of CPGs. The primary objective of the core set KT task force is to develop implementation packages that will include KT processes, products, and tools for organizations, clinicians, and educators to use to implement the core set.

The GDG and the Practice Committee of the ANPT jointly developed and disseminated the previous objectives with an invitation to apply for membership on the task force. Interested stakeholders were asked to submit a statement of interest and a curriculum vita. The ANPT Director of Practice,

Practice Committee Chair, and GDG reviewed applications and selected members. Two task force cochairs and 7 members agreed to participate.

The process of collaboration between the task force and the GDG has begun and is anticipated to continue through 2019. As this process evolves, the KT task force, in conjunction with the GDG and the leadership of the ANPT, will finalize plans and develop multiple and diverse implementation recommendations and strategies.

SUMMARY OF RESEARCH RECOMMENDATIONS

R. Research Recommendation 1: Researchers should further examine the BBS, to determine its psychometric properties in neurologic conditions other than stroke, SCI, PD, HD, and MS. Properties such as SEMs, MDCs, and MCID/MICs should be established for individuals with scores throughout the range of the scale in all adult neurologic conditions. Specific information regarding the functional levels of individuals who may benefit from the BBS, and when to start with or transition to another OM, is needed. Determination of optimal administration timing would assist clinicians in administering the BBS within a reasonable time frame when “real change” would be expected. Development and comprehensive testing of a BBS short-form would decrease administration burden.

R. Research Recommendation 2: Studies on OMs that provide a comprehensive assessment of sitting balance across acute, chronic progressive, and chronic conditions are needed. These should aim to determine the psychometric properties, including reliability, and to identify information to assist in interpretation, such as MDCs and MIC/MCIDs.

R. Research Recommendation 3: Specific information regarding the functional levels of individuals who may benefit from the FGA and when to start with or transition to another OM is needed. Determination of optimal administration timing would assist clinicians in administering the FGA within a reasonable time frame when real change can be expected. Development and psychometric testing of an FGA short-form would decrease administration burden.

R. Research Recommendation 4: Studies are needed to examine other OMs, such as the Mini-BESTest and the TUG, in individuals with acute, chronic progressive, and chronic stable neurologic conditions. While the FGA had enough evidence to support its inclusion of the core set, more comprehensive measures of standing and walking balance should be tested to ensure a complete comparison against the FGA. Properties such as reliability, internal consistency, measurement error, floor and ceiling effects, MDCs, and MIC/MCIDs should be established across neurologic conditions.

R. Research Recommendation 5: Studies are needed to determine the psychometric properties (eg, reliability) of the ABC in acute, chronic progressive, and chronic stable neurologic conditions. Furthermore, information to assist clinicians in interpreting the results of the ABC, such as MDCs and MIC/MCIDs, should be established across neurologic conditions. Specific information regarding the characteristics of individuals who may benefit from the ABC is needed.

R. Research Recommendation 6: Studies are needed to examine other OMs, such as the Falls Efficacy Scale International, in individuals with acute, chronic progressive, and chronic stable neurologic conditions. While evidence supports the inclusion of the ABC in the core set, other

patient-reported measures of balance should be studied to ensure a comprehensive comparison to the ABC. Properties such as reliability, internal consistency, measurement error, floor and ceiling effects, MDCs, and MIC/MCIDs should be established across neurologic conditions.

R. Research Recommendation 7: Studies are needed to explore the reliability and clinically important change (eg, MCID) of the 10mWT in individuals with acute neurologic conditions. Clinically important change should also be determined in chronic stable conditions. Studies to determine the presence of floor and ceiling effects should be conducted in persons with chronic progressive and chronic stable conditions.

R. Research Recommendation 8: Studies are needed to examine the Walk-12 in individuals with acute, chronic progressive, and chronic stable neurologic conditions. Psychometric properties such as reliability, internal consistency, measurement error, floor and ceiling effects, MDCs, and MIC/MCIDs should be established across neurologic conditions.

R. Research Recommendation 9: Studies are needed to determine the intrarater and interrater reliability, and clinically important change (eg, MCID), of the 6MWT in individuals with acute neurologic conditions. Data to assist in measuring change (eg, MDC, SEM, and MCID) are needed in individuals with acute and chronic stable neurologic conditions.

R. Research Recommendation 10: Studies are needed that explore the feasibility and psychometric properties of the 5TSTS to objectively describe the transfer abilities of adults with neurologic conditions, especially those other than individuals with PD, across the continuum of care and spectrum of acuity. Further study of the 30SCST is warranted, particularly relative to reliability and data to interpret changes in individuals with neurologic conditions.

R. Research Recommendation 11: Studies should explore the feasibility and psychometric properties, including reliability and data to assist in interpreting change (eg, MDC and MCID/MIC) of the GAS and other OMs that capture the individual goals of adults with neurologic conditions across the continuum of care and spectrum of acuity.

R. Research Recommendation 12: Studies are needed that explore the impact of using the core set of OMs on rehabilitation outcomes, including factors related to implementation (eg, time and cost). Studies should explore the impact of using the core set of OMs to support clinical decision-making across neurologic conditions and categories. Future measurement studies should be designed to meet the COSMIN requirements for excellent methodology with regard to sample size, design, and rigor of statistical analysis of psychometric properties.^{8,9,40,42}

R. Research Recommendation 13: The CPG KT Committee is developing standardized administration procedures for all 6 OMs in the core set. Studies are needed to determine the psychometric properties of these protocols across acute, chronic progressive, and chronic conditions in clinical practice.

R. Research Recommendation 14: Research is needed on the impact of discussing OM results and shared

decision-making with patients receiving neurologic physical therapy, including the development and impact of OM-related information (eg, OM-related decision aids) on the understanding and involvement of a patient in his/her care and on the achievement of patient goals. Furthermore, research should develop and test the use of decision aids that incorporate the core set.

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