

VA/DoD Clinical Practice Guidelines

THE MANAGEMENT OF STROKE REHABILITATION



VA/DoD Evidence-Based Practice

Provider Summary

Version 4.0 | 2019



VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF STROKE REHABILITATION

Department of Veterans Affairs

Department of Defense

Provider Summary

QUALIFYING STATEMENTS

The Department of Veterans Affairs and the Department of Defense guidelines are based upon the best information available at the time of publication. They are designed to provide information and assist decision making. They are not intended to define a standard of care and should not be construed as one. Neither should they be interpreted as prescribing an exclusive course of management.

This Clinical Practice Guideline is based on a systematic review of both clinical and epidemiological evidence. Developed by a panel of multidisciplinary experts, it provides a clear explanation of the logical relationships between various care options and health outcomes while rating both the quality of the evidence and the strength of the recommendation.

Variations in practice will inevitably and appropriately occur when clinicians take into account the needs of individual patients, available resources, and limitations unique to an institution or type of practice. Every healthcare professional making use of these guidelines is responsible for evaluating the appropriateness of applying them in the setting of any particular clinical situation.

These guidelines are not intended to represent Department of Veterans Affairs or TRICARE policy. Further, inclusion of recommendations for specific testing and/or therapeutic interventions within these guidelines does not guarantee coverage of civilian sector care. Additional information on current TRICARE benefits may be found at www.tricare.mil or by contacting your regional TRICARE Managed Care Support Contractor.

Version 4.0 – 2019

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Introduction

The Department of Veterans Affairs (VA) and Department of Defense (DoD) Evidence-Based Practice Work Group (EBPWG) was established and first chartered in 2004, with a mission to advise the Health Executive Committee (HEC) “...on the use of clinical and epidemiological evidence to improve the health of the population...” across the Veterans Health Administration (VHA) and Military Health System (MHS), by facilitating the development of clinical practice guidelines (CPGs) for the VA and DoD populations.^[1] This CPG is intended to provide healthcare providers with a framework by which to evaluate, treat, and manage the individual needs and preferences of patients rehabilitating from stroke, thereby leading to improved clinical outcomes. In 2010, the VA and DoD published a CPG for the Management of Stroke Rehabilitation (2010 Stroke Rehab CPG), which was based on evidence reviewed through March 2009. Since the release of that guideline, a growing body of research has expanded the general knowledge and understanding of stroke rehabilitation. Consequently, a recommendation to update the 2010 Stroke Rehabilitation CPG was initiated in 2018. The updated CPG, which includes objective, evidence-based information, is intended to assist healthcare providers in all aspects of stroke rehabilitation (e.g., assessment, treatment, follow-up). The system-wide goal of evidence-based guidelines is to improve the patient’s health and well-being by guiding health providers who are taking care of patients recovering from stroke along management pathways that are supported by evidence. The expected outcomes of successful implementation of this guideline include:

- Assess the patient’s condition and determine, in collaboration with the patient, the best treatment method
- Optimize each individual’s health outcomes and improve quality of life
- Minimize preventable complications and morbidity
- Emphasize the use of patient-centered care (PCC)

Recommendations

The following recommendations were made using a systematic approach considering four domains as per the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach as detailed in the section on Methods and Appendix D in the full text Stroke Rehabilitation CPG. These domains include: confidence in the quality of the evidence, balance of desirable and undesirable outcomes (i.e., benefits and harms), patient values and preferences, and other implications, as appropriate (e.g., resource use, equity, acceptability).

Topic	Sub-topic	#	Recommendation	Strength*	Category†
Approach and Timing		1.	We recommend a team-based approach in an organized inpatient unit that encompasses comprehensive rehabilitation in order to improve likelihood of discharge to home after acute stroke.	Strong for	Reviewed, Amended
		2.	We recommend that rehabilitation therapy should start as soon as medical stability is reached.	Strong for	Not reviewed, Amended

Topic	Sub-topic	#	Recommendation	Strength*	Category†
Approach and Timing (cont.)		3.	There is insufficient evidence to recommend for or against implementing very early mobilization (within 24-48 hours) to improve functional outcomes.	Neither for nor against	Reviewed, New-added
		4.	There is insufficient evidence to recommend for or against early supported discharge.	Neither for nor against	Reviewed, Amended
Motor Therapy	Upper and Lower Limbs Rehabilitation	5.	We recommend task-specific practice (also known as task-oriented practice or repetitive task practice) for improving upper and lower extremity motor function, gait, posture, and activities of daily living.	Strong for	Reviewed, New-replaced
		6.	We recommend cardiovascular exercise to increase maximum walking speed after stroke.	Strong for	Reviewed, New-replaced
		7.	We suggest offering body-weight support treadmill training as an adjunct to gait training in the non-ambulatory patient.	Weak for	Reviewed, Amended
		8.	We suggest offering rhythmic auditory cueing as a modality to include in multimodal interventions to improve walking speed.	Weak for	Reviewed, Amended
		9.	We suggest offering Constraint-Induced Movement Therapy or modified Constraint-Induced Movement Therapy for individuals with at least 10 degrees of active extension in two fingers, the thumb, and the wrist.	Weak for	Reviewed, Amended
		10.	There is insufficient evidence to recommend for or against mirror therapy for improvements in limb function.	Neither for nor against	Reviewed, Amended
	Technology-Assisted Physical Rehabilitation	11.	We suggest offering functional electrical stimulation, neuromuscular electrical stimulation, or transcutaneous electrical nerve stimulation as an adjunctive treatment to improve upper and lower extremity motor function.	Weak for	Reviewed, New-replaced
		12.	We suggest offering functional electrical stimulation to manage shoulder subluxation.	Weak for	Not Reviewed, Amended
		13.	For patients with foot drop, we suggest offering either functional electrical stimulation or traditional ankle foot orthoses to improve gait speed, as both are equally effective.	Weak for	Reviewed, New-added
		14.	We suggest offering robot-assisted movement therapy as an adjunct to conventional therapy in patients with deficits in upper limb function to improve motor skill.	Weak for	Reviewed, Amended
		15.	There is insufficient evidence to recommend for or against the use of robotic devices during gait training.	Neither for nor against	Reviewed, Amended
		16.	We suggest offering virtual reality to enhance gait recovery.	Weak for	Reviewed, Amended

Topic	Sub-topic	#	Recommendation	Strength*	Category†
Motor Therapy (cont.)	Technology-Assisted Physical Rehabilitation (cont.)	17.	There is insufficient evidence to recommend for or against the use of virtual reality for improving activities of daily living and non-gait motor function.	Neither for nor against	Reviewed, New-replaced
		18.	There is insufficient evidence to recommend for or against the use of transcranial direct current stimulation to improve activities of daily living.	Neither for nor against	Reviewed, New-added
		19.	There is insufficient evidence to recommend for or against repetitive transcranial magnetic stimulation to improve upper or lower extremity motor function.	Neither for nor against	Reviewed, New-added
	Pharmacological Treatment	20.	In patients with motor deficits, there is insufficient evidence to recommend for or against starting a selective serotonin reuptake inhibitor within 30 days of stroke to improve motor recovery and functional outcomes.	Neither for nor against	Reviewed, New-added
		21.	We recommend botulinum toxin for patients with focal spasticity that is painful, impairs function, reduces the ability to participate in rehabilitation, or compromises proper positioning or skin care.	Strong for	Not reviewed, Amended
		22.	We suggest offering intrathecal baclofen treatments for patients with severe chronic lower extremity spasticity that cannot be effectively managed by other interventions.	Weak for	Not reviewed, Amended
Dysphagia Therapy		23.	We suggest offering Shaker or chin tuck against resistance exercises in addition to conventional dysphagia therapy.	Weak for	Reviewed, New-replaced
		24.	We suggest offering expiratory muscle strength training for treatment of dysphagia in patients without a tracheostomy.	Weak for	Reviewed, New-replaced
		25.	There is insufficient evidence to recommend for or against tongue to palate resistance training for treatment of dysphagia.	Neither for nor against	Reviewed, New-replaced
		26.	There is insufficient evidence to recommend for or against neuromuscular electrical stimulation for treatment of dysphagia.	Neither for nor against	Reviewed, New-replaced
		27.	There is insufficient evidence to recommend for or against pharyngeal electrical stimulation for treatment of dysphagia.	Neither for nor against	Reviewed, New-replaced
		28.	In patients with dysphagia in the post-acute phase of stroke who require tube feeding, we suggest offering gastrostomy tube over nasogastric tube for maintenance of optimal nutrition.	Weak for	Reviewed, New-replaced
Cognitive, Speech, and Sensory Therapy	Cognitive Therapy	29.	There is insufficient evidence to recommend for or against the use of any specific cognitive rehabilitation methodology or pharmacotherapy to improve cognitive outcomes.	Neither for nor against	Reviewed, New-replaced
	Speech Therapy	30.	There is insufficient evidence to recommend for or against the use of intensive language therapy for aphasia.	Neither for nor against	Reviewed, New-added

