

A Core Set of Outcome Measures to Assess Physical Function for Adults Participating in Physical Therapist Treatment in the Hospital: A Clinical Practice Guideline

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ABSTRACT

Importance: Outcome measures (OMs) are an integral part of physical therapist practice and implementation can have a multifaceted effect on care delivery.

Objective: The objective of this project was to identify a core set of OMs for adults requiring acute care hospitalization in the setting of acute care physical therapist practice.

Design and Setting: This Clinical Practice Guideline (CPG) focuses on the assessment of physical function within the “activity” domain of the International Classification of Functioning, Disability and Health.

Main Outcomes and Measures: The CPG scope was developed with input from interested parties at multiple levels, including Academy of Acute Care Physical Therapy leadership, the CPG Working Group, and consumers of acute care physical therapist practice. A systematic review assessed psychometric data on physical function OMs that included the constructs of bed mobility, transfer ability, and ambulation. The modified Consensus-Based Standards for the Selection of Health Measurement Instruments (COSMIN-M) was used to examine methodological quality and psychometric strength for each OM. Recommended OMs in the core set met 3 criteria: addressed the established constructs, had strong psychometric properties and methodological quality, and had high clinical utility, defined as minimal time (<20 minutes), low to no cost, and minimal training required for use in clinical practice.

Results: Thirty-four OMs were initially identified in the systematic review. Fourteen OMs were considered for the final CPG. In the end, action statements 1 to 3 supported 3 OMs that comprised the acute care core outcome measure set (COMS), and action statements 4 to 8 were recommendations for supplemental OMs that may be performed as additions to augment the COMS. All action statements considered the published evidence, clinical utility, and acute care expertise from the Guideline Development Group. Research recommendations follow each summary of the evidence.

Conclusions and Relevance: The CPG provides recommendations for COMS to assess physical function in acute care physical therapist practice.

Key words: Activity Limitations; Acute Care Physical Therapy; Core Outcome Measures Set; Evaluation; Physical Function; Standardized Outcome Measures.

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INTRODUCTION

Measurement is an important process in physical therapist practice. Objective examination of an outcome through standardized outcome measures (OMs) enhances the ability to assess and monitor changes over time, particularly responses to illness and treatment, supporting better prognostication across the continuum of care.^{1–3} Implementation of OMs in practice and research have a direct impact on care delivery including improved communication between the patient and the health care professional, and between members of the interprofessional care team. Thus, objective data from OMs may support or justify the need for rehabilitation and potentially enhance prioritization, frequency, and timing of clinical care. Finally, using a core set of OMs with standardized protocols provides opportunities to perform comparative analyses within and across hospital systems. Thus, OMs are imperative for evaluating effectiveness and improving quality of care.⁴

In the acute care environment, physical therapists examine and treat patients with diverse diagnoses and comorbidities. Patients may present with impairments that encompass multiple domains of the International Classification of Functioning, Disability and Health (ICF).⁵ Identifying and utilizing appropriate OMs can be challenging because of the heterogeneity of patient presentations in the hospital. Survey data on the current use of OMs from the Academy of Acute Care Physical Therapy (AACPT) of the American Physical Therapy Association (APTA) suggests that 84% of physical therapists in acute care use at least 1 OM, primarily to assess physical function¹ and that OM implementation has increased in practice compared to prior findings in 2009.⁶ Increased utilization is likely multifactorial and may be partially explained by growth in the number of OMs available and an emphasis on evidence-based practice.^{7,8} Enhanced utilization also presents challenges, including heterogeneity of OMs and potentially inappropriate implementation, such as by modifying OM procedures. Thus, recommendations for OMs in acute care clinical practice may help to reduce unwarranted variations. Additionally, acute care environment physical therapists, educators, leaders, and administrators strongly supported development of a core set of OMs to guide physical therapy management of adult patients.¹

Physical therapists implementing OMs in the acute care environment should monitor vital signs (eg, heart rate and pulse oximetry) before, during, and after performance. Physical therapists should use appropriate clinical judgment and consider factors such as patient medication schedule, laboratory values, comorbid burden, patient clinical presentation and vital sign trends when vital signs are recorded outside physiological or recommended ranges. Physical therapists should refer to Academy of Cardiovascular and Pulmonary Physical Therapy resources⁹ for adult vital sign assessment in acute care and AACPT resources¹⁰ for establishing safety criteria with laboratory values when evaluating and treating patients with acute illness; multiple publications provide templates for developing safety screening.^{11,12} The Guideline Development Group (GDG) recognizes that different physiological and safety parameters are necessary for different patient populations which were not in the scope of this specific Clinical Practice Guideline (CPG).

Physical function and mobility frequency during hospitalization remains a strong predictor of hospital outcomes.^{13–16} Historically, health record documentation of

patient function has lagged in the acute care environment.¹⁷ Infrequent documentation of functional status is detrimental to tracking patient progress and potential for improvement, or to adequately identify patient deterioration, all of which may improve outcome prognostication, including adverse events.¹⁸ Using a core set of OMs can provide all members of the health care team with standard, consistent information and documentation of patient functional status from hospital admission through the duration of the patient's hospital stay, similar to recommendations to monitor delirium¹⁹ and perform comprehensive geriatric assessment²⁰ for older adults in the hospital. Prioritization of OMs as a standard method to document patient functional status during hospitalization will likely focus greater attention on patient safety and prevent members of the interprofessional team from failing to assess physical function prior to discharge. Additionally, consistent performance and documentation of a core set of OMs has the potential to enhance transitions of patient care to the next environment, including post-acute care and community-based rehabilitation.²¹

Scope of CPG

The purpose of this CPG is to recommend a core set of OMs to assess the “activity” domain of the ICF in adults receiving inpatient hospital physical therapist services for injury, illness, or disease. The CPG scope was established with input from leaders and members of the AACPT of the APTA. The GDG concentrated on assessment of physical function aligned with the ICF “activity” domain as the primary domain of physical therapist practice in acute care hospital settings. A systematic review of the literature on OMs in acute care physical therapist practice informed the core set. Interested parties in acute care physical therapist practice including physical therapists, physical therapist assistants, students, educators, clinical leaders and administrators who responded to a public survey identified that the core set should have high clinical utility with low cost, time efficiency, and require minimal clinician training.¹ Methodological quality, risk of bias, psychometric strength, and clinical utility all informed the final CPG action statements. A summary of the action statements of this CPG are provided in [Table 1](#).

Statement of Intent and Intended Users

The CPG action statements are intended to guide and assist clinical decision-making to improve physical therapist-directed care delivery for adult patients in the acute care environment. The recommendations are not intended to be construed or to serve as a legal standard of care. Standards of care are determined on the basis of all clinical data available for an individual patient/client and are subject to change as knowledge and technology advance, patterns of care evolve, and patient/family values are integrated. The recommendations were based on psychometric properties of OMs administered and published in the English language.

These recommendations require the following clinical caveat: The action statements specific to utilization of the core OMs for adults receiving physical therapist consultation/treatment in the hospital assume that the physical therapist has determined that physical therapist practice is appropriate for the patient on the basis of the following criteria: thorough chart review, including health care team referrals; current medications, vital signs, laboratory values, and imaging

Table 1. Summary of Action Statements for the Core Outcome Measures for Acute Care Physical Therapist Practice^a

Measures	Statement No.	Grade	Strength	Action Statement
Core set of outcome measures for adult patients in the hospital	1	A	Strong	Clinicians should use the Activity Measure for Post-Acute Care Inpatient Basic Mobility Short Form or the DeMorton Mobility Index during every physical therapist session to assess functional mobility for adult patients (≥ 18 y old) who are hospitalized for an acute or chronic illness, injury, or surgery at initial examination and hospital milestones ^b or minimally once every 7 d
	2	B	Moderate	Clinicians should assess habitual (self-selected) walking speed using the 4-m gait speed test for adult patients (≥ 18 y old) who are hospitalized for an acute or chronic illness, injury, or surgery at initial examination and hospital milestones ^b or minimally once every 7 d
	3	B	Moderate	Physical therapists should advocate for measuring mobility levels in adult patients (≥ 18 y old) who are hospitalized for an acute or chronic illness, injury, or surgery using the Intensive Care Unit (ICU) Mobility Scale or the Johns Hopkins Highest Level of Mobility at least once per day by a member of the interprofessional health care team
Supplemental measures for adult patients in the hospital	4	B	Weak to moderate	To augment the core outcome measure set (COMS), clinicians may assess physical function by selecting 1 of 4 ICU-specific outcome measures—the Chelsea Critical Care Physical Assessment Tool, the Functional Status Score for ICU, the Physical Function in the ICU Test Score, or the Perme ICU Mobility Score—at initial examination and hospital milestones ^b
	5	C	Weak	To augment the COMS, clinicians may add the 6-m walk test at initial examination and hospital milestones ^b or repeat it at minimum once every 7 d when the patient has a goal to improve functional exercise capacity
	6	C	Weak	To augment the COMS, clinicians may add the 30-s chair stand test at initial examination and hospital milestones ^b or repeat it at minimum once every 7 d when the patient has a goal to improve transfer ability with a parallel goal of improving lower extremity muscle performance
	7	C	Weak	To augment the COMS, clinicians may add the Short Physical Performance Battery at initial examination and hospital milestones ^b or repeat it at minimum once every 7 d when the patient has a goal to improve physical function
	8	C	Weak	To augment the COMS, clinicians may add the Timed “Up & Go” Test at initial examination and hospital milestones ^b or repeat it at minimum once every 7 d when the patient has a goal to improve physical function

^aThe action statements specific to the core outcome measures for adults who are hospitalized and receiving physical therapist consultation/treatment assume that the physical therapist has determined that physical therapist practice is appropriate for the patient on the basis of the following: thorough chart review, including health care team referrals, current medications, vital signs, laboratory values, imaging reports, and identification of any clinical precautions/restrictions; communication with appropriate members of the health care team, including physicians and bedside nurses; and bedside patient observation, screening, continual assessment of cognition, vital signs, functional status, and patient safety, and determination that the patient is able and willing to safely participate in each measure. ^bHospital milestones may include physical therapist reevaluation or recertification, changes in medical or physiological status, changes in functional status, ICU discharge, and prior to hospital discharge.

reports; identification of any clinical precautions/restrictions; communication with appropriate members of the health care team, including attending physician(s) and bedside nurse(s); bedside patient observation, screening, and continual assessment of cognition, vital signs, functional status, and patient safety; and determination that the patient is willing/able to safely participate in each measure.

This CPG is a summary of practice recommendations that are supported with current published literature that has been reviewed by expert practitioners and other interested parties. These parameters of practice should be considered guidelines

only, not mandates. Moreover, the CPG should not be construed as mandatory for discharge disposition and acceptance to the next facility. Adherence to these guidelines will not ensure success, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The CPG does not eliminate clinical decision making, and physical therapists should consider the evidence presented in this CPG, as well as previously published CPGs that may be directly related to specific patient populations. The ultimate decision regarding a particular clinical procedure or treatment plan must be made using the

clinical data presented by the patient/client/family, the diagnostic and treatment options available, the patient's values, expectations and preferences, and the physical therapist's and physical therapist assistant's scope of practice and expertise. The GDG suggests that significant departures from the recommendations should be documented at the time clinical decisions are made; physical therapists and physical therapist assistants are strongly encouraged to publish their clinical reasoning and results of alternative approaches.

METHODS

This core outcome measure set (COMS) was registered with the Core Outcome Measures for Effectiveness Trials initiative on June 30, 2020 (Suppl. Material 1). A glossary of terms and definitions are provided in [Supplementary Material 2](#).

GDG Team

The AACPT CPG committee invited members to volunteer on multiple Academy initiatives aimed at systematic review and development of CPGs in 2017 and 2018. Four core individuals were invited to lead the COMS, each having expertise in acute care physical therapist practice (>10 years of clinical experience), including 2 acute care rehabilitation clinical leaders and clinician educators (S.K. and T.N.) and 2 acute care academicians (K.P.M. and A.M.J.). Four acute care physical therapist residents (C.C., L.E.F., D.S., M.S.) were added in August 2020. The 4 core GDG members attended the APTA Clinical Practice Guideline Workshop in August 2020 and received funding from the AACPT in 2020 to support the development of the CPG. The GDG collaborated with 1 methodologist (S.L.K.) and consulted with an expert in psychometric properties for outcome measures (S.M.P.). S.L.K. guided the systematic review and CPG process through all phases, from concept development to dissemination. Authors of A Core Set of Outcome Measures for Adults With Neurologic Conditions Undergoing Rehabilitation² also provided periodic guidance.

Process

The GDG was charged by the AACPT CPG committee (P.O. and J.S., listed in the Acknowledgment section) to examine the literature on OM utilization in acute care physical therapist practice and determine the need for a core set with consumer input.

Target Population

This CPG targets physical therapist practice. The GDG recognize the teamwork of physical therapists and physical therapist assistants in the acute care clinical environment. Their well-coordinated physical therapist-directed services remain essential; thus, the term "clinicians" will be used in this manuscript referring to both members of that team while practicing within their scope. The CPG is specific to patients who are at least 18 years old with acute illnesses or exacerbation of chronic illnesses requiring admission to the acute care environment for observation or intervention inclusive of care in the intensive care unit (ICU), stepdown or progressive care, or any hospital floor or units which are part of an acute care hospital. The patient population is defined with intentional vagueness to promote generalizability across acute care environments. CPG exclusions include patients who are

only visiting the emergency department and those younger than 18 years. Studies of patients in the emergency department were excluded; these patients are not necessarily admitted to an acute care environment and physical therapists' roles are to screen patients during emergency department examinations which may require other assessments, such as screening for pain.²² Pediatric patients have significant differences in anatomy, physiology, and illness compared to adult patients, and thus, were excluded from this CPG.

Constructs

This CPG is based on the ICF framework "activity" domain²³ and 3 subsets related to performance of physical function: bed mobility, transfer ability, and ambulation. The activity domain, that is, physical function, was selected on the basis of data obtained in the initial survey of the COMS.¹ Balance is an important subdomain of physical function especially in the acute care setting given the recognition and risk of falls. The GDG considered balance within activity, but did not specifically target balance as a separate domain. OMs solely assessing the ICF "body function and structure" domain (eg, muscle strength) were not included. OMs with overlapping constructs that included the ICF "activity" domain were included (ie, sit-to-stand testing measuring muscle strength or endurance as well as transfer capacity).

Systematic Review

A systematic review was performed to appraise and extract data on the psychometric properties of OMs used in physical therapist practice for assessing physical function within the ICF "activity" domain in adults hospitalized for injury, surgery, illness, and disease.

Articles Included in the Systematic Review

The 3 study inclusion criteria were as follows: studies assessed at least 1 psychometric property of an OM(s) covering any of the 3 activity constructs (bed mobility, transfer ability, or ambulation); the OM was performed and published in English; and the OM was performed with adult patients in an acute care environment. The full inclusion and exclusion criteria are presented in [Supplementary Table 1](#). Responsiveness (eg, minimal important difference [MID] and floor and ceiling effects), reliability (interrater, intrarater, and test-retest), and validity (predictive and criterion/face/construct) were prioritized for the acute care environment on the basis of the modified Consensus-Based Standards for the Selection of Health Measurement Instruments (COSMIN-M) scoring criteria, GDG expertise, and input from survey responses.¹

Data Sources and Searches

The GDG collaborated with 3 medical librarians in 2 phases: initial search (inception to January 2021) and an updated search (January 2017 to March 2023). The GDG identified OMs in the literature and through *APTA Tests and Measures*²⁴ online resources to assist in development of the search strategies ([Suppl. Material 3](#)). The databases included MEDLINE (PubMed), EMBASE (Elsevier), and Cochrane Reviews (Wiley). Keywords specific to psychometrics, the acute care environment, and measurement properties were included to capture all potential OMs. Studies that only used OMs as an index or screening tool or where patients self-report their

functional status were excluded to ensure appropriate comparison of tools specific to performance of the ICF “activity” domain. Title and abstract review of search results were completed in Covidence (Veritas Health Innovation, Ltd, Melbourne, Victoria, Australia). The search methods are described in [Supplementary Material 4](#).

Appraiser Selection and Training

Article appraisers with acute care environment experience were recruited through electronic announcements on the AACPT Critical EdgeMail Newsletter, emails to AACPT members, AACPT social media accounts, and 2 different AACPT listservs, as well as verbal announcements during virtual presentations at the 2021 APTA Combined Sections Meeting. Volunteers completed a questionnaire and were selected on the basis of their background and expertise to create a diverse appraisal pool. Article appraisers completed a virtual training, either live or recorded via Zoom, led by 1 GDG member (K.P.M.) and then appraised a test article with the COSMIN-M. Appraisers had to score 100% on the COSMIN-M questions (compared to GDG responses), and demonstrate competency with extracting necessary data from the article. Appraisers not achieving 100% were provided additional training (recorded sessions and open discussions with K.P.M.), an opportunity to address errors and appraised a second test article; those meeting criteria were then approved. Four volunteers did not complete the training; 21 met criteria and assisted with the appraisal and data extraction.