Topic	Sub-topic	#	Recommendation	Strength*	Category†
Cognitive, Speech, and Sensory Therapy (cont.)	Spatial/Neglect Therapy	31.	There is insufficient evidence to recommend for or against hemi-field eye patching in addition to traditional therapy for patients with unilateral spatial neglect following stroke.	Neither for nor against	Reviewed, New-replaced
		32.	Among patients with unilateral spatial neglect, there is insufficient evidence to recommend for or against the use of prisms.	Neither for nor against	Reviewed, New-replaced
	Visual Therapy	33.	Among patients with hemianopsia, there is insufficient evidence to recommend for or against the use of prisms or visual search training.	Neither for nor against	Reviewed, New-replaced
Mental Health Therapy	Prevention of Post-Stroke Depression	34.	For the prevention of post-stroke depression, there is insufficient evidence for or against the universal use of selective serotonin reuptake inhibitor or a serotonin norepinephrine reuptake inhibitor due to the risk of fractures.	Neither for nor against	Reviewed, New-added
	Treatment of Post-Stroke Depression	35.	We suggest offering a selective serotonin reuptake inhibitor or a serotonin norepinephrine reuptake inhibitor for treatment of post-stroke depression.	Weak for	Reviewed, New-replaced
		36.	We suggest offering cognitive behavioral therapy for treatment of post-stroke depression.	Weak for	Reviewed, New-added
		37.	There is insufficient evidence to recommend for or against treatment with a combination of pharmacotherapy (selective serotonin reuptake inhibitor/serotonin norepinephrine reuptake inhibitor) and psychotherapy (cognitive behavioral therapy) for treatment of post-stroke depression.	Neither for nor against	Reviewed, New-added
	Treatment of Post-Stroke Anxiety	38.	There is insufficient evidence to recommend for or against pharmacotherapy or psychotherapy for the treatment of post-stroke anxiety.	Neither for nor against	Reviewed, New-added
	Adjunctive Treatment	39.	We suggest offering exercise as adjunctive treatment for post-stroke depression or anxiety symptoms.	Weak for	Reviewed, New-replaced
		40.	We suggest offering mind-body exercise (e.g., tai chi, yoga, qigong) as adjunctive treatment for post-stroke depression or anxiety symptoms.	Weak for	Reviewed, New-added
Other Functions		41.	There is insufficient evidence to recommend for or against any specific assessments or interventions regarding return to work.	Neither for nor against	Reviewed, Amended
		42.	There is insufficient evidence to recommend for or against using any specific assessments or interventions to facilitate return to driving.	Neither for nor against	Reviewed, Amended

*For additional information, please refer to the section on Grading Recommendations in the full text Stroke Rehabilitation CPG.


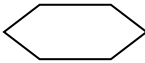
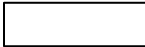

†For additional information, please refer to the section on Recommendation Categorization and Appendix F in the full text Stroke Rehabilitation CPG.

Algorithm

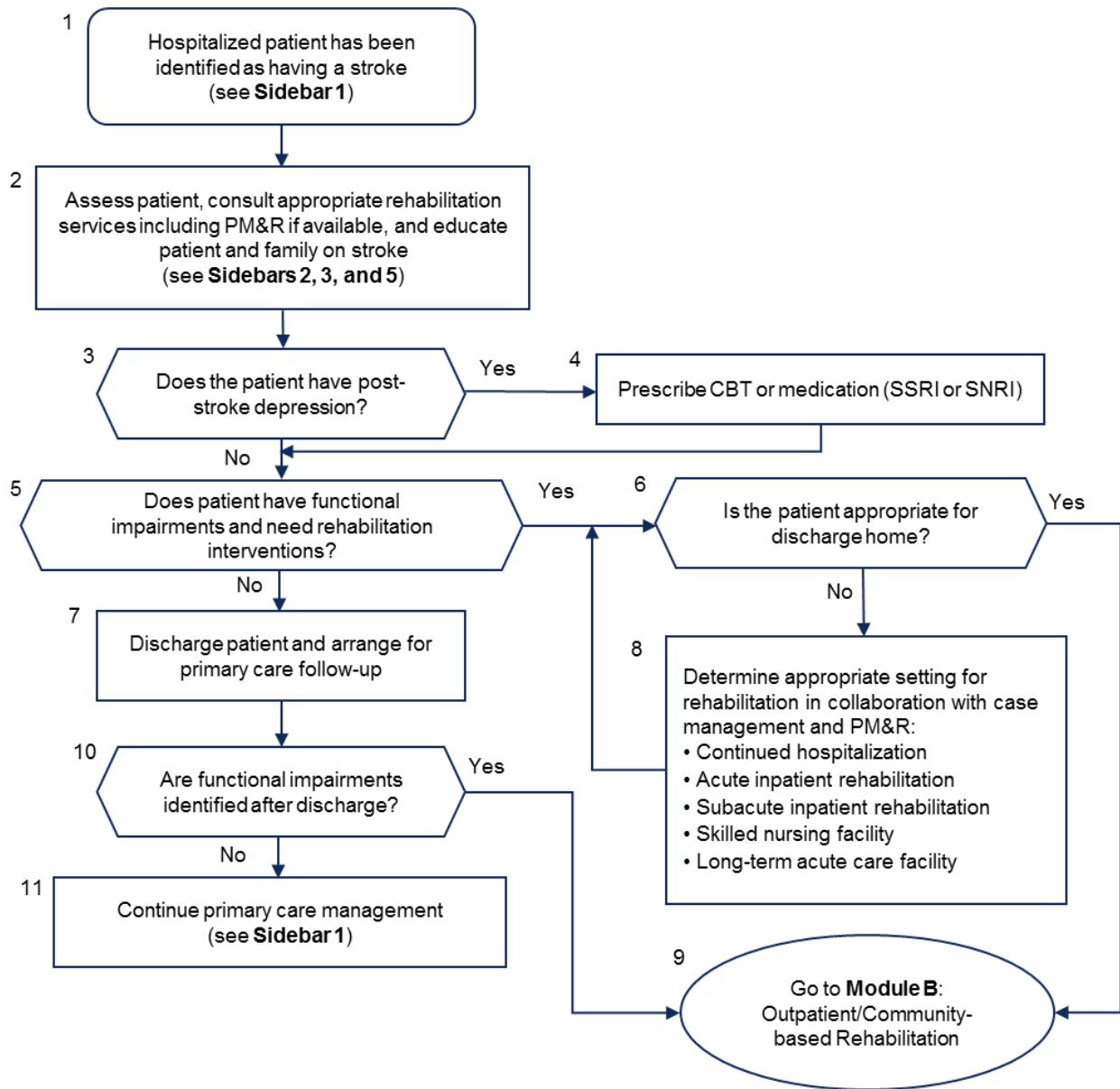
This CPG follows an algorithm, which is designed to facilitate understanding of the clinical pathway and decision-making process used in the management of stroke rehabilitation. The use of the algorithm format as a way to represent patient management was chosen based on the understanding that such a format may promote more efficient diagnostic and therapeutic decision-making and has the potential to change patterns of resource use. Although the Work Group recognizes that not all clinical practices are linear, the simplified linear approach depicted through the algorithm and its format allows the provider to assess the critical information needed at the major decision points in the clinical process. It includes:

- An ordered sequence of steps of care
- Recommended observations and examinations
- Decisions to be considered
- Actions to be taken

For each guideline, the corresponding clinical algorithm is depicted by a step-by-step decision tree. Standardized symbols are used to display each step in the algorithm, and arrows connect the numbered boxes indicating the order in which the steps should be followed.^[2]

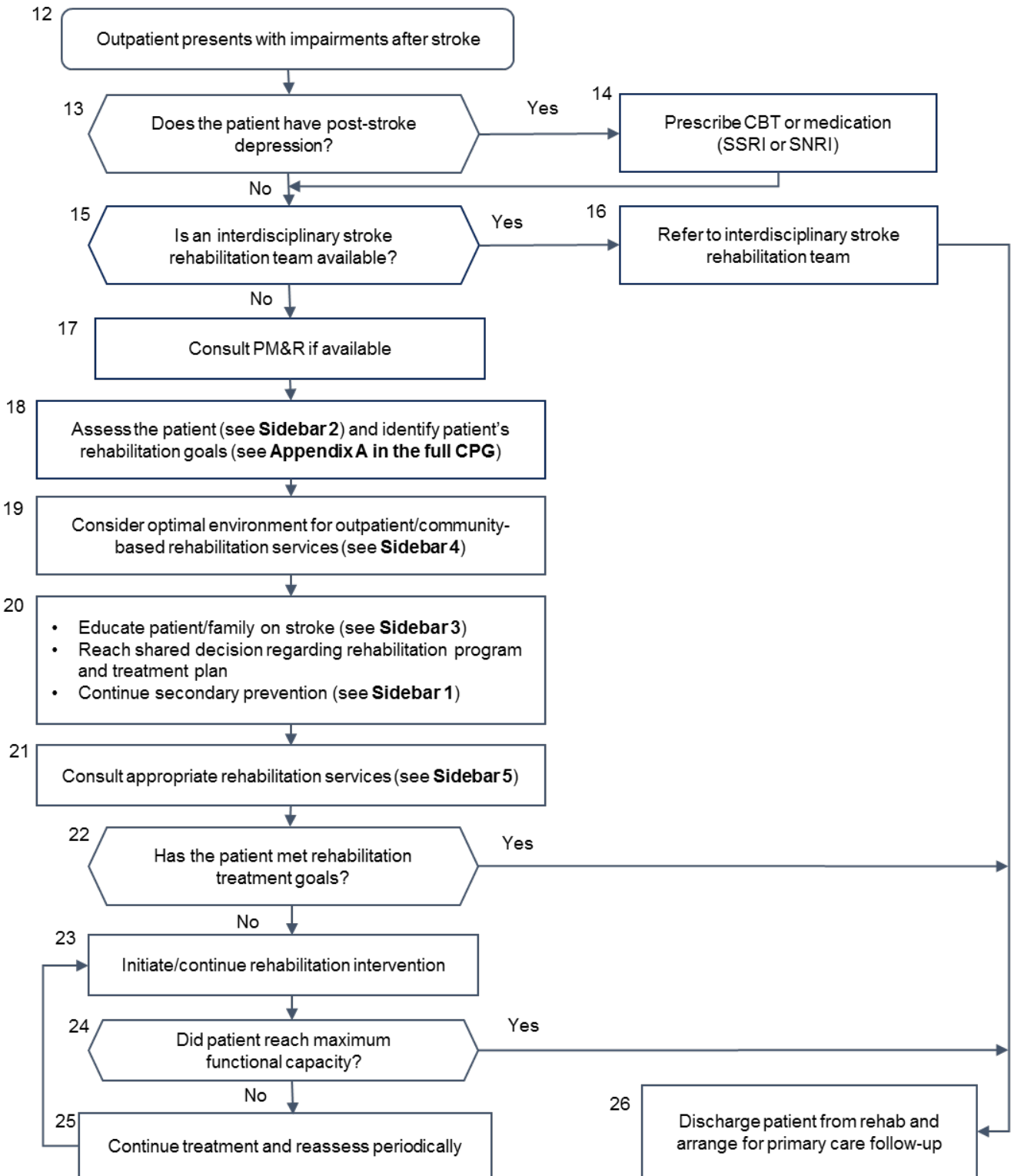
Shape	Description
	Rounded rectangles represent a clinical state or condition
	Hexagons represent a decision point in the guideline, formulated as a question that can be answered Yes or No
	Rectangles represent an action in the process of care
	Ovals represent a link to another section within the guideline.

Module A: Rehabilitation Disposition of the Inpatient with Stroke



Abbreviations: CBT: cognitive behavioral therapy; PM&R: physical medicine and rehabilitation; SNRI: serotonin–norepinephrine reuptake inhibitor; SSRI: selective serotonin reuptake inhibitor

Module B: Outpatient/Community-Based Rehabilitation



Abbreviations: CBT: cognitive behavioral therapy; CPG: clinical practice guideline; PM&R: physical medicine and rehabilitation; SNRI: serotonin–norepinephrine reuptake inhibitor; SSRI: selective serotonin reuptake inhibitor

Sidebar 1: Essential Guidelines for the Medical Management of Stroke

- AHA/ASA Guidelines for the Early Management of Patients with Acute Ischemic Stroke [3]
- AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage [4]
- AHA/ASA Guidelines for the Prevention of Stroke in Patients with Stroke and Transient Ischemic Attack [5]

Abbreviations: AHA: American Heart Association; ASA: American Stroke Association

Sidebar 2: Assessment of Impairments and Disabilities

- Assessment of impairments
 - Auditory/hearing
 - Bowel and bladder function
 - Cognition
 - Communication
 - Emotion and behavior
 - Inattention/neglect
 - Motor/mobility
 - Swallowing and nutrition
 - Tactile/touch
 - Vision function and formal visual field
- Assessment of barriers to participation in therapy
 - Cognitive impairment
 - Fatigue and sleep disorders
 - Medical conditions
 - Pain
 - Psychological and psychosocial factors
- Assessment of activity and function
 - ADLs (e.g., feeding, dressing, grooming), IADLs (e.g., finances, shopping)
 - Driving
 - Meaningful roles (e.g., parent, spouse)
 - Return to work or school
 - Sexual function and intimacy
- Assessment of support system
 - Family, caregivers, community

Abbreviations: ADLs: activities of daily living; IADLs: instrumental activities of daily living

Sidebar 3: Stroke Education Topics

- When to seek emergency care
- Etiology/warning signs and symptoms of stroke
- Risk factors/medical management (including education on new medications):
 - Blood pressure
 - Blood sugar
 - Blood thinners
 - Body weight
 - Cholesterol
 - Other cardiac disease
 - Smoking cessation
- Nutrition
- Physical activity and falls prevention
- Continuum of care options/follow-up after discharge
- Inpatient rehabilitation
- Outpatient rehabilitation
- Therapy at home
- Primary medicine

Sidebar 4: Considerations for Outpatient / Community-based Rehabilitation Services

- Current functional status and endurance level
- Family/caregiver support
- Home assessment for safety
- Motivation and preferences
- Necessary equipment
- Resources, availability, and eligibility
- Transportation

Sidebar 5: Resources for Management of Post-Stroke Impairments/Needs

Impairment/Need	Consultants/Referrals
<ul style="list-style-type: none"> ■ Pain ■ Prevention of post-stroke complications ■ Rehabilitation management, oversight, and direction ■ Sexual function and intimacy ■ Spasticity 	<ul style="list-style-type: none"> ■ PM&R
<ul style="list-style-type: none"> ■ Balance disorders and dizziness ■ Durable medical equipment recommendations ■ Motor/mobility problems ■ Pain ■ Sexual function and intimacy ■ Spasticity ■ Strength 	<ul style="list-style-type: none"> ■ Physical therapy

Sidebar 5: Resources for Management of Post-Stroke Impairments/Needs	
Impairment/Need	Consultants/Referrals
<ul style="list-style-type: none"> ■ Cognition ■ Driving ■ Durable medical equipment recommendations ■ Self-management skills, ADLs, IADLs ■ Sexual function and intimacy ■ Spasticity ■ Vision/vision perception 	<ul style="list-style-type: none"> ■ Occupational therapy
<ul style="list-style-type: none"> ■ Cognition ■ Communication ■ Swallowing and nutrition 	<ul style="list-style-type: none"> ■ Speech-language pathology
<ul style="list-style-type: none"> ■ Community resources ■ Emotion and behavior ■ Family/caregiver support ■ Financial resources 	<ul style="list-style-type: none"> ■ Case management (social work and/or nursing)
<ul style="list-style-type: none"> ■ Return to work or school 	<ul style="list-style-type: none"> ■ Vocational rehabilitation
<ul style="list-style-type: none"> ■ Healthy eating and nutritional needs 	<ul style="list-style-type: none"> ■ Dietetics
<ul style="list-style-type: none"> ■ Adjustment and coping ■ Cognition ■ Emotion and behavior ■ Family/caregiver support ■ Sexual function and intimacy 	<ul style="list-style-type: none"> ■ Mental and behavioral health
<ul style="list-style-type: none"> ■ Adaptive sports ■ Community re-entry ■ Leisure/recreation participation 	<ul style="list-style-type: none"> ■ Recreation therapy
<ul style="list-style-type: none"> ■ Functional eye exam ■ Non-operative strabismus management ■ Visual field cut 	<ul style="list-style-type: none"> ■ Optometry/visual rehabilitation
<ul style="list-style-type: none"> ■ Eye health ■ Eye surgeries ■ Strabismus assessment and procedures 	<ul style="list-style-type: none"> ■ Ophthalmology
<ul style="list-style-type: none"> ■ Bowel and bladder function ■ Medication ■ Patient and family education ■ Skin care 	<ul style="list-style-type: none"> ■ Nursing

Abbreviations: ADLs: activities of daily living; IADLs: instrumental activities of daily living; PM&R: physical medicine and rehabilitation

Scope of the CPG

This CPG is designed to assist providers in managing or co-managing patients undergoing stroke rehabilitation. The acute medical management of stroke is not included in the scope of this guideline. The patient population of interest for this CPG is adult patients who have experienced a stroke and are eligible for care in the VA and DoD healthcare delivery systems. It includes Veterans as well as deployed and non-deployed active duty Service, Guard, and Reserve Members and their dependents.