Quality Assessment and Data Extraction Process

Randomized pairs of GDG members independently assessed article titles and abstracts for inclusion criteria using Covidence. At least 1 GDG member conducted a full-text review of each accepted article title. Included articles were then independently appraised by randomized pairs of the trained article appraisers (Acknowledgment section) using the COSMIN-M tool ([Suppl. Material 5](#)). Appraisers scored 2 domains using the COSMIN-M: methodological quality of the article and psychometric quality of the respective OM(s). Discrepant appraisal items were resolved in a third review by one of the core GDG members. Appraisers extracted descriptive data on the study population, information specific to data collection (eg, who collected the data, and time points specific to implementation of OMs), and the raw psychometric data.

Data Synthesis

Multiple levels of quality assessment informed the data aggregation and synthesis process. First, the methodological quality of the article scored with COSMIN-M was reviewed: first, low risk of bias was determined by having appropriately addressed 50% or more of the methodology questions; and second, potential for high risk of bias was defined as not reporting or inappropriate reporting of <50% of the methodology questions. Articles with potential for high risk of bias were excluded. Articles with low risk of bias were then ranked according to the level of evidence outlined in [Table 2](#) and summarized in [Figure 1](#).

Second, the methodological quality for each psychometric property studied in the article was determined to be “strong” or “moderate to low” on the basis of the appraisal score for each subset of questions from the COSMIN-M. A strong rating was given if the article reported >50% of the psychometric

quality questions, and a low to moderate rating was given if the article reported <50% of the psychometric quality.

Finally, the strength of each psychometric property was evaluated on the basis of the established threshold ratings determined by the COSMIN-M except for predictive and construct validity. If the psychometric properties were above the established COSMIN-M threshold ([Figure 1](#)), then the manuscript received a ++ rating; a rating of + was used if the psychometric properties were at or below the established threshold; and a rating of ? was assigned if the psychometric properties were not studied or did not provide enough data for interpretation. For example, if the minimal detectable change (MDC) was calculated, but the MID or minimal clinically important difference (MCID) was not calculated, then the data would receive a ? rating. The MDC is not recommended by the COSMIN-M as the MDC is strictly a statistical concept, whereas the MCID and MID provide important contextual input from clinician and/or patient to denote a significant response. In addition, predictive and construct validity are not specifically addressed in the COSMIN-M but hold important value in the acute care environment. There are multiple approaches to examining validity as well as numerous potential dependent variables (discharge disposition, readmission, functional status, risk of falls) enhancing the heterogeneity of predictive and construct validity. Therefore, the GDG evaluated validity on the basis of the statistical significance provided by the original study: the article received a ++ rating for a statistically significant association or prediction; a rating of + was used for nonsignificant prediction; and a rating of ? was used when data could not be assessed (ie, raw data or *P* value not reported). The steps for assessing methodological and psychometric quality and strength are summarized in [Figure 1](#).

Development of the CPG and Grading of Recommendations

Methodological, psychometric, and descriptive data were aggregated for each OM into Excel (Microsoft Corp, Redmond, WA, USA) tables for visualization. A level of evidence was assigned on the basis of the aggregated data compiled for each OM using the established grade of evidence ([Table 2](#)). Selection of OMs for the final CPG was based on the level of evidence along with 3 additional priorities: OMs having psychometric data for responsiveness, reliability, and predictive validity; psychometric data reported in 2 or more acute care patient categories as defined by APTA specialty guidelines for acute care²⁵ promoting generalizability in acute care environments; and high clinical utility defined as a short duration to complete (<15 minutes), inexpensive or free to use, and requiring minimal equipment and training.

CPG recommendations were developed by the GDG on the basis of COSMIN-M factors with input from methodologists (S.L.K.) and a blueprint from a published CPG on a similar topic.²

Selection of Core OMs

Raw data, data syntheses, and a summary statement ([Suppl. Material 6](#)) for each OM were provided to all 8 members of the GDG at a minimum of 2 weeks before a teleconference meeting to develop and finalize the CPG recommendations. Each recommendation was presented as a “motion” to the group, followed by an in-depth deliberation on the use of each OM within the acute care environment. The GDG then voted

Table 2. Grade Assignments for Clinical Practice Guideline (CPG) Recommendations^a

Grade	Recommendation	APTA Definition	Acute Care COMS Priority for CPG	
			Rating	Description
A	Strong	A high level of certainty for moderate to substantial benefit, harm, or cost (based on a preponderance of level 1 or 2 evidence with at least 2 level 1 studies)	++	Internal consistency or reliability
			++	MID > SDC or ceiling and floor effects of <15%
			++	Statistically significant predictive validity (disposition, mortality, and/or physical function) Psychometric data available in 2 or more patient categories ^b
B	Moderate	A high level of certainty for slight to moderate benefit, harm, or cost or a moderate level of certainty for a moderate level of benefit, harm, or cost (based on a preponderance of level 1 and 2 evidence with at least 1 level 1 study)	++	Internal consistency or reliability
			++	MID > SDC or ceiling and floor effects of <15% Psychometric data available in 2 or more patient categories ^b
C	Weak	A moderate level of certainty for slight benefit, harm, or cost or a weak level of certainty for moderate to substantial benefit, harm, or cost (based on level 2 evidence)	+	Internal consistency or reliability
			+	MID > SDC or ceiling and floor effects of <15% Psychometric data available in 1 or more patient categories ^b
P	Best practice	Recommended practice based on clinical practice norms; exceptional situations in which validating studies have not or cannot be performed, yet there is a clear benefit, harm, or cost; expert opinion		Expert opinion of the GDG with significant consideration of input from interested parties
R	Research	An absence of research on the topic or disagreement among conclusions from higher-quality studies on the topic		Research recommendations to address gaps in knowledge

^aGrades of recommendations and the acute care core outcome measure set (COMS) priority for CPG were based on the APTA *Clinical Practice Guidelines Development Manual*,¹⁸² neurologic physical therapy core set of outcome measures,² and modified Consensus-Based Standards for the Selection of Health Measurement Instruments ratings for strength of statistics.¹⁸³ Abbreviations: APTA = American Physical Therapy Association; GDG = Guideline Development Group; MID = minimal important difference; SDC = smallest detectable change. ^bAccording to APTA specialty guidelines for acute care, patients are categorized by status (eg, intensive care, progressive) and by diagnosis group (eg, medicine, cardiac).²⁵

on each OM. To be included in the core set, an OM required a unanimous vote.

Selection of Supplemental OMs

OMs that did not achieve unanimous agreement were considered for recommendation as supplemental measures on the basis of the available psychometric data, their usefulness in this specialized acute care environment, and majority agreement during a second vote on the OM by the GDG.

BridgeWiz for APTA (APTA 3.0) was used to develop clear and implementable recommendations.²⁶ BridgeWiz addresses all standards of the National Academy of Medicine recommendations for transparency in CPGs.²⁶

Peer Review and Public Commentary

Interested parties including peers, former patients, and the public reviewed the CPG with the intent to improve its clarity and presentation. All submitted comments were documented, evaluated by the GDG, and when appropriate, edits were

made. The CPG was reviewed and appraised with the following 6 steps:

- 1) The AACPT CPG committee provided feedback on selected parts of the CPG before they reviewed the first draft.
- 2) The GDG members used the Appraisal of Guidelines for Research and Evaluation (AGREE II).²⁷
- 3) Peer and expert reviews were conducted by a methodologist, 2 physicians with experience in OMs and ICU research, 2 nurse scientists, 2 occupational therapists, and 10 physical therapists with different expertise in the acute care environment, home health care, geriatric care, and neurological care.
- 4) Five former patients and family members of patients reviewed the document, submitted comments, and provided endorsement of the COMS.
- 5) The CPG was posted for public comment on the AACPT website for 1 month. Notices of public comment period

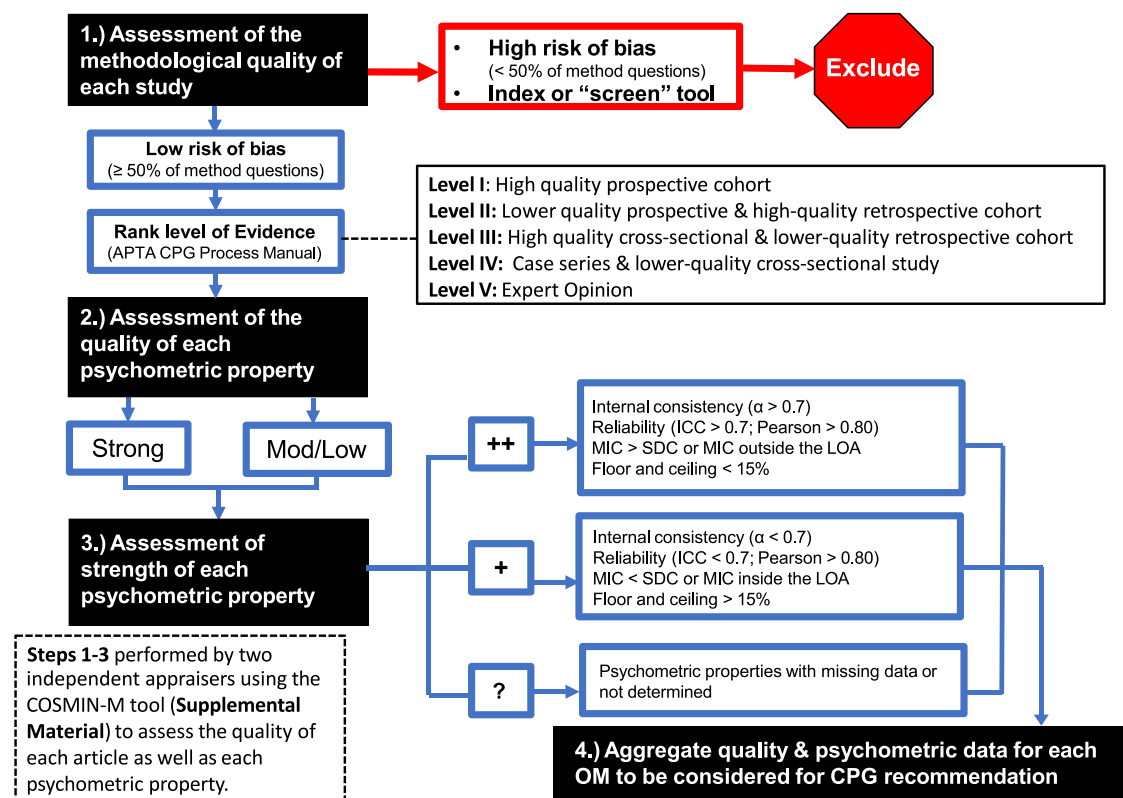


Figure 1. Process for Examining Quality of Outcome Measures (OM). Abbreviations: APTA = American Physical Therapy Association; COSMIN-M = Modified Consensus-Based Standards for the Selection of Health Measurement Instruments; CPG = Clinical Practice Guideline; LOA = Limit of Agreement; MIC = Minimal Important Change; Mod = Moderate; SDC = Smallest Detectable Change.

were distributed via email listserv and announcements on social media.

- 6) A final review was conducted by the journal editors and peer reviewers for publication.

Results obtained with the AGREE II tool for reviews 1 to 3 are provided in [Supplementary Material 7](#).

Procedure for Updating Guidelines

The literature of OMs in acute care physical therapist practice grows steadily; thus, the CPG should be updated within 3 to 5 years of publication. The updated CPG should use psychometric data from literature in combination with clinical utility to update the action statements. The updated CPG may consider expanding constructs to include the "body function and structure" domain of the ICF model and may consider expanding beyond English language. The AACPT CPG leadership committee will form a subsequent GDG with at least 1 member from current GDG continuing with the process ~ 3 years after publication date.

Role of the Funding Source

The funders, the National Institutes of Health and the AACPT, played no role in the design, conduct, or reporting of the CPG.

RESULTS

Systematic Review

Literature searches from inception-January 2021 yielded 9767 articles. After title and abstract review, 9316 articles were

excluded. Full-text reviews of the 451 eligible articles on the basis of title and abstract excluded 324 articles. An additional 13 articles were added by hand searches leaving 140 articles to be appraised. During appraisal, an additional 83 were excluded and 57 met the inclusion criteria. A second literature search with updated terms was covered January 2017 to March 2023; the 6-year period was selected to overlap the first search to ensure that no articles were omitted by the first search. More than 80% of the articles in the original search ($n = 46/57$) were published after 2016 justifying the period. The second search yielded 49,215 studies, with 47,847 excluded on the basis of title and abstract review. During full-text review, 1304 studies were excluded and 3 studies were added with hand searches yielding 59 new studies meeting eligibility ([Figure 2](#)). Thus, a total of 116 articles (57 from initial and 59 from updated) with 34 different OMs met the inclusion criteria for the systematic review. Descriptive details of included articles are presented in [Supplementary Table 2](#).

CPG Organization

The CPG OM recommendations apply to clinicians evaluating and treating patients for activity in the hospital, that is, assessing the difficulties an individual may have performing an activity or physical function. The CPG is divided into 2 sections: the recommended 3 COMS for all patients in a hospital and recommendations for supplemental measures to augment the core measures. Research recommendations are provided as appropriate. A visual summary for implementation of the recommendations is provided in [Figure 3](#).

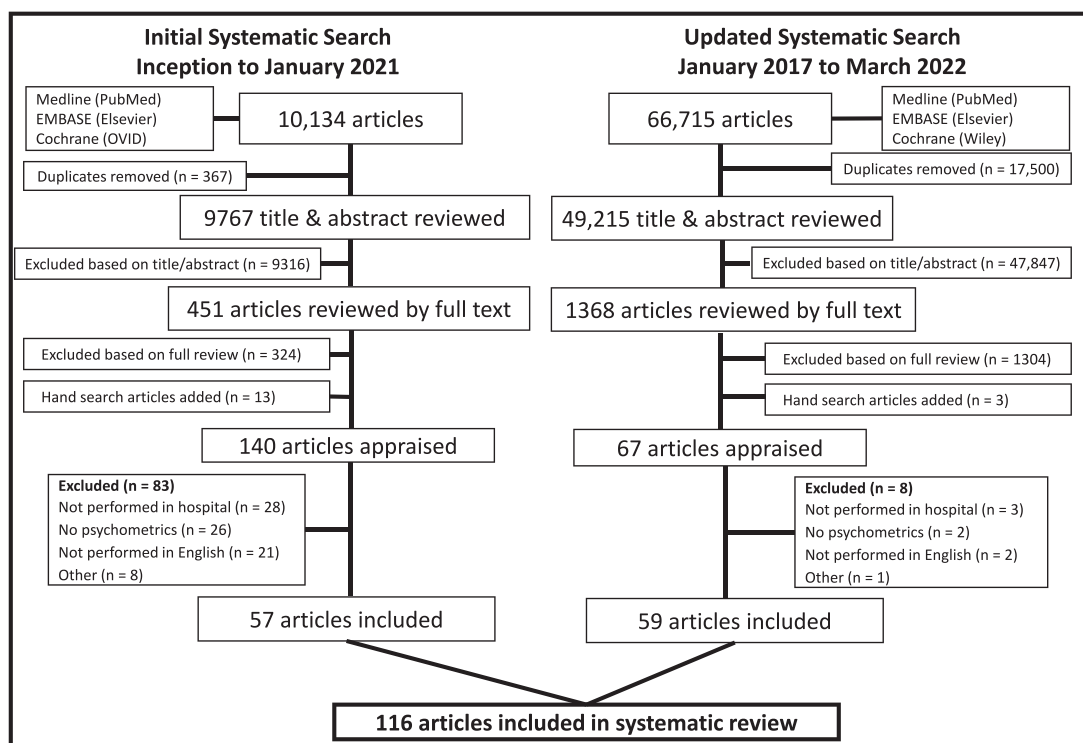


Figure 2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flowchart.

Core Set of OMs for Adult Patients in the Hospital

The first 3 action statements collectively represent the recommended core OM set (COMS) to be performed on all adult patients receiving physical therapy in a hospital.

Action Statement 1: Activity Measure for Post-Acute Care Inpatient Basic Mobility Short Form or DeMorton Mobility Index

Clinicians should use the Activity Measure for Post-Acute Care (AM-PAC) or the DeMorton Mobility Index (DEMMI) during every physical therapy session to assess functional mobility for adult patients (≥ 18 years old) who are hospitalized for an acute or chronic illness, injury, or surgery.

Aggregate Evidence Quality and Strength

- Grade A, strong strength: assessment of functional mobility using the AM-PAC is based on 5 level 1 studies^{28–32} and 25 level 2 studies^{33–57} (Table 3).
- Grade A, strong strength: assessment of functional mobility using the DEMMI is based on 6 level 1 studies^{58–63} and 3 level 2 studies^{64–66} (Table 4).

Benefits

- The AM-PAC and the DEMMI are objective assessments of functional mobility. Both OMs have high clinical utility and require minimal training, minimal to no equipment, and 5 to 10 minutes to complete.
- The DEMMI is free to administer.⁶⁷
- The AM-PAC advocates for²⁹ and the DEMMI may promote a common language between health care professionals to enhance discussion on patient mobility and function. OMs that promote systematic and interprofessional collaboration are viewed as key facilitators of optimal communication.²⁹

Risk of Harm/Cost

- No adverse events have been documented.
- Clinicians should monitor for potential risks during administration of the AM-PAC or DEMMI, including but not limited to changes in vitals during positional changes and risk of falling during ambulation or more challenging tasks, and provide necessary support to minimize harm and ensure safety. Clinicians using the AM-PAC can exercise clinical judgment to score items not observed.
- Purchase of an institutional license is required to use the AM-PAC.⁶⁸

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

On the basis of psychometric data from level 1 studies and clinical utility of the 2 tests, 1 test (AM-PAC vs DEMMI) does not appear superior to the other. The GDG values both OMs and recommends that clinicians select the OM that best aligns with their patient population and setting resources.