Guideline recommendations are intended to be patient centered. Thus, stroke rehabilitation should take into account a patient's needs and preferences. Good communication between healthcare professionals and the patient is essential and should be supported by evidence-based information tailored to the patient's needs. Use of an empathetic and non-judgmental approach facilitates discussions sensitive to gender, culture, ethnicity, and other differences. The information that patients are given about treatment and care should be culturally appropriate and also available to people with limited literacy skills. It should also be accessible to people with additional needs such as physical, sensory, or learning disabilities. Family involvement should be considered, if appropriate.

Methods

The 2019 Stroke Rehabilitation CPG is an update to the 2010 Stroke Rehabilitation CPG. The methodology used in developing the 2019 CPG follows the *Guideline for Guidelines*,^[6] an internal document of the VA and DoD EBPWG. The *Guideline for Guidelines* can be downloaded from <http://www.healthquality.va.gov/policy/index.asp>. The guideline development process for the 2019 CPG update consisted of the following steps: formulating and prioritizing evidence (key questions); convening a patient focus group; conducting the systematic review; convening a face-to-face meeting with the CPG Champions and Work Group members; and drafting and submitting a final CPG on the management of stroke rehabilitation to the VA/DoD EBPWG.

The Champions and Work Group used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system to assess the quality of the evidence base and assign a grade for the strength for each recommendation. The GRADE system uses the following four domains to assess the strength of each recommendation: balance of desirable and undesirable outcomes; confidence in the quality of the evidence; patient values and preferences; other implications, as appropriate (e.g., resource use, equity).^[7] Using this system, the Champions and Work Group determined the relative strength of each recommendation (“Strong” or “Weak”). A “Strong” recommendation generally indicates that the Work Group is highly confident that the desirable effects of an intervention outweigh undesirable effects. If the Work Group is less confident that the desirable effects of an intervention outweigh undesirable effects, they give a “Weak” recommendation. It is important to note that the GRADE terminology used to indicate the confidence in the desirable effects of an intervention (i.e., “Strong” vs. “Weak”) should not be confused with the clinical importance of the recommendation. A “Weak” recommendation may be just as important to the clinical care of a stroke patient as a strong recommendation.

Occasionally, instances may occur when the Work Group feels there is insufficient evidence to make a recommendation for or against a particular therapy or preventive measure. This can occur when there is an absence of studies on a particular topic that met evidence review inclusion criteria, studies included in

the evidence review report conflicting results, or studies included in the evidence review report inconclusive results regarding the desirable and undesirable outcomes.

Using these elements, the grade of each recommendation is presented as part of a continuum:

- Strong for (or “We recommend offering this option ...”)
- Weak for (or “We suggest offering this option ...”)
- No recommendation for or against (or “There is insufficient evidence...”)
- Weak against (or “We suggest not offering this option ...”)
- Strong against (or “We recommend against offering this option ...”)

The grade of each recommendation made in the 2019 CPG can be found in the section on [Recommendations](#). Additional information regarding the use of the GRADE system can be found in Appendix D in the full Stroke Rehabilitation CPG.

The Work Group developed both new and updated recommendations based on the evidence review conducted for the priority areas addressed by the key questions. In addition, the Work Group considered, without complete review of the relevant evidence, the current applicability of other recommendations that were included in the 2010 Stroke Rehabilitation CPG, subject to evolving practice in today’s environment. A set of recommendation categories was adapted from those used by NICE.^[8,9] These categories, along with their corresponding definitions, were used to account for the various ways in which recommendations could have been updated from the 2010 Stroke Rehabilitation CPG. The categories and definitions can be found in [Table 1](#).

Table 1. Recommendation Categories and Definitions

Evidence Reviewed*	Recommendation Category*	Definition*
Reviewed	New-added	New recommendation following review of the evidence
	New-replaced	Recommendation from previous CPG that has been carried over to the updated CPG that has been changed following review of the evidence
	Not changed	Recommendation from previous CPG that has been carried forward to the updated CPG where the evidence has been reviewed but the recommendation is not changed
	Amended	Recommendation from the previous CPG that has been carried forward to the updated CPG where the evidence has been reviewed and a minor amendment has been made
	Deleted	Recommendation from the previous CPG that has been removed based on review of the evidence
Not reviewed	Not changed	Recommendation from previous CPG that has been carried forward to the updated CPG, but for which the evidence has not been reviewed
	Amended	Recommendation from the previous CPG that has been carried forward to the updated CPG where the evidence has not been reviewed and a minor amendment has been made
	Deleted	Recommendation from the previous CPG that has been removed because it was deemed out of scope for the updated CPG

*Adapted from the NICE guideline manual (2012) [8] and Garcia et al. (2014) [9]

Abbreviation: CPG: clinical practice guideline

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Patient-centered Care

VA/DoD CPGs encourage clinicians to use a PCC approach, meaning treatment that is individualized based on patient needs, characteristics, and preferences. Regardless of setting, all patients in the healthcare system should be able to access evidence-based care appropriate to that patient. When properly executed, PCC may decrease patient anxiety, increase trust in clinicians, and improve treatment adherence.[\[10-12\]](#) Improved patient-clinician communication and a PCC approach conveys openness and supports disclosure of current and future concerns.

As part of the PCC approach, it is important for providers to review the outcomes of previous healthcare experiences with the patients who have experienced a stroke. Providers explore concerns the patient has or barriers to high quality care he or she might experience. Then, providers address post-stroke concerns related to social, occupational (including return-to-duty), and family functioning. As part of PCC, providers educate the patient on the actions that need to be taken and any decisions that need to be made and involve the patient in decision making regarding management of stroke rehabilitation

Shared Decision Making

Throughout the VA/DoD CPG, the authors encourage clinicians to focus on shared decision making (SDM). The SDM model was introduced in *Crossing the Quality Chasm*, an Institute of Medicine (IOM) (now called the National Academy of Medicine [NAM]) report, in 2001.[\[13\]](#) It is readily apparent that patients, together with their clinicians, make decisions regarding their plan of care and management options. Patients in stroke rehabilitation require sufficient information and time to be able to make informed decisions. Clinicians must be adept at presenting information to their patients regarding treatments, expected outcomes, and levels and/or locations of care. Clinicians are encouraged to use SDM to individualize treatment goals and plans based on patient capabilities, needs, goals, and preferences.

Approach and Timing

1. We recommend a team-based approach in an organized inpatient unit that encompasses comprehensive rehabilitation in order to improve likelihood of discharge to home after acute stroke. (Strong for; Reviewed, Amended)

- A 2013 Cochrane review of 28 studies with a total of 5,855 participants found that more patients who underwent organized stroke unit care, which included team-based rehabilitation, were living at home at one year post stroke when compared to patients who participated in less-organized care post discharge.[\[14\]](#)
- These teams included physicians, nurses, and therapists with expertise in stroke. The exact makeup of the team varied somewhat among studies, and the optimal composition of such a team is not yet known. Outcomes from these units were consistently superior to outcomes following care on a general medical unit in terms of death, dependency, and discharge to home.[\[14\]](#)
- This was a strong recommendation in the 2010 Stroke Rehabilitation CPG, based upon an earlier Cochrane review [\[15\]](#) and an SR from the Agency for Health Care Policy and Research (AHCPR) Guidelines for Stroke Rehabilitation.[\[16\]](#)
- The Work Group determined that the benefits, including improved outcomes for return to home, outweighed the potential harm of adverse events, which was small. Patient values and

preferences strongly favor organized, interdisciplinary care. Thus, the Work Group decided upon a “Strong for” recommendation.

2. We recommend that rehabilitation therapy should start as soon as medical stability is reached. (Strong for; Not reviewed, Amended)

- The 2010 Stroke Rehabilitation CPG recommended that rehabilitation therapy after stroke should start as soon as medical stability is reached.
- Despite general consistency in the evidence supporting rehabilitation therapy as soon as medical stability is reached, there may be some variability in provider and patient preferences regarding this treatment.
- As this is a *Not Reviewed, Amended* recommendation, the Work Group did not systematically review evidence related to this recommendation. Based on the assessment of the quality of the evidence put forth in the 2010 Stroke Rehabilitation CPG, [17-19] the Work Group determined that confidence in the quality of the evidence is high. Although patient values and preferences may be somewhat varied, the Work Group decided upon a “Strong for” recommendation.