Intentional Vagueness

The GDG recommends that physical therapists use the tools for direct observation of functional mobility as the first option while following protocols allowing for a proxy if direct observation is not an option. The GDG acknowledges that the AM-PAC and DEMMI may be used for other health care delivery activities, such as discharge prediction.⁶⁹ The GDG recommends that clinicians and researchers should clearly delineate when the AM-PAC and DEMMI are directly observed with the patient as recommended in standardized protocols versus solely used for screening, as differences in delivery can equate to differences in validity and reliability. If a physical therapist

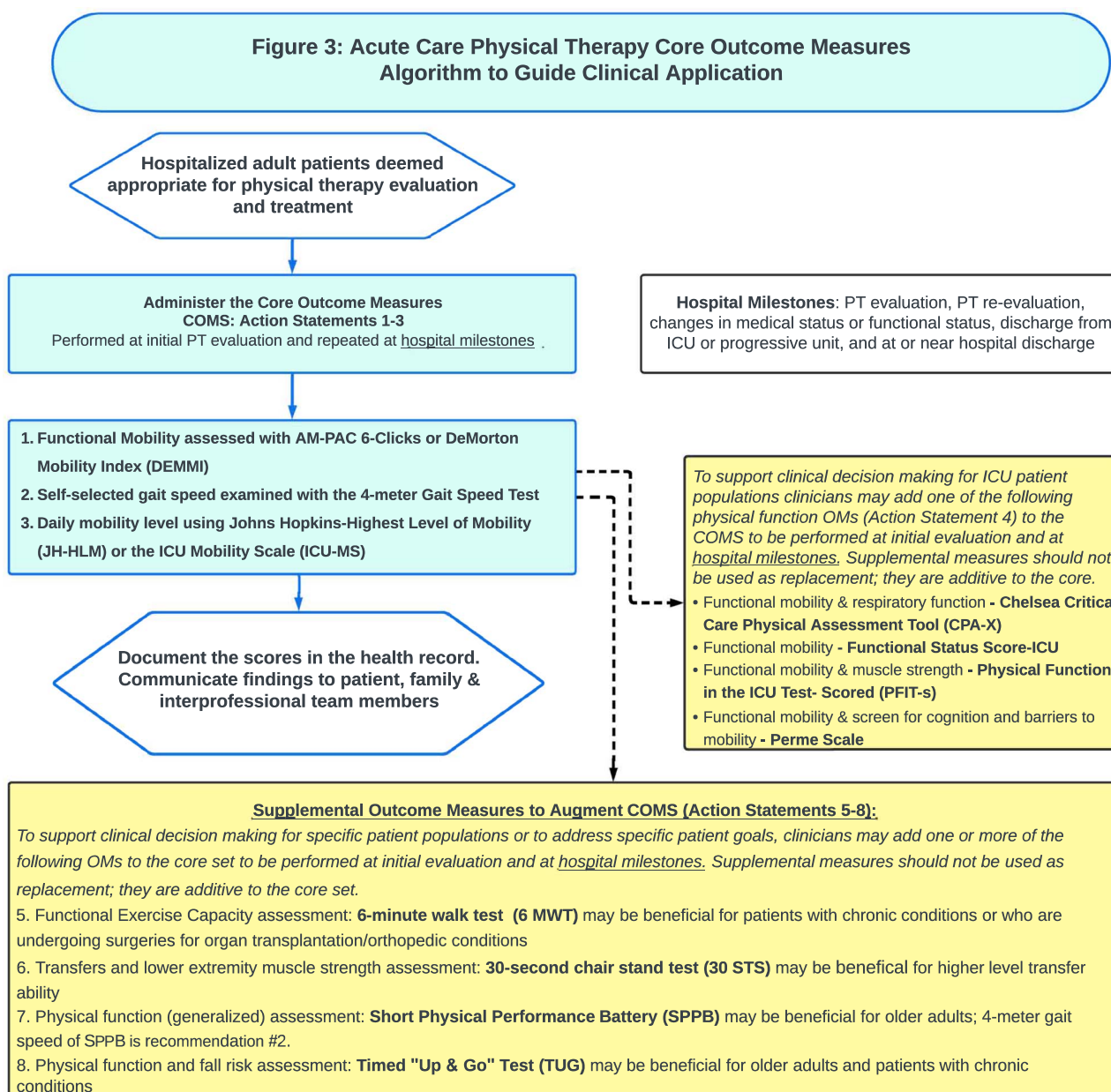


Figure 3. Acute Care Physical Therapy Core Outcome Measures Algorithm to Guide Clinical Application. Abbreviations: AM-PAC 6-Clicks = Activity Measure for Post-Acute Care Inpatient Basic Mobility Short Form; COMS = Core Outcome Measure Set; ICU = Intensive Care Unit; OMs = Outcome Measures; PT = Physical Therapist.

is unable to evaluate a particular component of the AM-PAC or the DEMMI, the therapist should follow the testing guidelines. For example, if the clinician cannot evaluate stair climbing on the AM-PAC, a proxy score can be obtained by using clinical judgment, or patient or family report.⁷⁰

Role of Patient Preferences

Clinicians should consider patient and family preferences to establish achievable and meaningful goals informed by the AM-PAC or the DEMMI.

Exclusions

Physical therapists should use clinical discretion and document when the AM-PAC or the DEMMI is not appropriate, such as when a patient presents with hemodynamic instability

or ongoing clinical concerns that prevent examination of functional mobility, although, the AM-PAC may still be scored with proxy examinations per its established protocol. The clinician should document and provide the rationale for not administering the OM.

Differences of Opinion

- Minor: Discussion in public forums (2021 and 2022 APTA Combined Sections Meetings) and survey comments¹ suggest that the AM-PAC and DEMMI may have reduced ability to detect impairments for patients with high functional mobility. Clinically, individuals scoring the maximum score on the AM-PAC 6-Clicks or the DEMMI may reach a ceiling effect despite presenting with other deficits not effectively examined in these tests. The DEMMI

Table 3. Levels of Evidence and Psychometric Data of the AM-PAC^a

Level of Evidence	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data Abbreviated
1	Jette et al ²⁸ (2015)	102	68 (12)	Mixed	NS	Interrater reliability (++): ICC 95% CI = 0.78–0.89
1	Hoyer et al ²⁹ (2018)	118	57 (16)	Mixed	5–7 nonconsecutive days	Internal consistency (++): κ 95% CI = 0.92–0.96 test-retest reliability (++): ICC 95% CI = 0.86–0.98 Interrater reliability (++): ICC 95% CI = 0.86–0.97 Responsiveness (?): MDC (95%) = 4.5; SEM = 1.6
1	Hiser et al ³⁰ (2020)	76	64 (56–71)	Mixed	NS; during ICU admission	Interrater reliability (++): ICC 95% CI = 0.95–0.96 Internal consistency (++): κ 95% CI = 0.63–0.845 for moving to sitting on edge of bed and 0.799–0.94 for walking in the room.
1	Moshtaghi et al ³² (2021)	138	48 (13)	Acoustic neuroma resection	48 h after surgery	Predictive validity (++): AM-PAC independently predicted LOS ($\beta = -.54$; $R^2 = 0.37$; $P < .001$)
1	Calthorpe et al ³¹ (2021)	100	52 (33–68)	Trauma	First and last physical therapist sessions; 24-h period for reliability	Interrater reliability (++): ICC 95% CI = 0.74–0.93 Responsiveness (?): MDC = 9.26; SEM = 3.34 Floor effect (++): 0%–6%; ceiling effect (+): 3%–33% Predictive and construct validity (+): return to work at 6 mo not significantly related; AM-PAC had weak correlation with quality-of-life measures at 6 mo
2	Jette et al ³³ (2014)	84,466	69 (16)	Mixed	Physical therapist/occupational therapist examination and DC	Internal consistency (++): Cronbach $\alpha = 0.96$ Responsiveness (?): MDC (90%) = 4.72; SRM = 1.06 Floor effect (++): 2.7%; ceiling effect (+): 15.5% Predictive validity (+): more than 1 rehabilitation visit to predict (AUC = 0.70)
2	Jette et al ³⁴ (2014)	55,358	NS; age quartiles	Mixed	Physical therapist/occupational therapist examination	Predictive validity (++): t score of 43 established as cutoff for DC to home (AUC = 0.75; positive LR = 2.96)
2	Menendez et al ³⁵ (2016)	744	66 (23–92)	Total hip or knee arthroplasty	Within 24 h of surgery	Predictive validity (+): DC disposition (AUC = 0.77); prolonged stay (AUC = 0.64); readmission (AUC = 0.66)
2	Hoyer et al ³⁶ (2019)	2876	54 (17)	Mixed	Hospital admission and DC	Predictive validity (++): the aOR for facility placement was 3.1 for a 10-point negative difference in AM-PAC (95% CI = 2.8–3.6; $P < .001$); if AM-PAC score declined (vs no change or improved), then the aOR for facility placement was 3.6 (95% CI = 2.7–4.9; $P < .001$)
2	Johnson et al ³⁷ (2020)	1323	59 (18)	Mixed	Hospital admission and DC	Predictive validity (++): patients with moderately low (aRR = 1.50; 95% CI = 1.15–1.93), moderately high (aRR = 1.52; 95% CI = 1.16–2.01), or high (aRR = 1.37; 95% CI = 1.02–1.85) scores on AM-PAC at hospital DC were more likely than those with very low scores to improve physical function while receiving acute rehabilitation

(continued)

Table 3. Continued.

Level of Evidence	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data Abbreviated
2	Fernandez et al ³⁸ (2020)	673	71 (9)	Cardiovascular disorders	Physical therapist examination and hospital DC	Predictive validity (+): logistic regression modeling revealed that after controlling for age, LOS, and insurance type, the basic mobility assessment at DC (OR = 0.77; 95% CI = 0.73–0.83) was able to predict DC to home/self-care ($P < .05$); however, scores at examination were not predictive
2	Pfoh et al ³⁹ (2020)	17,022	73 (15)	Mixed	Within 48 h of hospital admission	Predictive validity (++): moderate discrimination for DC to home (AUC = 0.78) Ceiling effect (+): estimated as ~20% from Figure S1 (in Pfoh et al ³⁹)
2	Harry et al ⁴⁰ (2021)	10,931	71 (61–81)	Mixed	NS; physical therapist or occupational therapist session	Predictive validity (++): predicting DC to home (AUC 95% CI = 0.86–0.88)
2	Power et al ⁴¹ (2021)	241	65 (10)	Pulmonary lobectomy	Baseline after surgery	Predictive/discriminative validity (++): first postoperative AM-PAC score was able to discriminate hospital disposition (AUC = 0.714; 95% CI = 0.594–0.834; $P = .009$)
2	Tymkew et al ⁵⁶ (2020)	1203	NS	Mixed	Initial physical therapist examination	Predictive validity (+): estimated an AUC of 0.71 (0.67–0.76) for predicting DC to home with a raw score of 14 or higher (t score = 35.55 or higher) and predicted DC to home with a sensitivity of 68.4% and a specificity of 75.1%
2	Lininger et al ⁴² (2021)	13,498	71 (15)	Mixed	Physical therapist and/or occupational therapist examination	Convergent validity (++): Spearman rank correlation to BMAT range = 0.39–0.54
2	Tevald et al ⁴³ (2021)	1456	64 (26)	COVID-19	Initial and last physical therapist or occupational therapist sessions	Predictive validity (++): initial AM-PAC was predictive of DC destination, LOS, and mortality
2 ^c	Wright et al ⁴⁴ (2022)	303	70 (14)	Mixed	Physical therapist examination and last physical therapist session	Predictive validity (+): AM-PAC mobility scores were predictive of readmission (OR = 0.99; $P = .008$; AUC = 0.68), but significance was lost when mobility and activity scores were examined simultaneously
2	Arnold et al ⁴⁵ (2021)	26,629	67 (15)	Mixed	Hospital DC	Predictive validity (++): AM-PAC scores were predictive of readmission; a threshold analysis suggested <17 maximized odds of readmission compared to scores of >17 (OR = 1.19; 95% CI = 1.13–1.24)
2	Warren et al ⁴⁶ (2021)	12,816	67–80 ^d	Mixed	Physical therapist examination	Predictive validity (++): predicting community (home) vs institutional DC, the ROC curve showed 40.78 as the t score to maximize sensitivity (0.71) and specificity (0.74) for AM-PAC, with an AUC of 0.80 (95% CI = 0.80–0.81)
2	Thrush and Steenbergen ⁴⁷ (2022)	2793	57 (44–70)	Mixed	Physical therapist examination and last session	Responsiveness (++): MID = 4.3; ES = 0.97 Floor effect (++): 5%–11%; ceiling effect (+): 4%–25%
2	Whitlock et al ⁴⁸ (2022)	359	68 (60–75)	Cardiac ICU	Physical therapist examination	Predictive validity (++): prediction model with classification tree provided 4 distinct groups; the model had a predictive ability to classify individuals discharged to a PAC facility with a precision of 0.43 and a recall of 0.80

(continued)

Table 3. Continued.

Level of Evidence	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data Abbreviated
2	Hadad et al ⁴⁹ (2022)	11,672	Groups ^e	Total hip or knee arthroplasty	First recorded	Predictive validity (++): score recorded within the first 48 h postoperatively had concordance indexes of 0.813 for the THA cohort and 0.790 for the TKA cohort for predicting actual DC disposition
2	Herbold et al ⁵⁰ (2022)	1696	NS; age quartiles	Mixed	First recorded and near hospital DC	Predictive validity (++): for a combined sample, the AM-PAC mobility cutoff <i>t</i> score for predicting DC to home (with and without services) vs institution (SNF or IRF) was 42.88 (PPV = 0.84–0.87).
2	Johnson et al ⁵¹ (2022)	70	64 (14)	Mixed	Standard of care	Interrater reliability (++): reliability of physical therapist assessment compared to patient-reported scores was moderate (ICC = 0.57; 95% CI = 0.42–0.69)
2	Mo et al ⁵² (2022)	90	61 (13)	Adult spinal deformity	First recorded and near hospital DC	Predictive validity (++): threshold regression identified cutoffs of ≤ 15 for first AM-PAC score, ≤ 17 for last AM-PAC score, and < 0.625 for daily AM-PAC change to be associated with non-home DC
2	Sutton et al ⁵³ (2022)	671,119	67 (61–74)	Orthopedic surgery	524 (SD = 449) min after surgery	Predictive validity (+): not related to 90-d readmission or posthospital complications; scores were predictive of not discharging to home (OR 95% CI = 0.56–0.67)
2	Casertano et al ⁵⁴ (2022)	704	Groups ^f	Stroke	Physical therapist examination	Predictive validity (++): AUC for discharging to home vs rehabilitation facility = 0.82
2	Myszewski et al ⁵⁵ (2022)	3999	64 (48–79)	Mixed	Physical therapist examination and last physical therapist session	Predictive validity (++): adjusted C-statistic for DC to home vs rehabilitation facility = 0.744; OR = 5.8
2	Tracy et al ⁵⁷ (2022)	432	52 (31–69)	Traumatic brain injury	Daily by physical therapist	Predictive validity (++): increasing score correlated with a greater odds of DC to home for the entire cohort (OR = 1.21; 95% CI = 1.15–1.28; $P < .0001$) and for patients with an isolated TBI (OR = 1.18; 95% CI = 1.11–1.26; $P < .0001$)

^aAM-PAC = Activity Measure for Post-Acute Care Inpatient Basic Mobility Short Form; aOR = adjusted odds ratio; aRR = adjusted relative risk; AUC = area under the curve; BMAT = Bedside Mobility Assessment Tool; DC = discharge; ES = effect size; ICU = intensive care unit; IRF = inpatient rehabilitation facility; LOS = length of stay; LR = likelihood ratio; MDC = minimal detectable change; MID = minimal important difference; NS = not specified or not reported; OR = odds ratio; PAC = post-acute care; PPV = positive predictive value; ROC = receiver operating characteristic; SEM = standard error of measurement; SNF = skilled nursing facility; SRM = standardized response mean; TBI = traumatic brain injury; THA = total hip arthroplasty; TKA = total knee arthroplasty; + = rating assigned to a manuscript when the psychometric properties were at or below the established threshold; ++ = rating assigned to a manuscript when the psychometric properties were above the established modified Consensus-Based Standards for the Selection of Health Measurement Instruments threshold; ? = rating assigned to a manuscript when the psychometric properties were not studied or did not provide enough data for interpretation. ^bPresented as mean (SD) or median (interquartile range). ^cStudy design was observational prospective; however, AM-PAC data were obtained in routine practice and then retrospectively collected from the patients' electronic medical records. ^dMeans and SEs based on discharge destination ranged from 67 (SE = 0.14) years for discharge home to 80 (SE = 0.24) for discharge to skilled nursing facility. ^eAges for patients with THA discharged to facility and home were 71 (SD = 11) and 64 (SD = 11), respectively. Ages for patients with TKA discharged to facility and home were 72 (SD = 9) and 66 (SD = 9), respectively. ^fAges were 69 (SD = 15) years for patients with ischemic stroke at 83% of sample; 66 (SD = 17) years for patients with hemorrhagic stroke at 13% of sample; and 61 (SD = 19) years for patients with subarachnoid hemorrhage at 3.6% of sample.

provides more specificity for higher-level functional mobility with incorporation of 2 tasks: ability to walk backwards and ability to jump. Clinicians may address these concerns by assessing functional mobility with gait speed (action statement 2) for individuals with a high level of functioning or by adding one of the supplemental measures (5–8).

- Minor: Public comments at the 2022 APTA Combined Sections Meeting suggest that the AM-PAC and DEMMI may not adequately capture the functional mobility of

patients with low functional status. For the AM-PAC, clinicians may address this issue by adding 2 items (head turning toward a sound and following a simple command);⁷¹ however, the addition of 2 items alters the original protocol warranting further determination of the psychometric properties.

Quality Improvement

- Documentation of the AM-PAC or the DEMMI provide objective data to support the functional mobility status

Table 4. Levels of Evidence and Psychometric Data of the DEMMI^a

Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data Abbreviated
1	de Morton et al ⁵⁸ (2008)	106 ^c	81 (7)	Older adult medical	Within 48 h of admission; every 48 h until DC	Reliability (++): interrater (Pearson $r = 0.94$; 95% CI = 0.86–0.98) Responsiveness (++): MDC (90%) = 8.9; MCID = 9.4–10.5; ES for change = 0.39
1	de Morton et al ⁵⁹ (2015)	120	82 (8)	Older adult medical	Within 48 h of admission and hospital DC	Floor effect (++): 6% at admission Ceiling effect (++): 0% at admission and DC Responsiveness (++): MCID = 8.02; MDC (90%) = 15
1	Camp et al ⁶⁰ (2019)	22 ^d	60 (10)	Acute exacerbation of COPD	Day 3 of hospital admission	Floor effect (++): 0% Ceiling effect (++): 14% Responsiveness (++): MCID (estimate) = 10 points Construct validity (+): significant correlations with 6MWT, gait speed, and use of gait aid but no association with BORG, heart rate, or quality of life
1	Parry et al ⁶¹ (2020)	151	64 (53–73)	Respiratory (MV for >48 h)	ICU awakening, ICU DC, and hospital DC	Floor effect (++): 23% awakening; 6% ICU DC; 0% hospital DC Ceiling effect (++): 5% awakening; 6% ICU DC; 12% hospital DC Responsiveness (?): ESs for change from awakening to ICU DC and to hospital DC were 0.47 and 1.03, respectively Predictive validity (++): DEMMI at awakening was predictive of DC to home (OR = 1.03; $P = .038$) in model with MV duration and MRC-ss Construct validity (++): significant correlations with PFIT and measures of muscle strength ($r = 0.62$ – 0.84) and ICU and hospital LOS ($r = -0.53$ and $r = -0.51$, respectively)
1	D'Souza et al ⁶² (2021)	417	81 (76–86)	Mixed	Physical therapist examination	Predictive validity (++): DEMMI had a specificity of 79%, a sensitivity of 72%, and an AUC of 80 (95% CI = 70–89) for predicting DC disposition
1	Hartley et al ⁶³ (2021)	62	84 (80–87)	Mixed	Initial examination	Predictive validity (+): baseline DEMMI was not predictive of change in knee extension strength (estimate = 0.09; SE = 0.05; $P = .078$) in repeated-measures mixed model
2	de Morton et al ⁶⁴ (2010)	106 ^e	81 (7)	Older adult medical	Initial examination	Floor effect (++): 4.7% scored <10 Ceiling effect (++): 2.8% scored ≥ 90 Validity (convergent) (++): strong correlation with HABAM scores (validation sample: Pearson $r = 0.91$; 95% CI = 0.87–0.94) and moderate correlation with Barthel scores (validation sample: Spearman $\rho = 0.68$; 95% CI = 0.56–0.77)
2	de Morton et al ⁶⁵ (2011)	35 ^f	80 (7)	Older adult medical	Initial assessment, hospital DC	Reliability (+): for item agreement between assessors (interrater), % absolute agreement was 80%–100%; κ statistic = 0.46–1.0 (see above for Pearson r)
2	Carroll et al. ⁶⁶ (2018)	161	67 (range = 20–87)	Elective GI resection	Before surgery, days 1–3 after surgery	Predictive validity (+): preoperative DEMMI was not predictive of DC within 1 wk (OR = 0.98; $P = .66$); postoperative DEMMI change scores were (OR = 1.01; $P = .048$); functional recovery (achieved 80% of preoperative DEMMI) was predictive of DC within 1 wk (AUC = 0.772)

^aAUC=area under the curve; BORG=Borg Rating of Perceived Exertion; COPD=chronic obstructive pulmonary disease; DC=discharge; DEMMI=DeMorton Mobility Index; ES=effect size; GI=gastrointestinal; HABAM=The Hierarchical Assessment of Balance and Mobility; ICU=intensive care unit; LOS=length of stay; MCID=minimal clinically importance difference; MDC=minimal detectable change; MRC-ss=Medical Research Council Sum Score; MV=mechanical ventilation; OR=odds ratio; PFIT=Physical Function in the ICU Test Score; SEM=standard error of measurement; 6MWT=6-min walk test. ^bPresented as mean (SD), median (interquartile range), or mean (range). ^cPresenting data only from the validation sample. ^dSample size calculation of 19 determined to detect 80% power with a correlation coefficient of 0.6 with $P < .05$. ^ePresenting data only from the validation sample; patient population was the same as in de Morton et al⁵⁹ (2008); duplicate data may have been present. ^fPower sample size calculation demonstrated 19 patients for an ICC between 0.7 and 0.9; patient population was the same as in de Morton et al⁵⁹ (2008); duplicate data were presented once.

of patients in the hospital, which may enhance communication among professionals to promote mobilization and rehabilitation interventions.

- The assessment of functional mobility by the AM-PAC or DEMMI provides opportunities for intra and extrahospital comparisons and should be considered for internal quality improvement as well as use in national and international patient registries.
- Acute care environments not currently using the AM-PAC or DEMMI should investigate quality improvement of patient-centered metrics before and after adoption.

Implementation and Audit

- Acute care physical therapist leaders should promote and if possible, provide training on using the standardized protocols for the AM-PAC or the DEMMI.
- Electronic health records may need revision to include the AM-PAC or DEMMI scores in a predictable area of the record for interprofessional communication.
- Conduct record audits of adult patients who have received physical therapist services in the hospital to determine how often the AM-PAC or DEMMI is being documented.

Supporting Evidence and Clinical Interpretation

The AM-PAC and DEMMI both contain multiple components of functional mobility including bed mobility, transfers, and ambulation. Additionally, the AM-PAC includes an assessment of stair climbing ability, whereas the DEMMI assesses the ability to pick a pen up off the floor, ability to walk backwards, and ability to jump. The psychometric data in the acute care environment are summarized below.

The AM-PAC inpatient basic mobility short form assesses the level of assistance needed to perform 6 specific tasks, including bed mobility, transfer ability, ambulation, and climbing 3 to 5 steps with a handrail. The patient's performance on each task is scored, with higher scores indicating greater functional independence. For items that are not observed, the clinician uses clinical judgment for proxy scoring for the remaining tasks. Administration and scoring guidelines for the AM-PAC "6-Clicks" are described in the user manual.⁷⁰ The AM-PAC is regularly referred to as the AM-PAC "6-Clicks," since it was originally developed as a computer adaptive test; it was later integrated into electronic health records of some institutions to increase accessibility and enhance a common language for functional mobility.²⁹ The AM-PAC has been primarily studied in mixed patient populations,^{28,33,34,36,37,39} as well as more homogenous groups, such as patients electing to have a hip or knee arthroplasty,³⁵ patients hospitalized for traumatic injuries,³¹ and patients in the ICU.³⁰ Psychometric data are summarized below and reported in Table 3.

- The AM-PAC has good to excellent reliability, including interrater reliability (ICC 95% CI = 0.74–0.97),^{28–31} test-retest reliability (ICC 95% CI = 0.91–0.96),^{29,31} and high internal consistency (Cronbach α 95% CI = 0.74–0.96).^{29,30}
- The responsiveness of AMPAC has not been confirmed as no level 1 studies have examined the MID or MCID. However, 2 level 1 studies suggested the responsiveness of the AM-PAC with an MDC and a standard error of

measurement (SEM) ranging from 4.5 to 9.26 and 1.6 to 3.3 units, respectively.^{29,31}

- Multiple level 2 retrospective investigations assessed psychometric properties of the AM-PAC.^{33–57} Large retrospective studies demonstrated that the AM-PAC scores can be extracted from large clinical databases for comparative analyses. Negligible to minor floor effects have been reported ranging from 0% to 11% for AM-PAC in diverse patient populations.^{31,33,39,47} Negligible to significant ceiling effects ranged from 3% to 33%.^{31,33,47} Several retrospective studies demonstrated that higher AM-PAC scores predict discharge to home and lower scores predict discharge to a secondary nursing or rehabilitation facility.^{36,37,39} At hospital admission, a cutoff score of ≤ 12 provided a sensitivity of 94% and a specificity of 27% for identifying patients who would not be discharged to home.³⁹ In patients undergoing total hip arthroplasty or total knee arthroplasty, lower AM-PAC scores predicted discharge disposition (area under the curve = 0.77) and, to a lesser extent, predicted prolonged hospital stays (area under the curve = 0.64) and readmissions (area under the curve = 0.66).³⁵ Likewise, AM-PAC scores of < 17 at hospital discharge predicted readmission in a mixed population of 26,298 patients.⁴⁵ In general, retrospective investigations support using the AM-PAC for measuring functional mobility; however, a few investigations have equivocal findings, especially with variability of the AM-PAC to predict patient outcomes.^{31,35,38} AM-PAC scores at the physical therapist's initial examination were not predictive of discharge to home in 673 patients hospitalized with a cardiovascular disorder, whereas scores at hospital discharge were predictive.³⁸

The DEMMI was designed to assess mobility and function in older adults across various clinical settings, including the acute care environment. The DEMMI assesses physical function using 15 tasks, including bed mobility, chair activities, balance, walking, and dynamic balance tasks.⁵⁸ The test is designed to be performed at the patient's bedside with tasks progressing in order, starting with bed transfers and ending with dynamic balance. The DEMMI has been studied in older adult populations,^{58,65} patients with acute chronic obstructive pulmonary disease exacerbation,⁶⁰ patients undergoing elective gastrointestinal resection,⁶⁶ patients with mixed acute illness,⁶² and ICU populations.^{59,61,65}

The DEMMI has good to excellent reliability, including high interrater reliability (Pearson r 95% CI = 0.86–0.98).⁵⁸ Studies have established an MCID as 8⁵⁹ to 10,⁶⁰ with another study providing an MCID range of 9.4 to 10.5 points.⁵⁸ Studies demonstrate the DEMMI as having negligible floor effects in adults in the hospital (0%–6%),^{59–61} but one study demonstrated significant floor effects (23%) at ICU awakening.⁶¹ The DEMMI has negligible to minor ceiling effects (ranging from 0% to 14%).^{60,61,72} The DEMMI has good to excellent construct and predictive validity (Table 4). Of note, higher DEMMI scores assessed on postoperative Day 1 and the change in scores from Days 2 to 3 were associated with hospital discharge in < 1 week (odds ratios [ORs] = 1.03 and 1.01, respectively).⁶⁶ Higher scores predicted discharge to home in patients surviving an ICU admission (OR = 1.03).⁶¹ In a mixed sample of 417 patients, the DEMMI at the physical therapist's initial examination had strong predictive validity

for discharge disposition with a specificity of 79%, a sensitivity of 72%, and an area under the curve of 80 (95% CI = 70–89).⁶² In general, there is strong evidence for using the DEMMI in patients hospitalized with acute illness; however, one study suggests that preoperative DEMMI scores for patients undergoing gastrointestinal surgeries did not correlate with hospital length of stay.⁶⁶

The focus of this CPG is on the acute care environment; however, both the AM-PAC and the DEMMI have applicability across settings potentially enhancing communication across the continuum of care. A feasibility study of 222 patients after stroke demonstrated that AM-PAC can be integrated in the hospital, skilled nursing facility, in the home, and the outpatient settings.⁷³ Likewise, the DEMMI has been studied in post-acute care environments (eg, community-dwelling individuals with Parkinson disease⁷⁴ and subacute stroke⁷⁵) demonstrating applicability across settings. The DEMMI is strongly related to a patient's self-reported functional status and therapist-directed assessment.⁷⁶ Thus, these OMs may enhance patient functional mobility tracking, optimize communication with patients and caregivers, and improve focus on the patient's goals across care environments.

Research Recommendation 1

Investigations of the inter and intrarater reliability and responsiveness in adults in the acute care environment are necessary to further strengthen the recommendation.

Research Recommendation 2

Studies examining the 2 OMs in head-to-head comparisons to differentiate clinical usefulness are needed.

Action Statement 2: 4-M Gait Speed Test

Clinicians should assess habitual (self-selected) walking speed using 4-m gait speed test for adult patients (≥ 18 years old) who are hospitalized for an acute or chronic illness, injury, or surgery at initial examination and hospital milestones (such as physical therapist reevaluation or recertification, changes in medical or physiologic status, changes in functional status, ICU discharge, and prior to hospital discharge) or minimally once every 7 days.

Aggregate Evidence Quality and Strength

- Grade B, moderate strength: Gait speed assessment is based on 5 level 1 studies^{77–81} and 5 level 2 studies^{82–86} (Table 5). Floor effects in multiple studies and the heterogeneity of protocols used to measure gait speed reduce the strength of this recommendation from strong to moderate, as the test loses suitability in this clinical environment.

Benefits

- Gait speed assessment requires minimal training and minimal equipment and is free to perform.
- The estimated time to complete is <10 minutes.

Risk of Harm/Cost

- No adverse events have been documented.
- Clinicians should monitor for potential risks during test administration, including but not limited to changes in vital signs during positional changes and risk of falling, to provide necessary supports to minimize harm.

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

The 4-m gait speed is included in the Short Physical Performance Battery (SPPB) (supplemental measure 7) and thus supports its implementation over other gait speed protocols.

Intentional Vagueness

The GDG is recommending the 4-m gait speed test as it is utilized in 3 level 1 studies included in this CPG. However, the Academy of Neurologic Physical Therapy COMS² recommends the 10-m walk test for patients with chronic neurological conditions using the standardized protocol by Steffen and Seney.⁸⁷ The 10-m walk test for acute neurological conditions is a best practice recommendation² and may be used in place of the 4-m test for this patient population. Additionally, clinicians may replace the 4-m gait speed test with the 5-m gait speed test before and after cardiac surgery as recommended in the Society of Thoracic Surgeons Adult Cardiac Surgery Database.⁸³

Role of Patient Preferences

The clinician should consider the patient's prior level of ambulation and current functional status in the hospital. Patients may select preferences for donning personal footwear, but clinicians should consider how shoes may impact performance. If the patient and family have a goal of returning to ambulation, but the patient is unable to ambulate (ie, ICU-acquired weakness), the physical therapist should document the reasons for not performing the test.

Exclusions

- Physical therapists should use clinical discretion and document when assessing gait speed is not appropriate, such as when a patient presents with hemodynamic instability or ongoing clinical concerns that prevent examination of functional mobility.
- Physical therapists should omit gait speed assessment when patients who do not have explicit goals to improve ambulatory status, such as patients who are unable to perform bipedal locomotion at baseline or prior to admission. For patients unable to perform bipedal locomotion in the acute care setting (eg, due to amputation or spinal cord injury), the GDG recommends assessing transfer ability using AM-PAC or may consider additional measures more specific to that activity domain (eg, the function in sitting test, which has been used to examine patients with acute neurological conditions in the acute care environment).⁸⁸

Differences of Opinion

There were no differences of opinion.