3. There is insufficient evidence to recommend for or against implementing very early mobilization (within 24-48 hours) to improve functional outcomes. (Neither for nor against; Reviewed, New-added)

- Two systematic reviews (SRs) found no statistical benefit on function at three months, and there were mixed results for improvement in independence with activities of daily living (ADLs) for patients who were mobilized very early. [20,21]
- A recent Phase III, multicenter, randomized controlled trial (RCT) (A Very Early Rehabilitation Trial [AVERT]) studied very early mobilization in patients with stroke and concluded there were reduced odds of favorable outcomes when compared to usual stroke unit care at three months. [22]
- The Work Group’s confidence in the quality of the evidence is very low, as serious inconsistencies were noted by the differing findings in the two SRs studied. [20,21] Although benefits outweighed the harms, given the very low rates of adverse events and an overall high level of recovery, the Work Group decided upon an insufficient evidence recommendation.

4. There is insufficient evidence to recommend for or against early supported discharge. (Neither for nor against; Reviewed, Amended)

- One SR included 17 trials and recruited 2,422 patients diagnosed with stroke to evaluate whether early supported discharge (ESD) versus conventional care can result in better patient recovery. [23] The review reported statistically significant findings favoring the ESD group for reductions in length of hospital stay (LOS) by approximately 3-8 days. However, because there was considerable heterogeneity among the studies for LOS, this can reduce the confidence in the estimates.
- Additionally, two RCTs assessed whether inter-professional home care support improved quality of life, but no statistically significant between-group differences were identified in either study. [24,25]
- The Work Group determined the confidence in the quality of the evidence was very low and found the evidence insufficient to recommend for or against ESD. The main limitations of these studies include lack of blinding of patient and providers to the intervention [23-25] and not

completing an intent to treat analysis.[\[24,25\]](#) Thus, the Work Group decided there was insufficient evidence to recommend for or against the use of ESD.

Motor Therapy

A. Upper and Lower Limbs Rehabilitation

5. We recommend task-specific practice (also known as task-oriented practice or repetitive task practice) for improving upper and lower extremity motor function, gait, posture, and activities of daily living. (Strong for; Reviewed, New-replaced)

- Task-specific practice involves practice of a whole task or pre-task movements for a whole limb or limb segment such as grasp, grip, or movement in a trajectory to facilitate an ADL or mobility. The approach typically includes application of motor learning principles in regard to feedback, practice schedules, task variation, and challenge of activity.[\[26\]](#)
- An SR by French et al. (2016) provided moderate quality evidence to support this recommendation.[\[26\]](#) It compiled 32 RCTs and one quasi-RCT that compared repetitive task practice with standard/usual care. The 2010 Stroke Rehabilitation CPG found moderate quality evidence in a review of the literature regarding task-specific training.[\[27-36\]](#)
- The Work Group found the overall quality of the evidence to be moderate. Because of the patient involvement in customizing their treatment with this intervention, the ability to perform this intervention in most environments, and the moderate level of evidence, the Work Group decided on a “Strong for” recommendation.

6. We recommend cardiovascular exercise to increase maximum walking speed after stroke. (Strong for; Reviewed, New-replaced)

- Cardiovascular exercise and/or training (e.g., walking, aquatics and rowing) has been found to improve the maximum walking speed in patients post stroke. One SR found a statistically significant benefit favoring cardiovascular training, in particular walking, to increase maximum walking speed after stroke.[\[37\]](#)
- The 2010 VA/DoD Stroke Rehabilitation CPG recommended that patients participate in a regular aerobic exercise program as a way to increase walking speed, endurance, and walking symmetry.
- The Work Group determined the confidence in the quality of the evidence was moderate based on a Cochrane SR consisting of 58 RCTs with five studies showing a significant difference favoring cardiorespiratory training to improve maximum walking speed.[\[37\]](#) Thus, the Work Group decided on a “Strong for” recommendation.

7. We suggest offering body-weight support treadmill training as an adjunct to gait training in the non-ambulatory patient. (Weak for; Reviewed, Amended)

- Body-weight support treadmill training (BWSTT) is a task-specific technique for improving gait. The patient is partially suspended using a body harness from the ceiling or a frame in order to reduce (offload) the relative weight of the patient and provide postural support while walking on a treadmill.

- The results of two SRs included in the evidence review were mixed,[\[38,39\]](#) though slightly in favor for the use of BWSTT in the non-ambulatory patient for achieving independent ambulation earlier in the rehabilitation process.
- Several references from the 2010 Stroke Rehabilitation CPG also addressed the use of BWSTT.[\[40-43\]](#) Long term outcome of BWSTT was comparable to over ground training after one year follow-up in the majority of the studies.
- Thus, the Work Group decided upon a “Weak for” recommendation for use with the non-ambulatory patient because of the decreased time to achieve independent ambulation in this population.

8. We suggest offering rhythmic auditory cueing as a modality to include in multimodal interventions to improve walking speed. (Weak for; Reviewed, Amended)

- The use of rhythmic auditory cueing during gait training helps to coordinate movement with timing, to stimulate and incorporate overlapping brain areas, and to improve walking speed.
- No new studies related to rhythmic auditory cueing were identified in the literature search. This recommendation is based on studies included in the 2010 Stroke Rehabilitation CPG.[\[44-46\]](#) The quality of evidence in support of rhythmic auditory cueing to improve walking speed after stroke was found to be low.
- The “Weak for” recommendation was supported by the relatively low cost, ease of use, and accessibility of the equipment. As benefits outweigh harms for using rhythmic auditory cueing to improve walking speed, it is suggested that this modality be offered as an adjunctive treatment to conventional gait training while considering comorbid diagnoses which may decrease the effectiveness of this intervention (e.g., cognitive impairments, stress disorders, hearing impairments).

9. We suggest offering Constraint-Induced Movement Therapy or modified Constraint-Induced Movement Therapy for individuals with at least 10 degrees of active extension in two fingers, the thumb, and the wrist. (Weak for; Reviewed, Amended)

- Constraint-Induced Movement Therapy (CIMT) and modified Constraint-Induced Movement Therapy (mCIMT) are multi-component interventions designed to help patients overcome learned non-use of a paretic upper extremity and increase motor function. CIMT consists of the following components: (1) immobilization of the non-paretic upper extremity to prevent its use in daily activities, (2) task-specific practice of the paretic upper extremity with frequent repetitions for about six hours per day, and (3) instruction in transfer of skills from the clinical setting to the home environment in performance of activities of daily living (ADLs) and instrumental ADLs (IADLs).
- One SR including 38 RCTs,[\[47\]](#) as well as one single RCT,[\[48\]](#) found that CIMT was associated with improvements in outcome measures of upper extremity function in the majority of patients. In another SR including 42 RCTs, CIMT was not found to demonstrate a significant difference compared with control groups in ADL outcome measures.[\[49\]](#)
- The Work Group’s overall confidence in the quality of the evidence is very low. The Work Group did not identify any additional risks for the patients in trialing CIMT or mCIMT. Overall, benefits slightly outweighed harms. If a patient is motivated to engage in this treatment, there may be a

transfer of learned motor functions to the home setting, though RCTs to date have not documented such improvement.

10. There is insufficient evidence to recommend for or against mirror therapy for improvements in limb function. (Neither for nor against; Reviewed, Amended)

- Mirror therapy uses a mirror that reflects movement of the non-paretic limb back to the patient, creating a visual illusion that the paretic limb is moving to increase cortical activation by inducing the perception of movement in the paretic limb and stimulation from the non-paretic limb through interhemispheric communication.
- There was very little evidence evaluating the use of mirror therapy in the post-stroke population. Two RCTs were reviewed, one focusing on upper extremities and the other focusing on lower extremities. Michielsen et al. (2011) focused on upper extremity improvement using mirror therapy in chronic stroke.[\[50\]](#) Arya et al. (2011) addressed the effect of mirror therapy on lower limb motor recovery and gait in chronic stroke.[\[51\]](#) There was no difference in return of motor function when comparing the experimental and control groups during follow-up for either upper or lower limb motor recovery.
- The Work Group’s overall confidence in the quality of evidence is low. This therapy can easily be performed at home or on the ward outside of skilled therapies if the patient does not have visual or cognitive impairments. The Work Group decided upon an insufficient evidence recommendation.