Quality Improvement

- Acute care clinicians not currently assessing gait speed as a measure of functional mobility should consider quality improvement projects to incorporate this measure.
- Documentation of self-selected gait speed in meters per second provides uniform data regardless of the protocol

Table 5. Levels of Evidence and Psychometric Data on Self-Selected Gait Speed for Short Distances (2.5–15 M)^a

Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Distance Traveled (m)	Psychometric Data (Strength): Raw Data Abbreviated
1	Hollman et al ⁷⁸ (2008)	16 ^c	78 (9)	Surgical fixation of hip fracture	4.7 (SD = 2.0) d after surgery	10	Reliability (++) : ICC test-retest = 0.82 (95% CI = 0.57–0.93) Responsiveness (?): SEM = 0.029 m/s; MDC = 0.082 m/s
1	Ostir et al ⁷⁷ (2012)	322	76 (7)	Older adult, medical	24 h after admission	2.5	Floor effect (+): 36% Predictive validity (++) : gait speed was predictive of LOS (OR = 0.24–1.92; C-statistic = 0.64); slower gait speed reduced odds of DC to home (OR = 0.03–0.08; C-statistic = 0.84) (see Tables 3 and 4 in original article)
1	Kon et al ⁷⁹ (2015)	213	72 (11)	Acute exacerbation of COPD	24 h after hospital DC	4	Predictive validity (++) : risk of 90-d all-cause readmission decreased as 4MGS increased (Q1 [slowest] = 48.2%; Q2 = 30.2%; Q3 = 20.4%; Q4 [fastest] = 11.5%; $P < .001$); increasing odds of readmission at 90 d for each decline in gait speed of 0.1 m/s (OR 95% CI = 1.14–1.48; $P < .001$); 4MGS and hospital admissions in the last year had a C-statistic of 0.78 to predict readmission
1	Ibrahim et al ⁸⁰ (2019)	233	80 (75–86)	Older adult, medical	NS	4	Floor effect (+): 66% unable to participate
1	Pandey et al ⁸¹ (2019)	202	71 (7) prefrail 73 (8) frail	Heart failure	Initial session	4	Construct validity (++) : per change in gait speed of 0.10 m/s, there was an increase of 28 (SD = 2) m in 6-min walk distance ($P < .001$), and there was a reduction in self-reported difficulty with mobility on Eq-5D (–0.1 [SD = 0.0]; $P < .001$) Discriminative validity (++) : slow gait speed had highest discrimination (C-statistic = 0.73) for distinguishing frail from prefrail patients
2	Purser et al ⁸² (2005 ^d)	1388	74 (6)	Older, frail adult, medical	Hospital admission and hospital DC	15	Floor effect (+): at admission 74% and at DC 57% were categorized as ambulating at <0.17 m/s Predictive validity (++) : an increase of 0.10 m/s corresponded to a score ~4.5 points higher on the SF-36; 0.63 fewer ADL disabilities; 2 fewer inpatient rehabilitation visits; 3 fewer inpatient medical-surgical visits; and an association with lower costs during index admission
2	Clark et al ⁸⁴ (2018)	333	Fast gait speed: 58 (50–67) Intermediate gait speed: 64 (55–75) Slow gait speed: 70 (65–77) 68 (15)	Cardiac surgery	Before surgery	5	Predictive/construct validity (+): gait speed was not associated with the development of shock after surgery or in-hospital mortality
2	McNicholl et al ⁸⁵ (2019)	1250	68 (15)	Mixed	NS	5	Floor effect (+): only 43% (n = 535/1250) of patients were able to complete the 5-m walk test Validity (++) : patients who had a perceived disability had slower gait speed compared to individuals without a disability (t = 10.69, $P < .001$)

(continued)

Table 5. Continued.

Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Distance Traveled (m)	Psychometric Data (Strength): Raw Data Abbreviated
2	Afilalo et al ⁸³ (2018)	8287	74 (69–79]	Cardiac surgery	Before surgery	5	Predictive validity (++): continuous gait speed was also predictive of 1-y mortality (HR = 2.16 per decrease of 0.1 m/s in gait speed; 95% CI = 1.59–2.93); continuous gait speed was also predictive of all-cause hospitalization (adjusted HR = 1.71 per decrease of 0.1 m/s in gait speed; 95% CI = 1.45–2.02)
2	Walsh et al ⁸⁶ (2021)	213 ^e	72 (11)	AE of COPD	Hospital DC	4	Predictive validity (++): independent predictor of all-cause readmission, with an adjusted cause-specific HR of 0.868 (95% CI = 0.799–0.943; $P = .001$) and an SHR of 0.868 (95% CI = 0.797–0.945; $P = .001$) per increase in gait speed of 0.1–1 m/s; all-cause mortality 4MGS as continuous measure had an unadjusted cause-specific HR of 0.773 (95% CI = 0.669–0.892; $P < .001$) and an HR of 0.773 (95% CI = 0.665–0.899; $P = .001$) per increase in gait speed of 0.1–1 m/s

^aADL = activities of daily living; AE = acute exacerbation; COPD = chronic obstructive pulmonary disease; DC = discharge; Eq-5D = EuroQol Group EQ-5 Domain Health Questionnaire; ES = effect size; 4MGS = 4-m gait speed test; HR = hazard ratio; ICU = intensive care unit; LOS = length of stay; MCID = minimal clinical importance difference; MDC = minimal detectable change; NS = not specified or reported; OR = odds ratio; gait speed quartiles Q1 = <0.40 ms⁻¹ (n = 54); Q2 = 0.40–0.59 ms⁻¹ (n = 53); Q3 = 0.60–0.79 ms⁻¹ (n = 54); Q4 = ≥0.80 ms⁻¹ (n = 52); SEM = standard error of measurement; SF-36 = 36-Item Short Form Survey; SHR = sub-distribution hazard ratio. ^bPresented as mean (SD) or median (interquartile range). ^cA power analysis conducted a priori demonstrated that a minimum of 7 to 10 patients were required to establish a minimally acceptable reliability coefficient of 0.75 with $P = .05$. ^dSecondary analysis of previously published randomized controlled trial aggregating and controlling for data from treatment and control groups.

^eWalsh et al⁸⁶ (2021) is a secondary analysis of Kon et al⁷⁹ (2015), potentially indicating that duplicate data may have been present.

or the walking track selected, which enhances the ability to perform comparative analyses.

Implementation and Audit

- Assessors should receive training, annually establish reliability, and follow a designated standardized protocol based on the selected distance to ensure consistency.
- Patients should be assessed on a clear path over solid flooring, with marks indicating the start and end points. The GDG strongly urges clinicians to measure the time to walk across the track and calculate the time in meters per second such that scores can be compared to reference values and height-normalized measures to improve interpretations.⁸⁹ Gait speed may not be appropriate for clinical situations in which patients are restricted to a small hospital room because of isolation status.
- The GDG recognizes that illness acuity, weight-bearing status, or other significant injury may preclude patient performance. Clinicians should document the specific clinical situation and use clinical judgment to select an appropriate replacement.
- Electronic health records may need revision to document gait speed in a predictable area of the record for interprofessional communication.
- Audits of adult patients who have received physical therapist services in the hospital should examine whether gait speed is being documented.

Supporting Evidence and Clinical Interpretation

Clinicians and researchers should document gait speed in meters per second. Gait speed is an objective measure that can be assessed across patient populations and the continuum of care. Currently, multiple protocols have been reported in the literature, including 2.5-, 4-, 5-, 10-, and 15-m gait speed or “walk” tests that inform this recommendation. Multiple gait speed protocols introduce practice variations, reduce the strength of the psychometric properties and the ability to perform comparative analyses. The GDG recommends using the 4-m gait speed test on the basis of 3 level 1 studies, clinical expertise considering potential constraints for space in hospital room and overlap with the SPPB.⁹⁰

The protocol for the 4-m gait speed test includes a marked walking track (preferably with clear demarcations of start and finish lines). Patients are instructed to start just behind the starting line and walk at their “usual speed, just as if they were walking down the street to go to the store.” Patients are instructed to start walking after the command “ready, 3, 2, 1, go” and walk past the finish line. The rater should demonstrate the test and let the patient have a practice trial. Stopwatch recording begins with the patients first movement and stops when the first foot passes the finish line.⁹¹ The gait speed test recommended in this CPG is designed to assess self-selected (ie, habitual) walking speeds over a walking track in line with the original 4-m gait speed protocol. Normal or habitual walking speed also provides the ability to compare

to normative data for different age groups. Psychometric data are summarized in Table 5.

- Only 1 level 1 study assessed gait speed test-retest reliability in patients after hip fracture surgical fixation, resulting in an ICC of 0.823.⁷⁸ Interrater reliability and intrarater reliability of gait speed have not been assessed in English in the acute care environment. Data for responsiveness in acute care are limited as there are no reports of MCID. Data from 1 level 1 study suggests responsiveness of gait speed for patients following hip fracture with an MDC of 0.08 m/s and an SEM of 0.03 m/s.⁷⁸ Self-selected gait speed has good to excellent validity, with studies indicating that slower gait speed increases the likelihood of hospital readmission in 90 days (OR = 2.8),⁷⁹ is related to higher health care costs after discharge,⁸² and is predictive of 1-year mortality.^{83,86} Faster gait speed is predictive of discharge to home⁷⁷ and improved physical function 1 year after hospital admission.⁸²
- The strength of the recommendation for gait speed is reduced by several studies suggesting that a significant floor effect may be present when measuring in the acute care setting (ranging from 36% to 74%).^{77,80,82,85}

The data reported in this CPG are focused on the acute care environment; however, gait speed is recommended as the “sixth vital sign” and recognized as an important indicator of health and functional status in multiple settings and patient populations.^{92,93} Normative values for gait speed are available on the basis of age^{91,94} and the care environment.⁹⁵ Gait speed is an important barometer of recovery and gait speed is commonly assessed across the continuum of care for patients surviving an ICU admission.^{96,97} In the acute care setting, gait speed has been studied in orthopedic,⁷⁸ pulmonary,⁷⁹ and general populations of adults in the hospital.^{77,82}

Research Recommendation 3

Comparative studies are needed to identify whether a specific protocol (2.5, 4, 5, and 10 m) provides better psychometric properties with better discriminatory values in both general hospital and specific patient populations.

Research Recommendation 4

Studies are needed to determine whether self-selected versus fast gait speed and static versus rolling start have better reliability, responsiveness, and validity for adult patients in the hospital.

Research Recommendation 5

Prospective studies are needed to establish the psychometric properties of inter and intrarater reliability and responsiveness of gait speed performed in the acute care environment.

Action Statement 3: Interprofessional Assessment of Mobility Level

Physical therapists should advocate for measuring mobility levels in adult (≥ 18 years old) patients who are hospitalized for an acute or chronic illness, injury, or surgery, using the ICU Mobility Scale (IMS) or the Johns Hopkins Highest Level of Mobility (JH-HLM) at least once per day by a member of the interprofessional health care team.

Aggregate Evidence Quality and Strength

- Grade B, moderate strength: assessment of mobility level using the IMS is based on 4 level 1 studies^{90,98–100} and 1 level 2 study⁵⁶ (Table 6). The recommendation is downgraded from strong to moderate, as the IMS to date has little evidence examining predictive validity.
- Grade B, moderate strength: assessment of mobility level using the JH-HLM is based on 2 level 1 studies^{29,101} and 1 level 2 study¹⁰² (Table 6). The recommendation is downgraded from strong to moderate, as the JH-HLM to date has little evidence examining predictive validity.

Benefits

- The IMS and the JH-HLM are both used to track the highest level of patient mobility achieved in a 24-hour or shift-based time frame. They require minimal training and minimal equipment, are free to administer, and generally take <1 minute to complete.
- The IMS and the JH-HLM can be administered by any member of the interprofessional health care team including, but not limited to, physical therapists, occupational therapists, physical therapy assistants, certified occupational therapy assistants, nurses, certified nursing assistants, respiratory therapists, advanced practice providers, physicians, and other support personnel.

Risk of Harm/Cost

- No adverse events have been documented.
- The assessment and tracking of daily mobility level by a member of the interprofessional health care team may require commitment, higher levels of engagement, and hospital personnel support to implement.¹⁰³ A long-term plan and multiple phases of implementation may be needed to generate standard protocols and ensure adherence to consistent patient mobility assessment.¹⁰⁴ Barriers to implementing a hospital wide initiative may be expected.¹⁰⁵

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

There are no value judgments.

Intentional Vagueness

There is no intentional vagueness.

Role of Patient Preferences

Maintaining functional status and promoting mobility are frequently recognized as important outcomes by patients and their caregivers during acute illness and hospitalization.^{106–108} The IMS or the JH-HLM may be useful in discussions with patients and families to establish expectations around the frequency of mobility.¹⁰⁸

Exclusions

There are no exclusions.

Differences of Opinion

There are no differences of opinion.

Table 6. Levels of Evidence and Psychometric Data Supporting the IMS and JH-HLM^a

Outcome Measure	Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data Abbreviated
IMS	1	Hodgson et al ⁹⁸ (2014)	100	58 (17)	Mixed	During ICU admission	Reliability (++): interrater reliability ICC = 0.80 (95% CI = 0.75–0.84); weighted κ comparing nurse to physical therapist ranged from 0.69 to 0.72; weighted κ comparing senior physical therapist to junior physical therapist = 0.84
	1	Parry et al ⁹⁰ (2015)	66	58 (17)	Mixed	Awakening and ICU DC	Floor effect (++): 16.7% for awakening; 0% for ICU DC Ceiling effect (++): 0% for awakening; 4.7% for ICU DC Responsiveness (?): awakening to discharge improved significantly ($z = -6.71$; $P < .005$) with effect size of 0.59 Predictive validity (+): IMS not predictive of DC to home ($P = .143$) at awakening but predictive at ICU DC (OR = 1.54; $P = .011$) Validity: criterion to PFIT-S rho = 0.66–0.81; construct to MRC-ss rho = 0.69
	1	Tipping et al ¹⁰⁰ (2016)	192	58 (16)	MV for ~48 h	Enrollment, ICU DC, and 6 mo later	Floor effect (+): 96% for enrollment; 14% for ICU DC Ceiling effect (++): 0% for enrollment; 4% for ICU DC Responsiveness (?): effect size for change in IMS was large ($d = 0.8$) Predictive validity (++): increasing IMS predicted survival to 90 d (OR = 1.38; 95% CI = 1.14–1.66) and DC to home (OR = 1.16; 95% CI = 1.02–1.32), after adjustments (see Table 3 in original article)
	1	Tipping et al ⁹⁹ (2018)	184	62 (45–73)	Mixed	Initial physical therapist examination and physical therapist DC	Responsiveness (?): cutoff of 3 demonstrated clinically significant change with sensitivity of 84.93% and specificity of 92.11%; at ICU admission the SEM was 0.89 and the effect size was 0.99; at ICU DC the SEM was 1.26 and the effect size was 1.4; MID = 0.89–3.0
	2	Tymkew et al ⁵⁶ (2020)	1203	NS	Mixed	Initial physical therapist examination	Predictive validity (++): initial AM-PAC score estimated an AUC of 0.71 (range = 0.67–0.76) for DC to home; raw score of 14 or higher (t score of 35.55 or higher) predicted DC to home with a sensitivity of 68.4% and a specificity of 75.1%
JH-HLM	1	Hoyer et al ²⁹ (2018)	118	57 (16) reliability cohort 53 (17) validity cohort	Neuroscience unit	Hospital DC	Reliability (++): test-retest reliability ICC 95% CI = 0.90–0.96 between physical therapists; interrater reliability ICC 95% CI = 0.97–0.98 between physical therapists Responsiveness (?): SEM = 0.2; MDC (95%) = 0.6 Validity: moderate correlations with grip strength, ADL measure, 5-times sit-to-stand test, and 2-min walking test
	2 ^c	Kappel et al ¹⁰² (2018)	59	66 (range = 24–100)	Orthopedic unit	Hospital admission	Validity (++): JH-HLM scores at initial assessment correlated with hospital LOS ($r = -0.33$; $P = .02$); JH-HLM also correlated with PTMA and OTAA

(continued)

Table 6. Continued.

Outcome Measure	Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data Abbreviated
	1	Hiser et al ¹⁰¹ (2021)	76	64 (56–71)	Mixed	Routine physical therapy session	Reliability (++) : interrater reliability demonstrated 95% perfect agreement equating to ICC = 0.98 (95% CI = 0.96–0.99) Floor effect (++) : 0% Ceiling effect (++) : 12%

^aADL = activities of daily living; AM-PAC = Activity Measure for Post-Acute Care Inpatient Basic Mobility Short Form; AUC = area under the curve; DC = discharge; ICU = intensive care unit; IMS = Intensive Care Unit Mobility Scale; JH-HLM = Johns Hopkins Highest Level of Mobility; LOS = length of stay; MDC = minimal detectable change; MID = minimal important difference; MRC-ss = Medical Research Council Sum Score; MV = mechanical ventilation; NS = not specified or reported; OR = odds ratio; OTAA = Occupational Therapy Assistance Assessment; PFIT-S = Physical Function in the ICU Test Score; PTMA = Physical Therapy Mobility Assessment; SEM = standard error of measurement. ^bPresented as mean (SD), median (interquartile range), or mean (range). ^cLevel 2 study rating as the purpose of the project was initially quality improvement; data were presented for the intervention period of the quality improvement.

Quality Improvement

- Physical therapists and physical therapist assistants should be leaders in developing and supporting initiatives for regular, daily assessment of patients' highest level of mobility during hospitalizations.¹⁰⁹ Interprofessional health care teams can leverage their combined expertise and shared goal of preventing hospital acquired functional decline to establish standard protocols and track adherence using the IMS or the JH-HLM.
- Documentation of daily mobility levels may elucidate patterns of mobility or immobility, and thus lead to initiatives to combat the negative consequences of prolonged immobility.

Implementation and Audit

- Electronic health records may need revision to include the IMS or JH-HLM as mobility measures in a predictable area of the record for interprofessional communication. This may include incorporating data from other areas of documentation to complete the daily assessment of patients' highest levels of mobility in each 24-hour period.
- Interprofessional teams should receive training and annually establish reliability on the IMS or JH-HLM.
- Audit electronic health records to determine how often, on whom, and by whom the mobility levels are documented by the interprofessional team.

Supporting Evidence and Clinical Interpretation

Immobility is a common consequence of hospitalization^{14,110,111} that can lead to adverse patient outcomes including muscle atrophy,¹¹² impairments in physical function,^{13,18,113} and increased risk of long-term morbidity.¹⁶ Observational data demonstrates that patients engaging in higher levels of mobility during their hospitalization have better outcomes.¹¹⁴ Daily assessment of patient mobility level is one approach to enhance team awareness of patient functional status and improve communication among health care team members.¹¹⁵ The IMS or the JH-HLM can be used to assess adult patients in the hospital; neither tool is restricted to a specific hospital location or patient population.

The IMS is an 11-point scale used to document a patient's highest mobility level (lying in bed to walking independently without a device) with a ranking of 0 to 10.¹¹⁶ A score is given on the basis of the highest level of mobility achieved since the last administered score, or at minimum once per day. The IMS has good to excellent reliability with high interrater reliability among physical therapists and good interrater reliability between nurses and physical therapists.⁹⁸ Responsiveness of

IMS with MID or MCID have not been confirmed, but multiple studies support responsiveness with an MDC ranging from 0.89 to 3 units.⁹⁹ The IMS has negligible to minor floor effects (range = 0%–17%) and negligible ceiling effects (range = 0%–3%) in patients in the ICU.^{90,100} Finally, higher IMS scores were predictive of 90-day survival and likelihood to discharge to home after hospital stays.¹⁰⁰

The JH-HLM is used to document a patient's highest level of mobility (lying in bed to walking ~75 m [250 ft]) on an 8-point scale. A score is based on the highest level the patient achieves during the session or in a day. The JH-HLM has been implemented in a health care system to track interprofessional awareness of patient mobility level, and thus has excellent clinical utility while promoting a common language surrounding patient function.¹¹⁷ The JH-HLM has good to excellent reliability, with high interrater reliability among physical therapists (ICC = 0.98 [95% CI = 0.96–0.99]) and high test-retest reliability (ICC = 0.94 [95% CI = 0.90–0.96]).^{29,101} The JH-HLM has a reported MDC of 0.6 unit and an SEM of 0.2.²⁹ In a quality improvement study, lower JH-HLM scores were negatively correlated with hospital length of stay ($r = -0.33$; $P = .02$).¹⁰² The JH-HLM is a free tool and has online resources for users.¹¹⁸

Research Recommendation 6

Researchers and clinicians should perform prospective head-to-head analyses to determine if the IMS or the JH-HLM has superior psychometric properties to provide divergence.

Research Recommendation 7

Researchers and clinicians should investigate the reliability, responsiveness, and predictive validity of these tools when performed by diverse members of the interprofessional health care team to strengthen the recommendation.

Recommendations for Supplemental Measures

In addition to the core set of measures, clinicians may select 1 or more of these supplemental measures to the COMS (action statements 1–3) when more specific data is required related to patient goals. These supplemental OMs should augment the COMS; they are not a substitute for any of the recommended core set.

Action Statement 4: Activity Limitation Assessment in the ICU

To augment the core set of 3 measures, clinicians may assess physical function for patients in the ICU by selecting 1 of the following 4 ICU-specific OMs at initial examination and

hospital milestones or repeated at minimum once every 7 days. Clinicians should choose the OM to use consistently within their respective ICU type (eg, pulmonary, neurological, or cardiovascular):

- Chelsea Critical Care Physical Assessment Tool (CPAx) for patients who require mechanical ventilation or have significant respiratory compromise or injury and functional mobility impairment,
- Functional Status Score for ICU (FSS-ICU) for patients at risk of developing functional mobility impairment and limited endurance,
- Physical Function in the ICU Test Score (PFIT-S) for patients at risk of developing functional mobility impairment, limited endurance, and/or anticipated muscle weakness, or
- Perme ICU Mobility Score for patients at risk of developing functional mobility impairment, anticipated or known mental status fluctuations, and significant barriers to early physical rehabilitation (eg, multiple ICU lines and tubes, recent cardiac surgery, pain).

Aggregate Evidence Quality and Strength

- Grade C, weak strength: assessment of functional mobility using the CPAx is based on 3 level 1 studies^{119–121} (Table 7); the strength is downgraded to weak, as predictive validity and reliability data are limited.
- Grade B, moderate strength: assessment of functional mobility using the FSS-ICU is based on 2 level 1 studies^{90,122} and 4 level 2 studies^{56,123–125} (Table 7); the strength is downgraded to moderate, as the majority of data are from retrospective or secondary analyses.
- Grade B, moderate strength: assessment of functional mobility using the PFIT-S is based on 4 level 1 studies^{61,90,126,127} and 2 level 2 studies^{47,128} (Table 7); the strength is downgraded to moderate, as data on predictive validity are equivocal.
- Grade C, weak strength: assessment of functional mobility, barriers to mobility, and cognitive status using the Perme ICU Mobility Score is based on 3 level 1 studies^{129–131} (Table 7); the strength is downgraded to weak, as neither responsiveness nor predictive validity has been established.

Benefits

- Each of the 4 OMs are designed for patients in the ICU, enhancing validity and specificity of the assessment, and potentially addressing known limitations in OMs recommended in action statements 1 to 3, including floor effects at ICU awakening. In patients with severely limited functional mobility, strength deficits, waxing and waning hemodynamic stability and/or cognitive status, inability to ambulate, and many other clinical situations common in ICU physical therapist care, these ICU OMs demonstrate greater sensitivity to functional change, strength, and fluctuation in health status in the ICU environment. For example, FSS-ICU, CPAx, and Perme ICU Mobility Score allow the physical therapist to evaluate transitional movements within the bed, including static sitting, with greater discrimination compared to tools not designed for the ICU environment.
- The CPAx, FSS-ICU, PFIT-S, and Perme ICU Mobility Score are free to perform. The estimated completion time

ranges from 10 to 25 minutes, and the OMs are designed to be incorporated into clinical practice, thus promoting clinical utility and efficiency.

Risk of Harm/Cost

There are minimal risks to assessing functional mobility in the ICU that should be addressed by anticipating challenges to any patient's level of engagement prior to testing. Physical therapists should manage and/or coordinate with members of the interprofessional health care team to ensure all lines and tubes are secured and monitored during testing to reduce risk of dislodgement. Physical therapists and support staff should provide appropriate guarding and assistance to the patient.

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

There are no value judgments.

Intentional Vagueness

There is no intentional vagueness.

Role of Patient Preferences

Restoration of physical function is a priority for many ICU survivors.¹³² Patient diagnoses, hemodynamic stability, goals, and preferences as well as the ICU type may influence which of the 4 OMs to select to augment the core set.

Exclusions

- Physical therapists should use clinical discretion when assessing functional mobility in the ICU and document test omission when it is not appropriate, such as when a patient has hemodynamic instability or ongoing clinical issues preventing safety during testing.
- Physical therapists should coordinate with the ICU interprofessional health care team to ensure patient safety, manage all lines and tubes, and continuously assess vital signs during testing.

Differences of Opinion

- Minor: The GDG recognizes that not recommending one measure over the others for assessing ICU function may lead to unnecessary heterogeneity; however, the psychometric data and clinical utility of the 4 OMs prevented consensus. A unanimous vote supported including all 4 measures so clinicians could select 1 on the basis of their setting and patient population(s). Clinicians should select measures to align with patient needs within the ICU setting and consistently utilize the same OM for all patients with similar conditions.

Quality Improvement

- Documentation of functional mobility in the ICU provides objective data, which may enhance communication among health care professionals to promote mobilization and rehabilitation interventions for patients in the ICU.
- The assessment of functional mobility in the ICU provides opportunity for intra and extrahospital comparisons and should be considered for entry into patient registries.

Table 7. Levels of Evidence and Psychometric Data Supporting Best Practice Recommendation for Assessing Activity in the Intensive Care Unit (ICU)^a

Outcome Measure	Level of Evidence	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data
CPAx	1	Corner et al ¹²¹ (2013)	33	67 (51–75)	Mixed	Admission	Internal consistency (++): Cronbach $\alpha = 0.79$ Interrater reliability (++): $\kappa = 0.988$ (95% CI = 0.791–1.00)
	1	Corner et al ¹²⁰ (2014)	499	62 (18)	Mixed	Within 48 h of ICU admission	Floor effect (++): 3.2% Ceiling effect (++): 0.8%
	1	Corner et al ¹¹⁹ (2015)	30	47 (21)	Burns	ICU admission	Responsiveness (?): SEM = 2.5 Floor effect (+): 67% at ICU admission
FSS-ICU	1	Hiser et al ¹²² (2018)	76	64 (56–71)	Mixed	During ICU admission	Interrater reliability (++): ICC 95% CI = 0.981–0.987
	1	Parry et al ⁹⁰ (2015)	66	58 (17)	Mixed	ICU awakening	Responsiveness (++): MID = 4.3–5.6 Floor effect (++): 0%–3% Ceiling effect (++): 0%–3%
	2	Huang et al ¹²⁴ (2016 ^c)	819	Groups	Mixed	Multiple	Floor effect (++): 0%–0.5% Ceiling effect (+): 0.7%–21% Internal consistency (++): Cronbach α range = 0.78–0.95 Predictive validity (++): OR of 1.09–1.23 predicted DC to home
	2	Tymkew et al ⁵⁶ (2020)	1203	NS	Mixed	Initial physical therapist examination	Predictive validity (++): ROC curve for predicting DC to home at initial assessment = 0.71; ICU DC = 0.80 and hospital DC = 0.86
	2	Ragavan et al ¹²⁵ (2016)	26 (validity); 31 (reliability)	54 (20)	Mixed	ICU discharge	Internal consistency (++): Cronbach $\alpha = 0.992$ Interrater reliability (++): ICC 95% CI = 0.969–0.993
	2	Fick et al ¹²³ (2022)	100	53 (14)	CVP	Initial physical therapist examination and last session	Predictive validity (++): ROC curve for predicting DC to home at initial assessment = 0.80
PFIT-S	1	Denehy et al ¹²⁶ (2013)	144	59 (15)	Mixed	Days 5–9 after ICU DC	Responsiveness (++): MCID = 1.5 Predictive validity (+): OR = 1.28 for DC to home; OR = 0.86 for DC to IRF Floor effect (+): 21% Ceiling effect (+): 22%
	1	Costigan et al ¹²⁷ (2019)	40	62 (17)	Mixed	ICU DC	Interrater reliability (++): ICC 95% CI = 0.66–0.86 Responsiveness (?): MDC = 2.4
	1	Parry et al ⁹⁰ (2015)	66	58 (17)	ICU, mixed	ICU awakening and ICU DC	Predictive, criterion, and construct validity (++): PFIT-S was strongly correlated with FSS-ICU ($r = 0.87$; $P < .005$) and IMS ($r = 0.81$; $P > .005$); higher PFIT-S scores on awakening predicted DC to home (OR = 1.59; $P = .004$)
	1	Parry et al ⁶¹ (2020)	151	NS	Mixed	ICU awakening	Predictive validity (++): OR = 1.5 for DC to home Floor effect (++): 1%–7% Ceiling effect (+): 6%–10%; 27% at DC
	2	Nordon-Craft et al ¹²⁸ (2014)	51	51 (16)	ICU, mixed	ICU awakening and ICU DC	Responsiveness (?): using baseline test with ICU DC (26 pairs), test responsiveness was large (1.14); at follow-up PFIT-S testing (21 pairs), an average of 5.67 d after ICU DC, responsiveness was moderate (0.59) Construct/predictive validity (+): PFIT-S scores correlated with MRC-ss ($r = 0.923$) and grip strength ($r = 0.763$) ($P < .0005$); PFIT-S at baseline had significant relationships with disposition to LTAC

(continued)

Table 7. Continued.

Outcome Measure	Level of Evidence	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data
Perme	2	Thrush and Steenberg ⁴⁷ (2022)	2793	58 (44–70)	Mixed	Initial physical therapist examination and last session	Responsiveness (++): MID = 3.9; ES = 0.87 Floor effect (++): 1%–3% Ceiling effect (+): 3%–25%
	1	Nawa et al ¹³¹ (2014)	20	65 (20–86)	CVP	Initial physical therapist examination	Interrater reliability (++): ICC 95% CI = 0.977–0.998
	1	Perme et al ¹²⁹ (2014)	35	67 (26–92)	CVP	Initial physical therapist examination	Interrater reliability (++): overall agreement between the raters had a median of 94.29% (range = 68.57%–100%)
	1	Perme et al ¹³⁰ (2020)	250	63 (15)	Mixed	Initial physical therapist examination	Construct validity: moderate with MRC-ss ($r = 0.66$)

^aCPAx = Chelsea Critical Care Physical Assessment Tool; CVP = Cardiovascular and pulmonary intensive care; DC = discharge; ES = effect size; FSS-ICU = Functional Status Score for ICU; IMS = ICU Mobility Scale; IRF = inpatient rehabilitation facility; LOS = length of stay; LTAC = long-term acute care; MCID = minimal clinically important difference; MDC = minimal detectable change; MID = minimal important difference; MRC-ss = Medical Research Council Sum Score; NS = not specified or reported; OR = odds ratio; Perme = Perme ICU Mobility Score; PFIT-S = Physical Function in the ICU Test Score; ROC = receiver operating characteristic; SEM = standard error of measurement. ^bPresented as mean (SD) or median (interquartile range). ^cHuang et al¹²⁷ (2016) was a secondary analysis of 5 studies in 3 countries (the United States, Australia, and Brazil) that may have been administered with different protocols and language and therefore should be considered in the interpretation of the data. Ages of patients in the 5 studies ranged from 54 (SD = 15) to 75 (SD = 9) years.

Implementation and Audit

- Clinicians should receive training on using OMs and establish reliability annually to ensure the psychometric values are maintained.
- Electronic health records may need revision to include OM documentation in a predictable area of the record for interprofessional communication.
- Audits of adult patients in the ICU who have received physical therapist services may indicate whether functional mobility using 1 of the 4 OMs is being routinely documented.

Supporting Evidence and Clinical Interpretation

The CPax, FSS-ICU, PFIT-S, and Perme ICU Mobility Score were intended for use in patients with critical illness in the ICU. Each of the 4 OMs have been studied in previous systematic reviews and a CPG for management of delirium in the ICU.^{133,134} The GDG did not achieve consensus on a singular ICU measure on the basis of psychometric data and clinical utility. Each ICU measure includes slightly different elements that may enhance clinical utility for specific ICUs or environments. Solely on the basis of psychometric data, the PFIT-S may be slightly superior to other 3 tests. Regarding clinical utility, including time to complete, the FSS-ICU and the PFIT-S may be slightly superior to the other 2 tests. However, each 1 of the 4 tests can be incorporated into routine physical therapist practice. If clinicians decide to augment the COMS with an ICU measure, then the GDG recommends that clinicians select 1 of the 4 OMs on the basis of their respective unit types (eg, pulmonary ICU vs cardiovascular ICU vs trauma ICU). Once the patient has transitioned to a progressive and/or floor unit (non-ICU environment), the GDG recommends continued use of the COMS. If a patient in the ICU is unable to complete any of the COMS (action statements 1–3) because of floor effects, then the GDG encourages clinicians to select 1 of the 4 OMs on the basis of their respective patient population/unit type for continued assessment in the ICU. Psychometric data for the 4 OMs are presented below.