B. Technology-Assisted Physical Rehabilitation

11. We suggest offering functional electrical stimulation, neuromuscular electrical stimulation, or transcutaneous electrical nerve stimulation as an adjunctive treatment to improve upper and lower extremity motor function. (Weak for; Reviewed, New-replaced)

- This recommendation addresses the use of electrical stimulation for muscle re-education and strengthening. When the different modes of electrical stimulation (functional electrical stimulation [FES], functional neuromuscular electrical stimulation [NMES], transcutaneous electrical nerve stimulation [TENS]) were compared to placebo electrical stimulation or no stimulation treatment interventions, statistically significant results were in favor of the use of electrical stimulation in the majority of the evidence reviewed.[\[52-57\]](#)
- The Work Group’s overall confidence in the quality of the evidence is very low.[\[52-59\]](#) The benefits of using this intervention (external electrodes) outweigh the harms and could provide improved function over standard of care. FES/NMES/TENS units are readily available in most clinics and can be used as an adjunct to task-specific training. The Work Group decided upon a “Weak for” recommendation.

12. We suggest offering functional electrical stimulation to manage shoulder subluxation. (Weak for; Not reviewed, Amended)

- FES causes contraction of muscles in an organized fashion to achieve various therapeutic and functional goals, including creating better joint alignment or limb position and facilitating the recovery of limb function.

- The 2010 Stroke Rehabilitation CPG recommended FES for persons with shoulder subluxation based on three studies.[\[60-62\]](#) The Work Group determined the confidence in the quality of the evidence to be moderate.

13. For patients with foot drop, we suggest offering either functional electrical stimulation or traditional ankle foot orthoses to improve gait speed, as both are equally effective. (Weak for; Reviewed, New-added)

- This recommendation addresses the use of FES application as an alternative to traditional orthoses for improving foot clearance during ambulation in persons with post-stroke foot drop. The use of the ankle foot orthoses (AFOs) is currently considered the standard of care in the U.S. to treat foot drop. FES is also used, but less frequently.
- One meta-analysis of five RCTs with 815 participants suggested that no statistically or clinically significant difference existed between the two interventions.[\[63\]](#)
- Based on the data suggesting equal efficacy, the Work Group cannot recommend one intervention over the other for management of foot drop. For persons with post-stroke foot drop, FES and AFO are both effective management options and each individual's values, preferences, and resources should be considered when choosing between the two.

14. We suggest offering robot-assisted movement therapy as an adjunct to conventional therapy in patients with deficits in upper limb function to improve motor skill. (Weak for; Reviewed, Amended)

15. There is insufficient evidence to recommend for or against the use of robotic devices during gait training. (Neither for nor against; Reviewed, Amended)

- There has been an increase in the number of robotic-assisted devices available for use in stroke rehabilitation. The majority of these systems focus on improving strength and functional activity of the upper extremity or improving walking speed and independence with ambulation.
- Our review included two SRs [\[64,65\]](#) and three RCTs [\[59,66,67\]](#) that addressed the use of robotics for upper extremity rehabilitation. For robotic use in gait training, the Work Group found only one SR that met criteria. The SR consisted of nine RCTs that addressed gait velocity and six RCTs that addressed return to independent walking.[\[68\]](#) There was a great deal of variability in the robotic devices used and in their availability from clinic to clinic in the research trials.
- The Work Group's confidence in the quality of the evidence was low for the use of robotics in upper extremity and gait rehabilitation. This Work Group decided upon a "Weak for" recommendation for use of robotics for rehabilitation of the upper extremity and an insufficient evidence recommendation for the use of robotics for gait rehabilitation.

16. We suggest offering virtual reality to enhance gait recovery. (Weak for; Reviewed, Amended)

17. There is insufficient evidence to recommend for or against the use of virtual reality for improving activities of daily living and non-gait motor function. (Neither for nor against; Reviewed, New-replaced)

- According to Henderson et al. (2007), "Virtual reality (VR) is a computer-based, interactive, multi-sensory environment that occurs in real time."[\[69\]](#) Nonetheless, there are vast differences in types of VR.

- The Work Group reviewed three RCTs comparing various non-immersive VR systems to standard occupational therapy for upper extremity motor training.[\[70-72\]](#) One of the smaller studies found significantly greater improvement in upper extremity motor recovery in the experimental group, which used a mobile game-based VR program for 30 minutes in addition to conventional occupational therapy for 30 minutes, compared to a control group that received one hour of conventional occupational therapy.[\[72\]](#) The other studies reviewed found no significant difference between VR and control groups in ADLs for upper extremity function.[\[70,71\]](#)
- The Work Group found the overall quality of the evidence to be low. Although patient preferences may vary, VR could be a way to offer opportunities to enhance motivation to participate in therapies and increase engagement in repetitive task-specific practice for persons who enjoy this kind of activity. The Work Group believes that further research is needed to investigate the role of VR in enhancing motor recovery following stroke.

18. There is insufficient evidence to recommend for or against the use of transcranial direct current stimulation to improve activities of daily living. (Neither for nor against; Reviewed, New-added)

- Transcranial direct current stimulation (tDCS) is a non-invasive form of neurostimulation using low voltage direct electrical current stimulation delivered through electrodes placed on the head in order to modulate neuronal activity.
- The Work Group found that there was insufficient evidence to recommend for or against the use of tDCS for the improvement of ADLs.[\[73,74\]](#)
- At this time, as benefits are unclear, benefits and harms appear balanced. tDCS in stroke rehabilitation is an emerging technology. Additional research is required to investigate effectiveness, duration, intensity, dosage, and the long-term safety profile of tDCS as a modality in stroke rehabilitation.

19. There is insufficient evidence to recommend for or against repetitive transcranial magnetic stimulation to improve upper or lower extremity motor function. (Neither for nor against; Reviewed, New-added)

- Repetitive transcranial magnetic stimulation (rTMS) is a non-invasive form of neurostimulation which uses a rapidly pulsed magnetic field from a coil placed over the scalp to modulate a specific part of the brain.
- Several studies showed no statistically significant difference between rTMS and control (sham rTMS) for improvement in critical outcomes related to motor functions in the upper and lower extremities.[\[75-77\]](#) One study provided low quality evidence for improvement in upper and lower extremity function following rTMS relative to control (sham rTMS).[\[78\]](#) The Work Group's overall confidence in the quality of the evidence is very low.[\[75-78\]](#)

C. Pharmacologic Treatment

20. In patients with motor deficits, there is insufficient evidence to recommend for or against starting a selective serotonin reuptake inhibitor within 30 days of stroke to improve motor recovery and functional outcomes. (Neither for nor against; Reviewed, New-added)

- Selective serotonin reuptake inhibitors (SSRIs) have been studied to try to determine if they improve functional outcomes in patients with recent stroke.[\[79-82\]](#) The Work Group evaluated

the available evidence regarding improvement in motor deficits and functional outcomes overall and found mixed results. While initial findings were promising, a recent study suggested limited benefit and significant adverse events (e.g., fractures).[\[82\]](#)

- In addition to the varied quality of evidence for this recommendation, the Work Group considered the importance of motor deficits to patients and providers as well as the reluctance of some individuals to take “anti-depressant” medications, especially in the absence of clear depressive symptoms.
- The Work Group’s confidence in the quality of the evidence is moderate; but given conflicting results on efficacy and safety, the Work Group is unable to endorse the use of SSRIs for motor or functional outcome gains at this time. Thus, the Work Group decided upon an insufficient evidence recommendation.

21. We recommend botulinum toxin for patients with focal spasticity that is painful, impairs function, reduces the ability to participate in rehabilitation, or compromises proper positioning or skin care. (Strong for; Not reviewed, Amended)

- The use of botulinum toxin has been found to decrease spasticity in patients with a history of stroke.[\[83-86\]](#) Since the publication of the 2010 Stroke Rehabilitation CPG, the use of botulinum toxin for post-stroke spasticity has become standard care.
- Though new evidence for botulinum toxin was not reviewed specifically for this guideline update, the Work Group determined that botulinum toxin should be recommended for those patients with focal spasticity that is painful, impairs function, reduces the ability to participate in rehabilitation, or compromises proper positioning or skin care. In some patients, however, treatment of focal spasticity may actually worsen function (e.g., a patient who utilizes lower limb extensor spasticity to aid with standing, transfers, or ambulation).
- As the use of botulinum toxin for post-stroke spasticity is increasingly common and has the potential to benefit an even greater number of patients with post-stroke spasticity, the Work Group decided upon a “Strong for” recommendation.