The Chelsea Critical Care Physical Assessment Tool rates physical function in the critical care population from level 0 (unable) to level 5 (independence) on 10 domains, including respiratory components (ventilator/oxygen support and cough), grip strength using handheld dynamometer, and 7 functional tasks of bed mobility: supine to sitting, sitting at edge of bed, dynamic sitting, standing balance, sit-to-stand, bed-to-chair transfer, and stepping. A higher score indicates a higher level of function.¹²¹ The CPax uniquely includes oxygen requirements and the effectiveness of a patient's cough in the assessment. Clinicians may choose this test when working with patients in a pulmonary or medical ICU with predominant acute or chronic respiratory illness in the ICU. The CPax has high interrater reliability ($\kappa = 0.99$)¹²¹ and good internal consistency (Cronbach $\alpha = 0.79$).¹²¹ A SEM has been established as 2.5.¹¹⁹ In 30 patients hospitalized in a burn ICU, there were negligible floor and ceiling effects at 3.2% and 0.8%, respectively.¹²⁰ The CPax is free to use, requires minimal training, and takes 10 to 30 minutes per standardized instructions.¹²¹

The FSS-ICU measures performance-based physical function tasks including rolling, supine-to-sit transfer, sit-to-stand transfer, sitting on the edge of the bed, and walking or propelling a wheelchair ~45 m (150 ft).^{124,135} The level of assistance needed to complete each task is scored from 0 to 7 points, with a possible total of 35; a higher score indicates greater independence. Clinicians may choose the test for a diverse spectrum of ICU settings including cardiothoracic, traumatic, pulmonary, and mixed ICUs. In addition, the test may be appropriate when working with a patient who uses a manual wheelchair for mobility. The FSS-ICU has high interrater reliability (ICC = 0.985 [95% CI = 0.981–0.987])¹²² and high internal consistency (Cronbach $\alpha = 0.992$).¹²⁵ The MID has been established as 4.3 to 5.6 points.^{47,90} In 66 patients hospitalized in a variety of ICUs, negligible floor effects (0%–3%)^{90,124} and minor ceiling effects (0%–21%) were observed.^{90,124} The receiver operating characteristic curve to predict discharge to home ranged from 0.71 to

0.86.⁵⁶ The FSS-ICU is free, requires minimal training to administer, and takes 10 to 30 minutes.¹³⁶

The PFIT-S assesses 4 components including manual muscle testing of the shoulder flexors and knee extensors, sit-to-stand transfer ability, and step cadence. The patient's performance in each section is scored from 0 to 3 points, with a possible total of 12; a higher score indicates higher functional mobility.¹³⁷ Clinicians may choose the test for a spectrum of ICU settings, including cardiothoracic, traumatic, pulmonary, and mixed ICUs. The PFIT-S has good to excellent interrater reliability (ICC = 0.78–1.0).^{127,137} The MCID was determined to be 1.5 units.¹²⁶ Floor and ceiling effects were negligible to minor (0%–21% and 5%–27%, respectively).^{61,126,128} Better performance on PFIT-S was predictive of discharge to home (OR = 1.28–1.56),^{61,126} and lower scores were predictive of discharge to long-term care facilities (OR = 0.7).¹²⁸ The PFIT-S is free to use, requires no training for clinicians, and takes 10 to 20 minutes to complete.¹²⁶

The Perme ICU Mobility Score assesses the mobility status of patients in the ICU and consists of 15 items. The first 6 questions relate to the patient's mental status (level of alertness and command following) and potential mobility barriers. The remaining 9 items relate to the patient's functional strength, bed mobility, transfers, gait, and endurance.¹²⁹ The patient is scored in each section, with a higher score indicating higher mobility status; scores range from 0 to 32. The Perme ICU Mobility Score is unique in its combination of functional mobility and identification of barriers to mobility, including questions pertaining to mechanical ventilation, pain, the presence of lines/tubes, and continuous intravenous infusions. Clinicians may choose the test for a spectrum of ICU settings, including cardiothoracic, traumatic, pulmonary, and mixed ICUs. Clinicians may use this tool with patients in the ICU because of anticipated barriers that influence functional mobility. The Perme ICU Mobility Score has high interrater reliability (ICC = 0.94–0.99).^{129,131} The Perme ICU Mobility Score requires minimal training but does require a license agreement by contacting the author. There are no fees associated with obtaining a license. Completion ranges from 2 to 5 minutes per standardized instructions depending on the patient's mental and functional capacities.¹²⁹

Research Recommendation 8

Prospective studies are needed to investigate the reliability, responsiveness, and predictive validity of these tools.

Research Recommendation 9

Prospective head-to-head comparative studies are needed to examine if the 1 of the 4 OM's has superior psychometric properties and clinical utility for general ICU patient populations as well as specific ICU populations.

Action Statement 5: 6-Minute Walk Test

Clinicians may add the 6-minute walk test (6MWT) to the core set at initial examination and hospital milestones or repeated at minimum once every 7 days when the patient has a goal to improve functional exercise capacity. This might be indicated if an adult patient in the hospital has a goal to improve functional exercise capacity for community ambulation activities or return to prior exercise regime.

Aggregate Evidence Quality and Strength

- Grade C, weak strength: assessment of functional exercise capacity using the 6MWT in hospital settings is based on 2 level 1 studies^{138,139} and 3 level 2 studies^{140–142} (Table 8). The strength of the recommendation is downgraded as data on reliability in acute care settings are not available and the data on predictive validity are equivocal.

Benefits

The 6MWT requires minimal training and minimal equipment and is free.

Risk of Harm/Cost

- The risk of assessing the 6MWT is minimal and should be addressed by assessing the ability of the patient and physiological status to engage in testing. Physical therapists should provide appropriate guarding to minimize fall risk. Patients may use assistive devices but are encouraged to use the least restrictive device to measure their capacity. Physical therapists should monitor vital signs and rating of perceived exertion before, during, and after the test. At hospital discharge following coronary artery bypass graft, 1 patient of 44 experienced pleuritic chest pain during the 6MWT.¹⁴³
- The 6MWT requires at least 26 minutes to perform when the 10-minute rest period is applied before and after testing.
- The 6MWT requires a 30-m walking track to ensure consistency. Shorter walking tracks increase the amount of required turning and alter the validity of the results.

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

There are no value judgments.

Intentional Vagueness

There is no intentional vagueness.

Role of Patient Preferences

Patients may prefer to perform testing with clothing and shoes, especially if the walking track is in a public hallway.

Exclusions

- Defer testing when not appropriate, such as when a patient has hemodynamic instability or ongoing clinical issues preventing testing.
- Patients in "isolation" status may not be able to participate in the 6MWT because of hospital policies, so physical therapists should select an alternate OM with similar constructs, such as the 30-second chair stand test (30-CST).

Differences of Opinion

There are no differences of opinion.

Quality Improvement

Documentation of the 6MWT provides objective data, which may enhance communication among professionals to promote physical rehabilitation interventions.

Table 8. Levels of Evidence and Psychometric Data Supporting Best Practice Recommendations 5–8^a

Outcome Measure	Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data
6MWT	1	Howie-Esquivel and Dracup ¹³⁸ (2008)	44	60 (19)	Heart failure	Hospital DC	Predictive validity (+): distance ambulated on 6MWT 24–48 h before DC was not related to or predictive of 90-d readmission (HR = 0.99; <i>P</i> = .06)
	2	Antonescu et al ¹⁴² (2014)	119	61 (50–72)	Abdominal surgery	Day of operation	Responsiveness (++): linear estimate of MCID: 14–19 m
	1	McCabe et al ¹³⁹ (2017)	71	53 (12)	Heart failure	Hospital DC	Predictive validity (++): better performance on the 6MWT was predictive of reduced odds of 30-d readmission (OR = 0.85; 95% CI = 0.73–0.98); with an increase in the 6MWT of ~30 m (100 ft), the risk of 30-d readmission decreased by 16%
	2	Pastva et al ¹⁴¹ (2021)	202	72 (8)	Acute decompensated heart failure	Hospitalization	Construct validity (+): the 6MWT had weak construct validity with cognition (β = 0.01; <i>P</i> = .006)
	2	Aladin et al ¹⁴⁰ (2021)	202	72 (8)	Acute decompensated heart failure	Hospitalization	Construct validity (+): the 6MWT had weak to moderate construct validity with measures of quality of life (see Table 2 of Aladin et al ¹⁴³)
30 sec STS	1	Costigan et al ¹²⁷ (2019)	35	62 (17)	MV for >24 h	Awakening and ICU DC	Reliability (++): interrater reliability ICC = 0.85 (95% CI = 0.76–0.90) Responsiveness (?): SEM = 1.91; MDC (90%) = 4.45 repetitions
	2	O’Grady et al ¹⁵⁹ (2022)	451	Multiple ^c	Mixed ICU	ICU and hospital DC	Floor effect (++): 15% at ICU DC; 0% at hospital DC Ceiling effect (++): 0% at ICU and hospital DC Responsiveness (?): SEM and MDC (90%) from ICU to hospital DC were 0.51 and 1.19 sit-to-stand repetitions, respectively
SPPB	1	Parry et al ⁹⁰ (2015)	66	58 (17)	Mixed	Awakening and ICU DC	Floor effect (+): 83% at awakening; 57% at ICU DC Ceiling effect (++): 0% at awakening; 0% at ICU DC Responsiveness (+): awakening to DC improved significantly (z = –2.23; <i>P</i> = .026) with effect size of 0.33; MID = 1.3–1.5 Construct validity (++): moderate correlation between the PFIT-S and the SPPB (ρ = 0.70; <i>P</i> < .005)
	2	Pastva et al ¹⁴¹ (2021)	202	72 (8)	Acute decompensated heart failure	Hospitalization	Construct validity (++): SPPB had moderate construct validity with cognition (SPPB β = 0.47; <i>P</i> < .001)
	1	Tew et al ¹⁶³ (2021)	186	79 (6)	Cardiology	Hospital DC	Predictive validity (+): SPPB was not predictive of 90-d readmission or death (HR = 1.13; 95% CI = 0.91–1.40); with modeling for death at 12 mo after controlling for age, sex, and comorbid burden, the SPPB was significant (HR = 1.79; 95% CI = 1.14–2.82; <i>P</i> < .05)
	1	Rengo et al ¹⁴³ (2022)	44	66 (6)	Coronary artery bypass	Hospital DC	Construct validity (+): SPPB did not correlate with self-reported indexes of physical function measured with the SF-36

(continued)

Table 8. Continued.

Outcome Measure	Level	Study	Sample Size	Age ^b	Patient Population	Primary Time Point	Psychometric Data (Strength): Raw Data
TUG	1	Lindsay et al ¹⁷⁰ (2004)	160	81 (range = 65–99)	Mixed	Initial physical therapist evaluation and hospital DC	Predictive validity (+): the TUG was not predictive of risk of falling ($P = .61$)
	1	Salgado et al ¹⁷¹ (2004)	88	86 (4)	Geriatric medical unit	Days 0–3	Predictive validity (+): RR = 0.90 for turning inability on the TUG to predict falling
	1	Gan et al ¹⁷² (2006)	2463	82 (8)	Aged care unit	Hospital admission	Predictive validity (+): weak relationship between the LOS and the TUG ($r = 0.18$; $P < .001$; $n = 932$); HR = 0.85 to predict LOS; TUG did not identify patients with longer LOS
	1	Belga et al ¹⁷³ (2016)	495	64 ^d	Mixed	Hospital DC	Predictive validity (+): aOR = 1.34 with C-statistic of 0.58 to predict 30-d death/readmission
	1	Hajduk et al ¹⁷⁴ (2019)	2587	81 (5)	Acute MI	Day 2	Floor effect (+): 32.2% could not perform at baseline Predictive validity (++): ordinal scale of performance on the TUG was predictive of decline in ADL at 6 mo after DC (aOR = 1.24–5.45) (see Figure 3 in original study)
	1	Wang et al ¹⁶⁹ (2021)	169	56 (13)	Gynecological surgery	Hospital DC	Floor effect (+): 25.4% ($n = 43$) did not perform, with 27 refusing to participate

^aADL = activities of daily living; aOR = adjusted odds ratio; DC = discharge; ES = effect size; ICU = intensive care unit; HR = hazard ratio; LOS = length of stay; MCID = minimal clinically importance difference; MDC = minimal detectable change; MI = myocardial infarction; MID = minimal important difference; MV = mechanical ventilation; PFIT-S = Physical Function in the ICU Test Score; RR = relative risk; SEM = standard error of measurement; SF-36 = the 36-Item Short Form Survey Instrument; SPPB = Short Physical Performance Battery; 30 sec STS = 30-s sit-to-stand test; TUG = Timed “Up & Go” Test; 6MWT = 6-min walk test. ^bPresented as mean (SD), median (interquartile range), or mean (range). ^cSecondary analysis of 5 studies with mean ages of patients ranging from 60 to 66 years (with SDs ranging from 12 to 17 years). ^dSD or interquartile range for age was not provided; ages stratified by frailty were provided in original article.

Implementation and Audit

- Clinicians should receive training on the 6MWT and annually establish reliability to ensure its psychometric rigor.
- Electronic health records may need revision to include OM documentation in a predictable area of the record for interprofessional communication.
- Audits of the 6MWT may examine when and why the test is being performed, which may enhance the clinical utility.
- Physical therapists should follow a standard protocol when administering the test¹⁴⁴ to enhance validity and reliability.
- The CPG strongly urges clinicians to calculate the percentage of predicted distance to improve interpretations of the raw distance.^{145–147}

Summary of Evidence and Clinical Interpretation

The 6MWT is designed to assess a patient’s functional exercise capacity and incorporates constructs of cardiovascular endurance, muscular endurance, and ambulation. The 6MWT records the distance a patient can ambulate in 6 minutes following the American Thoracic Society guidelines.¹⁴⁴ A 30-m walking track is required to perform the test using the standard protocol.¹⁴⁴ However, previous recommendations suggest a 12-m walking track may be appropriate for individuals with neurological conditions.² Raw distance and

the percentage of predicted distance¹⁴⁵ are used for clinical interpretation and comparative analyses.

- In patients recovering from abdominal surgeries ($n = 119$), the MCID of the 6MWT performed on the day of surgery in the hospital and repeated at 1-month follow-up was 14 m (95% CI = 9–18).¹⁴² In patients hospitalized for acute heart failure ($n = 71$), walking longer distances on 6MWT prior to discharge was predictive of a reduced risk of 30-day readmission (OR = 0.84) with each additional ~30.5 m (100 ft) walked, odds of a 30-day readmission decreased by 16%.¹³⁹
- Performance on 6MWT had moderate construct validity when compared to self-report measures of health-related quality of life in 202 patients hospitalized with acute decompensated heart failure.¹⁴⁰ However, the 6MWT did not correlate with a quality of life visual analog scale.¹⁴⁰ A secondary analysis in the same 202 patients, demonstrated that the 6MWT had a small, but significant relationship with cognition ($\beta = 0.01$; $P = .006$) as measured by the Montreal Cognitive Assessment.¹⁴¹
- In patients hospitalized for acute heart failure ($n = 44$), the distance ambulated on the 6MWT 24 to 48 hours before discharge was not predictive of 90-day readmissions (hazard ratio = 0.99; $P = .06$).¹³⁸

This CPG is focused on the acute care environment data but recognizes the importance of assessing functional exercise

capacity across the continuum of care. The 6MWT holds value in multiple physical therapist practice settings outside of the acute care environment, including a recommendation for use during rehabilitation at home¹⁴⁸ and with specific patient populations, including individuals with type 2 diabetes,¹⁴⁹ cardiac diagnoses such as heart failure,¹⁵⁰ post-heart transplant,¹⁵¹ orthopedic issues such as post-hip fracture,¹⁵² hip pain from osteoarthritis,¹⁵³ lower extremity amputation,¹⁵⁴ neurological diagnoses such as concussion or mild traumatic brain injury,¹⁵⁵ and acute and chronic neurological disorders.² The 6MWT is a well-established OM for cardiopulmonary conditions and is frequently used in outpatient cardiac and pulmonary rehabilitation.¹⁵⁶ The 6MWT is used in specific clinical situations to establish baselines and assess recovery trajectories, such as patients with end-stage heart or lung disease listed for transplantation.¹⁵⁷ Moreover, data demonstrate that self-reported health related quality of life on the 36-Item Short Form Survey Instrument and performance on the 6MWT have a moderate association in patients undergoing cardiac surgery ($n = 125$; $r = 0.44$ – 0.54).¹⁵⁸ Thus, the findings may indicate that performance on the 6MWT is an important barometer of perceived health and functional status, especially in non-acute care environments. Despite strong support in multiple settings and patient populations, the 6MWT was not included in the core recommendation, as the psychometric data in English in the acute care environment are equivocal.

Research Recommendation 10

Studies are needed to determine the psychometric properties of the 6MWT in the acute care environment.

Research Recommendation 11

Studies are needed to determine the clinical utility and floor and ceiling effects of the 6MWT in the hospital setting.

Action Statement 6: 30-CST

Clinicians may add the 30-CST to the core set at initial examination and hospital milestones or repeated at minimum once every 7 days when the patient has a goal to improve transfer ability with a parallel goal of improving lower extremity muscle performance. This might be indicated if an adult patient in the hospital has a goal to improve sit-to-stand transfer ability with a parallel goal of improving lower extremity muscle strength and endurance.

Aggregate Evidence Quality and Strength

- Grade C, weak strength: assessment of the 30-CST is based on 1 level 1 study¹²⁷ and 1 level 2 study¹⁵⁹ (Table 8) and the clinical expertise of the GDG. The recommendation is downgraded, as data on reliability, responsiveness, and predictive validity in the acute care setting are limited.

Benefits

- The 30-CST assesses the ability to perform repetitive sit-to-stand transfers in parallel with assessing lower extremity muscular strength and endurance. The 30-CST requires minimal time to complete (<5 minutes) and minimal training and is free.

Risk of Harm/Cost

- No adverse events have been documented.
- The risk of assessing sit-to-stand performance is minimal and should be addressed by assessing the patient's ability and physiological status prior to testing. Physical therapists should provide appropriate guarding to minimize fall risk, particularly ensuring that the chair is stable and will not slip.
- An ~43.2-cm (17-in) chair with a straight back without armrests and a timing device are required to perform the 30-CST.
- When the 30-CST is used as a complement to the core set, physical therapists should monitor patients for fatigue and testing burden.

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

There are no value judgments.

Intentional Vagueness

The 30-CST and the chair rise test, a component of the SPPB (action statement 7), may address overlapping constructs of sit-to-stand ability. Clinicians should use clinical discretion to select the most appropriate measure and may not need to administer both tests.

Role of Patient Preferences

The ability of patients to perform sit-to-stand transfers is a primary marker of independence with activities of daily living, such as standing from the toilet on their own.

Exclusions

Physical therapists should use clinical discretion when assessing sit-to-stand transfers and omit performance when not appropriate, such as with hemodynamic instability or ongoing clinical issues preventing standing. For patients unable to perform sit-to-stand transfers (complete spinal cord injury, orthopedic injury preventing weight bearing), the GDG recommends assessing transfer ability (eg, time and assistance using a transfer board to a wheelchair) or assessing function in supine or sitting positions.