22. We suggest offering intrathecal baclofen treatments for patients with severe chronic lower extremity spasticity that cannot be effectively managed by other interventions. (Weak for; Not reviewed, Amended)

- The use of intrathecal baclofen in patients with chronic stroke has been shown to reduce lower extremity spasticity. In the development of the 2010 Stroke Rehabilitation CPG, the Work Group reviewed both a small case series and a small randomized controlled cross-over trial assessing the efficacy of intrathecal baclofen for post-stroke spasticity and determined that this may be a reasonable option for some patients.[\[87,88\]](#)
- The Work Group’s confidence in the quality of the evidence is low. Though additional evidence for intrathecal baclofen was not reviewed for this updated guideline, this Work Group determined that the use of intrathecal baclofen is reasonable in the subgroup of patients for whom oral medications or chemodenervation (i.e., botulinum toxin) are not effective or appropriate. The Work Group decided upon a “Weak for” recommendation and wish to emphasize the consideration of other agents prior to use of intrathecal baclofen.

Dysphagia Therapy

23. We suggest offering Shaker or chin tuck against resistance exercises in addition to conventional dysphagia therapy. (Weak for; Reviewed, New-replaced)

- Implementing chin tuck against resistance or Shaker exercises as an adjunct to conventional dysphagia therapy improves oral pharyngeal swallowing in patients with dysphagia following stroke. [\[89-91\]](#)
- The Work Group’s confidence in the quality of the evidence is very low. Patient values and preferences concerning these interventions were somewhat varied. However, the benefits, such as a clinically significant improvement in oral pharyngeal swallowing, were considered to outweigh the potential harms, which were relatively mild. Thus, the Work Group decided upon a “Weak for” recommendation.

24. We suggest offering expiratory muscle strength training for treatment of dysphagia in patients without a tracheostomy. (Weak for; Reviewed, New-replaced)

- Expiratory muscle strength training (EMST) has been found to improve oral pharyngeal swallowing in patients with a history of stroke. [\[92,93\]](#)
- Despite general consistency in the evidence supporting the use of EMST in treating dysphagia following stroke, there is some variability in patient preferences regarding this treatment.
- The Work Group’s confidence in the quality of the evidence is low. Other considerations regarding the benefits of this recommendation, such as an increased oral intake and decreased risk of aspiration, outweigh the potential small risk of adverse events. Thus, the Work Group decided upon a “Weak for” recommendation.

25. There is insufficient evidence to recommend for or against tongue to palate resistance training for treatment of dysphagia. (Neither for nor against; Reviewed, New-replaced)

- Tongue to palate resistance training (TPRT) is an exercise performed by pressing the tongue strongly against the palate. One RCT of 41 patients seen approximately five months following cortical stroke found that TPRT paired with conventional dysphagia therapy is not superior to conventional dysphagia therapy alone. [\[94\]](#)
- The Work Group’s confidence in the quality of the evidence is low. TPRT is widely available and easily implemented. Patient values and preferences are somewhat varied with TPRT. Additionally, this recommendation considered the balance of potential benefit, which is unproven in this body of evidence, and the minimal risk of harm associated with this intervention. Thus, the Work Group decided there is insufficient evidence to recommend for or against this treatment.

26. There is insufficient evidence to recommend for or against neuromuscular electrical stimulation for treatment of dysphagia. (Neither for nor against; Reviewed, New-replaced)

- In treatment of dysphagia, neuromuscular electrical stimulation (NMES) is a technique involving the application of surface electrodes on the skin overlying submental and laryngeal regions. Despite some evidence supporting NMES as an adjunct for conventional dysphagia therapy, SRs and meta-analyses to date have not demonstrated definitive agreement regarding the treatment efficacy regarding NMES.
- Conflicting evidence has been found regarding NMES as an adjunct treatment for dysphagia in patients following stroke.[\[95-98\]](#) The Work Group’s confidence in the quality of the evidence is very low. The Work Group decided there is insufficient evidence to recommend for or against this treatment.

27. There is insufficient evidence to recommend for or against pharyngeal electrical stimulation for treatment of dysphagia. (Neither for nor against; Reviewed, New-replaced)

- Pharyngeal electrical stimulation (PES) is theorized to improve swallowing function by creating increased sensory input to the swallowing cortex from the cranial nerves innervating the pharynx, thereby driving neuroplastic changes. This treatment is currently not U.S. Food and Drug Administration (FDA) approved and is only available in the U.S. through clinical trials.
- Though the two RCTs [\[99,100\]](#) and one meta-analysis [\[101\]](#) included in the evidence review reported some benefit and no adverse effects directly related to PES treatment, potential harms need to be considered. One RCT specifically noted investigator concerns about the potential to harm patients with the magnitude of stimulation at the treatment threshold shown to be associated with improvement in aspiration.[\[100\]](#)
- The Work Group’s confidence in the quality of the evidence is very low. Thus, the Work Group decided there is insufficient evidence to recommend for or against this treatment.

28. In patients with dysphagia in the post-acute phase of stroke who require tube feeding, we suggest offering gastrostomy tube over nasogastric tube for maintenance of optimal nutrition. (Weak for; Reviewed, New-replaced)

- A Cochrane SR and meta-analysis of three studies comprised of 63 patients with subacute stroke (LOS ranged from 2-3 months) found that compared to nasogastric tube (NGT), percutaneous endoscopic gastrostomy (PEG) tube placement was associated with significantly increased albumin concentration, indicating improvement in nutritional status.[\[102\]](#)
- Patient preferences regarding NGT and PEG tube placement vary greatly. Though a PEG tube can be removed once no longer needed, some patients/caregivers delay PEG tube placement due to a sense of permanence and to body image concerns. Benefits, including improved nutritional status, slightly outweigh the harms associated with PEG versus NGT placement for enteral nutritional support.
- The quality of the evidence is very low due to serious limitations including small sample size, lack of outcome assessor blinding, and lack of reported follow-up intervals.[\[102\]](#) Thus, the Work Group decided upon a “Weak for” recommendation.

Cognitive, Speech, and Sensory Therapy

A. Cognitive Therapy

29. There is insufficient evidence to recommend for or against the use of any specific cognitive rehabilitation methodology or pharmacotherapy to improve cognitive outcomes. (Neither for nor against; Reviewed, New-replaced)

- Since the publication of the 2010 Stroke Rehabilitation CPG, there has been very little advancement in the evidence regarding the use of specific cognitive rehabilitation strategies or techniques to improve clinical outcomes following stroke. One SR examined the effectiveness of cognitive rehabilitation to treat memory deficits following stroke.[\[103\]](#) At the conclusion of treatment, mild-to-moderate improved memory performance was seen in the experimental group, but these benefits did not persist on follow-up examinations.
- Regarding the use of pharmacotherapy to enhance or improve cognitive function, one SR failed to show evidence to support the use of SSRIs to improve cognitive function after stroke.[\[104\]](#)
- Taken as a whole, the overall confidence in the quality of the evidence for the use of any specific cognitive rehabilitation methodology or pharmacotherapy to enhance cognitive performance post stroke is very low,[\[103-108\]](#) necessitating the statement of insufficient evidence for or against the use of any specific interventions.

B. Speech Therapy

30. There is insufficient evidence to recommend for or against the use of intensive language therapy for aphasia. (Neither for nor against; Reviewed, New-added)

- Evidence reviewed in development of this recommendation included two RCTs that evaluated outcomes for patients with aphasia who received structured, intensive speech and language therapy.[\[109,110\]](#)
- There are limitations to the findings from these studies, as treatments were individualized [\[109,110\]](#) and treatment was limited to three weeks [\[109\]](#) or four weeks.[\[110\]](#)
- The Work Group’s confidence in the quality of the evidence related to intensive language therapy for aphasia was low. Thus, the Work Group decided that there is insufficient evidence to recommend for or against the use of intensive language therapy for aphasia.

C. Visual Therapy

31. There is insufficient evidence to recommend for or against hemi-field eye patching in addition to traditional therapy for patients with unilateral spatial neglect following stroke. (Neither for nor against; Reviewed, New-replaced)

- Unilateral spatial neglect (USN) is defined as a failure to report, respond, or orient to novel or meaningful stimuli presented to the side opposite the brain lesion. USN affects two thirds of patients with acute right hemispheric stroke.[\[111\]](#)
- The evidence base included two RCTs.[\[111,112\]](#) The Work Group’s confidence in the quality of evidence is very low. Other considerations regarding this recommendation included the balance of benefits, which are unproven, and the potential harms, which are small. There is some

variability in patient preferences regarding hemi-field eye patching treatment. Some individuals simply reject hemi-field eye patching treatment due to discomfort. Thus, the Work Group decided upon an insufficient evidence recommendation.

32. Among patients with unilateral spatial neglect, there is insufficient evidence to recommend for or against the use of prisms. (Neither for nor against; Reviewed, New-replaced)

- USN occurs much more frequently with right-sided brain lesions than with left-sided lesions.[113] An important clinical problem for patients with USN is interference with the rehabilitation process by the profound lack of awareness for the contralesional hemisphere, which results in poor functional outcome.
- The Work Group’s confidence in the quality of evidence is low.[113-115] Other considerations regarding this recommendation included the balance of benefits, which are unproven, and the potential adverse effects, which may be significant for prism adaptation treatment.[115] Thus, the Work Group decided upon an insufficient evidence recommendation.