Differences of Opinion

- Minor: Constructs of the 30-CST only partially align with the scope of this CPG, as the test measures components of functional lower extremity strength and endurance, which are classified under the “body function and structure” domain of the ICF model. However, the test does capture sit-to-stand ability. Clinicians support the test as a measure of repetitive sit-to-stand ability, a crucial component of physical function.

Quality Improvement

- Documentation of the 30-CST provides objective data, which may enhance communication among professionals to promote rehabilitation interventions.
- The assessment of sit-to-stand performance in the hospital provides opportunity for intra- and extrahospital comparisons and may be considered for entry into patient registries.

Implementation and Audit

- Clinicians should receive training on the 30-CST and annually establish reliability to ensure its psychometrics if this is a desired OM.
- Electronic health records may need revision to include OM documentation in a predictable area of the record for interprofessional communication.
- Audits of adult patients in the hospital who have received physical therapist services may indicate whether functional mobility is being routinely examined.

Supporting Evidence and Clinical Interpretation

The 30-CST was intended for older adults and a general, nonspecific population of patients in the hospital.¹⁶⁰ Physical therapists should follow the standardized protocol for 30-CST.¹⁶⁰ The STEADI—Older Adult Fall Prevention program of the Centers for Disease Control and Prevention provides clinical resources on the 30-CST.¹⁶¹ The patient is instructed to repeatedly rise from the chair and then sit back down without using his or her arms. On “go,” stated by the rater, the number of times the patient achieves the full standing position in the 30 seconds is counted.

- The 30-CST has been studied in patients surviving an ICU admission.¹²⁷ At ICU discharge, the 30-CST had excellent interrater reliability (ICC = 0.85 [95% CI = 0.76–0.90]) among physical therapists, and the SEM and MDC (90% confidence level) were 1.91 and 4.45 repetitions, respectively.¹²⁷
- In a secondary analysis of 5 ICU rehabilitation RCTs, there were minor floor effects (15%) at ICU discharge and no floor effects at hospital discharge. Ceiling effects were not observed at either time point.¹⁵⁹ The SEM and MDC from ICU to hospital discharge were 0.51 and 1.19 repetitions, respectively.¹⁵⁹

The CPG is focused on the acute care environment but recognizes the importance of OM use across care environments. The 30-CST holds value in multiple settings and may support use beyond the hospital environment, including in home health,¹⁴⁸ rehabilitation of older adults in the community,¹⁶² and across settings for patients with hip pain due to osteoarthritis.¹⁵³

Research Recommendation 12

Studies are needed to establish the 30-CST clinical utility and psychometric properties of reliability, responsiveness, and validity in the acute care environment.

Research Recommendation 13

Studies are needed to understand whether the 30-CST or other versions of the sit-to-stand test (eg, 60-second sit-to-stand test) provide better clinical utility and psychometric value for patients in the hospital setting.

Research Recommendation 14

Studies are needed to determine whether modifications to testing, including use of arms on the chair, alter the psychometric value of the 30-CST.

Action Statement 7: SPPB

Clinicians may add the SPPB to the core set at initial examination and hospital milestones or repeated at minimum once

every 7 days when the patient has a goal to improve physical function. This might be indicated if an adult patient in the hospital has a goal to improve physical function as well as lower body function.

Aggregate Evidence Quality and Strength

- Grade C, weak strength: assessment of physical function using the SPPB is based on 3 level 1 studies^{90,143,163} and 1 level 2 study¹⁴¹ (Table 8). The strength of the recommendation is downgraded because of high floor effects and limited data supporting the reliability, predictive validity, and responsiveness of the SPPB in the acute care setting.

Benefits

- The SPPB has 3 components that require minimal training to perform and minimal equipment; the test is free to administer.

Risk of Harm/Cost

- The risk associated with the SPPB is minimal and should be addressed by assessing the patient’s ability and physiological status prior to testing. Physical therapists should provide guarding to minimize fall risk.
- An ~43.2-cm (17-in) chair, stopwatch, and short walking track (4 m) are needed to administer the test.

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

There are no value judgments.

Intentional Vagueness

There is no intentional vagueness.

Role of Patient Preferences

The SPPB may add value to clinician assessments as it captures multiple domains of physical function and independence. Patients may prefer to perform testing in clothing and shoes while in public areas of the acute care hospital environment.

Exclusions

Physical therapists should omit the test when not appropriate, such as when a patient has hemodynamic instability or ongoing clinical issues preventing standing.

Differences of Opinion

- Minor: The 3 components of the SPPB address similar constructs of previous recommendations. The GDG highly recommends performing the COMS (action statements 1–3) and adding the SPPB for specific clinical populations when the additional components (chair rise test or standing balance) of the SPPB strengthen the assessment and align with patient goals.

Quality Improvement

- Documentation of the SPPB provides objective data, which may enhance communication among professionals to promote rehabilitation interventions.
- The assessment of the SPPB in the hospital provides opportunity for intra and extrahospital comparisons and may be useful for patient registries.

Implementation and Audit

- Clinicians should receive training on using the SPPB and annually establish local reliability to enhance its psychometric rigor.
- Electronic health records may need revision to include OM documentation in a predictable area of the record for interprofessional communication.
- Audits of adult patients in the hospital who have received physical therapist services may indicate whether functional mobility is being routinely examined.
- Clinicians should follow the standard protocol developed by the National Institute on Aging.¹⁶⁴ The patient's raw score from each subcomponent of the test and the total score of the SPPB should be documented.

Supporting Evidence and Clinical Interpretation

The SPPB was designed to assess the lower body functioning in older adults.¹⁴⁸ The SPPB has 3 components (balance tests, gait speed, and chair rise or 5-times sit-to-stand test), and each is demonstrated by the clinician first. For balance tests, the patient is asked to maintain 3 different positions with eyes open for 10 seconds each. If the patient steps out of the position or grabs for support to prevent loss of balance, then the time is stopped. For gait speed, a 3- or 4-m walk test is performed. The fastest of 2 trials of the patient's self-selected walking speed is scored. For the chair rise or 5-times sit-to-stand test, the patient is asked to stand up from a chair without using his or her arms as quickly as he or she can 5 times. The test is stopped if the patient uses his or her arms or after 1 minute if the patient has not completed 5 rises. Psychometric data for SPPB in the acute care environment are limited and equivocal.

- The SPPB had no ceiling effects for patients hospitalized in the ICU and demonstrated a small to moderate effect size for change (0.33) and an MID of 1.3 to 1.5 points from awakening to ICU discharge.⁹⁰ However, high floor effects for patients with critical illness at awakening (78%) and at ICU discharge (56%) were observed.⁹⁰
- In Cox regression analyses, the SPPB at hospital discharge was not predictive of 90-day readmission or death in 186 older adults hospitalized in the cardiology ICU (hazard ratio = 1.13; 95% CI = 0.91–1.40).¹⁶³ However, when modeling for death at 12 months after controlling for age, sex, and comorbid burden, SPPB at discharge was a significant predictor (hazard ratio = 1.79; 95% CI = 1.14–2.82; $P < .05$).
- Performance on the SPPB had small to moderate construct validity when compared to cognitive function in 202 patients hospitalized with acute decompensated heart failure (for SPPB: $\beta = 0.47$; $P < .001$).¹⁴⁰

This CPG is focused on the acute care environment but recognizes the importance of assessing functional mobility across the continuum of care. The SPPB was intended for use in geriatric populations, in whom it has been frequently studied, and has been recommended in community settings.^{165–167} The SPPB has been recommended for use in the home health setting and with patients diagnosed with COVID-19.¹⁶⁸ Thus, the SPPB has high clinical applicability across community settings. The 4-m gait speed test, a component of the SPPB, is included in this CPG as recommendation 2. The chair rise test, a component of the SPPB, is a measure of lower extremity

muscle power and sit-to-stand transfer ability similar to the 30-CST (CPG supplemental measure 6). If there is a need to add or augment the core set when assessing physical function, the SPPB may hold value over the 30-CST and the Timed “Up & Go” Test (TUG), as it includes multiple components in 1 test.

Research Recommendation 15

Studies are needed to establish the psychometric properties of the SPPB in the acute care environment, particularly test-retest and intertester reliability.

Research Recommendation 16

Studies are needed to compare the SPPB to measures with similar constructs (ie, the TUG) to determine if 1 test has superior psychometric properties in the hospital setting.

Action Statement 8: TUG

Clinicians may add the TUG to the core set at initial examination and hospital milestones or repeated at minimum once every 7 days when the patient has a goal to improve physical function. This might be indicated if an adult patient in the hospital has a goal to improve functional mobility incorporating dynamic balance.

Aggregate Evidence Quality and Strength

- Grade C, weak strength: assessment of physical function using the TUG is based on 6 level 1 studies^{169–174} (Table 8). The recommendation strength for the TUG is downgraded, as responsiveness and reliability have not been examined in the acute care hospital environment, and data on the predictive validity of the TUG are equivocal.

Benefits

- The assessment of functional mobility using the TUG requires minimal training and is free to use. The time to complete the OM is less than 10 minutes per standardized instructions.¹⁶¹

Risk of Harm/Cost

- No adverse events have been documented.
- The TUG requires a chair of standard height (46 cm; arm height = 67 cm), a timing device, and an appropriate length (3 m) of marked hallway or space.
- The risk of performing the TUG is minimal and should be addressed by assessing the patient's ability and physiological status prior to engaging in testing. Physical therapists should provide appropriate guarding to minimize fall risk. Patients may use an assistive device but are encouraged to use the least restrictive device to measure functional capability.

Benefit-Harm Assessment

There is a preponderance of benefit.

Value Judgments

There are no value judgments.

Intentional Vagueness

There is no intentional vagueness.

Role of Patient Preferences

There are no known patient preferences.

Exclusions

- Patients with hemodynamic instability or ongoing clinical issues that prevent functional mobility assessment.
- Patients unable to perform bipedal locomotion (eg, recent amputation or complete spinal cord injury).

Differences of Opinion

- Minor: The performance of the TUG may overlap with CPG action statements 1 (AM-PAC or DEMMI) and 2 (gait speed). The TUG should be used as a supplemental measure to the COMS when it is necessary to assess the combination of sit-to-stand performance, balance, and mobility in 1 test. The TUG has also been recommended in other initiatives for specific patient populations and, thus, clinicians may value the test for patients with acute myocardial infarction¹⁷⁴ or hip arthroplasty.¹⁵³

Quality Improvement

- Documentation of functional mobility provides objective data, which may enhance communication among professionals to promote mobilization and rehabilitation interventions for patients in the hospital.
- The TUG is commonly recognized as a useful measure to assess and classify fall risk for adults in the hospital and may be used as a quality improvement measure.

Implementation and Audit

- Regular training should be provided on the TUG annually to establish reliability to ensure its psychometrics if this is a desired OM.
- Electronic health records may need revision to include OM documentation in a predictable area of the record for interprofessional communication.
- Audits or quality improvement projects may examine when the TUG is being used in addition to the core set of recommendations to further determine the benefits of implementing the TUG.

Supporting Evidence and Clinical Interpretation

The TUG is an important barometer of health status as performance has previously been associated with patient's self-evaluated health status and patient-reported outcomes.^{175,176} The TUG was designed to assess dynamic mobility, balance, and walking in older adults.^{177,178} Clinicians should follow the original protocol and model the process for the patient.¹⁶¹ The patient begins seated, with his or her back on the chair back. When the therapist tells the patient "go," the individual is instructed to stand up from the chair, permitting use of arms, and then walk at his or her safe, comfortable walking speed to a line 3 m (9.8 ft) away; the patient turns around, walks back to the chair, and sits down. Patients should be allowed 1 practice trial that is not included in the score.¹⁷⁸

- There are minimal prospective data on the reliability, validity, and responsiveness of the TUG performed in English in the acute care environment. Only 1 of 6 level 1 studies had a ++ psychometric property rating; a study in patients with acute myocardial infarction demonstrated that poor performance on the TUG ($n = 2587$) was predictive of functional decline 6 months after hospital discharge (adjusted OR range = 1.24–5.4).¹⁷⁴

- Five studies had + psychometric ratings, reducing the strength of the recommendation.^{170–173} At hospital admission in a cohort of 2463 older adults, only 37.8% were able to perform the TUG (floor effect = 62.2%), and performance on the TUG was not a clinically significant predictor of length of stay.¹⁷² Floor effects of the TUG in older adults hospitalized with acute myocardial infarction were reported as 31%.¹⁷⁴ Floor effects at hospital discharge for patients undergoing open gynecological surgery were 25.4%, mainly because of high patient refusal.¹⁶⁹ In older adults ($n = 88$) hospitalized in a medical ward, TUG scores were similar between fallers and nonfallers; the inability to turn back during the TUG was a poor predictor of falls (relative risk = 0.90).¹⁷¹ In a retrospective study of 160 patients hospitalized in a general medicine unit, TUG scores were not related to risk of falling ($P = 0.61$).¹⁷⁰ Similarly, TUG scores performed in a general medicine unit were not an independent predictor of posthospital death or readmission, but prediction did improve when adjusted for age and sex (adjusted OR = 1.34; 95% CI = 0.73–2.44).¹⁷³ The culmination of data suggest that the predictive validity of the TUG is equivocal.

The CPG is focused on the acute care environment but recognizes the importance of assessing functional mobility across the continuum of care. The TUG holds value in multiple settings and may enhance the ability to track functional changes over the course of illness. Using the TUG to assess functional mobility is supported for older adults,¹⁶² individuals with diabetes,¹⁴⁹ patients with hip osteoarthritis,¹⁵³ individuals undergoing total hip arthroplasty,¹⁷⁹ patients with lower extremity amputation,¹⁵⁴ and patients experiencing ICU delirium.¹³³ We recommend that the TUG be used in addition to the COMS when clinicians have a desire to assess multicomponent functional status or a specific patient population to enhance the ability to perform trajectory analyses across settings.

Research Recommendation 17

Studies are needed on the psychometric properties of the TUG in the acute care environment.

Research Recommendation 18

Studies are needed to compare the TUG to similar measures (gait speed test and SPPB) to determine whether 1 test provides superior psychometric properties (eg, reliability, responsiveness, and predictive validity) and clinical utility.

Research Recommendation 19

For all OMs in acute care physical therapists practice, studies are needed to assess the relationship of performance-based measures to patient satisfaction, quality of life, and engagement in care.

Research Recommendation 20

For all OMs in acute care physical therapists practice, studies are needed to examine and develop effective communication strategies to inform patients and their support systems about the purposes, results, and impact of OMs on their care.

CONCLUSIONS

CPG action statements 1 to 3 of the COMS should be performed for all adult patients receiving physical therapy during a hospital stay. CPG action statements 4 to 8 provide supplemental OMs for adult patients, including adults requiring critical care. Action statements 1 to 3 are based on the psychometric data for OMs performed in English in the acute care setting with key consideration given for clinical utility. Supplemental recommendations 4 to 8 were based on available psychometric data and clinical expertise of the GDG; they potentially aid in further discrimination of function for future physical therapy needs. The targeted patient population of the CPG is intentionally vague to promote broad generalizability in the acute care environment but may be recognized as a potential limitation as psychometric properties studied in one population may not transfer to others. The scope of the CPG only included OMs performed in English to ensure strength of psychometric data, but this may also be a limitation. The GDG estimates that the COMS may require as little as 5 minutes and up to 15 minutes to complete while requiring minimal equipment and resources and, thus, meet the parameters defined by interested parties. Knowledge translation and resources for implementation of the COMS to enhance delivery and standardization will be disseminated through subsequent initiatives.

Identification of the valid, reliable, and responsive OMs to support clinical practice is challenging given that the acute care environment is a high-paced and highly dynamic setting. Moreover, the heterogeneity of patient populations in the hospital setting present challenges when developing a core set of OMs. This CPG is designed to support clinicians by providing recommendations based on data aggregated from studies assessing the psychometric properties of OMs in acute care environment. The goal is to reduce unwarranted variation in practice to enhance patient outcomes and improve the ability to perform comparative analyses. In addition, the core set of OMs may support clinical decision making.¹⁸⁰ Our CPG focused on the ICF “activity” domain, that is, physical function. Updates to the CPG in 3 to 5 years should consider expansion of the COMS with focus on specific components of physical function as well as the ICF “body structure and function” domain (eg, muscle strength).

Consistent use of a core set of OMs in the acute care environment promotes a common language of patient function and mobility during hospitalization for all members of the interprofessional health care team, provides reliable assessment of patient mobility levels, promotes each patient’s functional goals, and encourages regular interprofessional communication about patient function. Studies demonstrate excellent interrater reliability and test-retest reliability for physical therapists and nurses when using 2 OMs recommended in this CPG (AM-PAC and JH-HLM).²⁹ Low mobility levels are associated with adverse outcomes such as ICU-acquired weakness¹¹⁰ and increased risk of new institutionalization and death.¹³ Given the history of low mobility during hospital admissions, changes in clinical practice that promote measurement of mobility levels and increase communication among interprofessional team members remain critically important. A common language describing patient physical function and mobility during hospital stays may prevent the persistent and pervasive hospital-acquired functional decline experienced by patients of all ages.^{14,29,181}

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SUPPLEMENTARY MATERIAL

Supplementary material is available online.

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DATA AVAILABILITY

All data generated or analyzed during this systematic review and clinical practice guideline are included in this published article and its supplementary materials.

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