33. Among patients with hemianopsia, there is insufficient evidence to recommend for or against the use of prisms or visual search training. (Neither for nor against; Reviewed, New-replaced)

- Homonymous hemianopsia (HH) is the loss of half of the visual field of both eyes, creating a “blind spot” on the left or right side.
- A multi-center RCT studied 87 patients with partial or complete HH approximately three months after stroke.[115] At all follow-up points, no difference was found in mobility or quality of life outcomes.
- The Work Group’s confidence in the quality of evidence is very low. There is some variability in patient preferences regarding these treatments for HH. For visual search training, the potential benefits are balanced with patient burden; the training involved only 30 minutes of treatment per day and adverse effects were minimal. Thus, the Work Group decided upon an insufficient evidence recommendation.

Mental Health Therapy

34. For the prevention of post-stroke depression, there is insufficient evidence for or against the universal use of selective serotonin reuptake inhibitor or a serotonin norepinephrine reuptake inhibitor due to the risk of fractures. (Neither for nor against; Reviewed, New-added)

- Depression is common after stroke (approximately 30% incidence rate) and is associated with increased rates of disability and mortality.[116,117] Thus, prevention and treatment efforts are important.
- The evidence reviewed by the Work Group provided mixed results regarding the use of SSRIs or serotonin norepinephrine reuptake inhibitor (SNRIs) for the prevention of post-stroke depression. While three of the four studies showed positive effects on the prevention of depression,[94,118,119] The Effects of Fluoxetine on Functional Outcomes After Acute Stroke (FOCUS) Trial also found an increased risk of bone fractures in patients receiving six months of fluoxetine.[82]

- The Work Group’s confidence in the quality of the evidence is low due to methodological limitations. The Work Group decided on a “Neither for nor against” recommendation for the use of SSRIs/SNRIs for the prevention of post-stroke depression.

35. We suggest offering a selective serotonin reuptake inhibitor or a serotonin norepinephrine reuptake inhibitor for treatment of post-stroke depression. (*Weak for; Reviewed, New-replaced*)

- In a network meta-analysis consisting of 15 RCTs with 876 participants with post-stroke depression, all antidepressants were directly compared to at least one other active drug and eight antidepressants had at least one placebo-controlled comparison.^[120] All of the SSRIs that were compared to placebo were effective in reducing the symptoms of depression. There were no significant differences in any of the head-to-head antidepressant comparisons, which included SSRIs, SNRIs, norepinephrine reuptake inhibitors, and tricyclic antidepressants (TCAs).
- The Work Group’s confidence in the quality of the evidence is low. The potential harms of SSRIs/SNRIs must be considered alongside the potential benefits. Common side effects of these medications include drowsiness, dry mouth, diarrhea, nausea, restlessness, dizziness, headache, and reduced sexual desire or function. The FOCUS Trial also found an increased risk of bone fractures in patients receiving six months of fluoxetine.^[82]
- TCAs are not included in the recommendation since the VA/DoD CPG for the Management of Major Depressive Disorder (VA/DoD MDD CPG)¹ cautions against using TCAs as a first-line treatment for depression due to the side effect profile.

36. We suggest offering cognitive behavioral therapy for treatment of post-stroke depression. (*Weak for; Reviewed, New-added*)

- Post-stroke depression might include new-onset of depression or worsening of pre-existing depression. In the general population, there is evidence of the effectiveness of a variety of psychotherapeutic interventions for the treatment of depression (see the VA/DoD MDD CPG¹); however, studies are limited in the stroke population.
- A meta-analysis of 23 RCTs including 1,972 participants with post-stroke depression demonstrated that cognitive behavioral therapy (CBT) alone or CBT in combination with an antidepressant significantly reduced symptoms of depression.^[121] Patients treated with CBT also demonstrated significantly greater remission and response rates.
- The Work Group’s confidence in the quality of the evidence is low due to methodological limitations. Other considerations regarding this recommendation included the benefits, including reduction in depressive symptoms, outweighing the potential harm of adverse events, which was small. Thus, the Work Group decided upon a "Weak for" recommendation.

¹ See the VA/DoD Clinical Practice Guideline for the Management of Major Depressive Disorder. Available at: <https://www.healthquality.va.gov/guidelines/MH/mdd/>

37. There is insufficient evidence to recommend for or against treatment with a combination of pharmacotherapy (selective serotonin reuptake inhibitor/serotonin norepinephrine reuptake inhibitor) and psychotherapy (cognitive behavioral therapy) for treatment of post-stroke depression. (Neither for nor against; Reviewed, New-added)

- One SR of the effectiveness of SSRI or SNRI treatment in combination with CBT versus antidepressant alone found that both were equally effective.[\[121\]](#) Adverse events were not reported in this SR.
- The Work Group’s confidence in the quality of evidence is low due to limitations including inadequate information provided regarding randomization procedures, blinding of participants, study personnel, and outcome assessors, as well as low compliance with intervention and high drop-out rates. Other considerations regarding this recommendation include the benefits outweighing the potential harm of adverse events. The Work Group decided upon an insufficient evidence recommendation regarding combination treatment with an SSRI/SNRI and CBT.

38. There is insufficient evidence to recommend for or against pharmacotherapy or psychotherapy for the treatment of post-stroke anxiety. (Neither for nor against; Reviewed, New-added)

- Although providers should treat anxiety in patients following stroke, there is insufficient evidence regarding the most effective treatment in the post-stroke population specifically. One SR/meta-analysis of three RCTs investigated the effect of pharmacotherapy and psychotherapy interventions for post-stroke anxiety.[\[122\]](#) The study concluded that the results do not provide definitive evidence on the efficacy of interventions for anxiety due to poor study quality and small sample sizes.
- The Work Group’s confidence in the quality of the evidence for the use of pharmacotherapy or psychotherapy for the treatment of post-stroke anxiety is very low due to unclear or high risk of bias, as well as varying patient values and preferences. Thus, the Work Group decided upon an insufficient evidence recommendation.

39. We suggest offering exercise as adjunctive treatment for post-stroke depression or anxiety symptoms. (Weak for; Reviewed, New-replaced)

- Improvement in depression/anxiety symptoms is a critical outcome for patients post stroke. Exercise has been found to improve depression and anxiety symptoms in patients with a history of stroke.[\[123,124\]](#)
- The Work Group determined the confidence in the quality of evidence was very low. The body of evidence had some limitations, including small sample sizes and confounders in the analysis.
- Despite general consistency in the evidence supporting a small benefit of physical activity for the treatment of post-stroke anxiety and depression, there is some variability in patient and provider preferences regarding this treatment.
- Other considerations regarding this recommendation included the well-studied benefits of physical activity on general health, outweighing the potential harm of adverse events, which is small. Thus, the Work Group decided upon a “Weak for” recommendation.

40. We suggest offering mind-body exercise (e.g., tai chi, yoga, qigong) as adjunctive treatment for post-stroke depression or anxiety symptoms. (Weak for; Reviewed, New-added)

- Evidence from two SRs on the effects of mind-body exercises (which included studies on tai chi, yoga, and qigong) on mood and functional capabilities in patients with stroke was considered in the development of this recommendation.[122,125] Tai chi, yoga, and qigong are all types of movement exercise that combine breathing and meditation techniques to promote and maintain health and relaxation.
- One SR including 16 RCTs found an overall statistically significant reduction in depression and anxiety symptoms as well as overall improvement in ADLs and mobility.[125] However, it found no effect on sleep quality. In another SR including 14 RCTs, only two RCTs with a total of 40 patients with post-stroke anxiety disorder/symptoms focused specifically on exercise interventions.[122] The results were not statistically significant.
- The Work Group determined the confidence in the quality of evidence was very low. Overall, the Work Group determined that the benefits of tai chi, yoga, and qigong may be more far reaching than just on the improvement of anxiety and depression symptoms and may foster enhanced stress management skills in addition to other overall health improvements from exercise. There may be some variation in patient preferences for this type of exercise/physical activity, as some patients may simply not enjoy a mind-body approach. Thus, the Work Group decided upon a “Weak for” recommendation.

Other Functions

41. There is insufficient evidence to recommend for or against any specific assessments or interventions regarding return to work. (Neither for nor against; Reviewed, Amended)

- Work has long been thought to be beneficial to the overall psychological well-being of individuals who have experienced a stroke and return to work is a frequent goal.
- The 2010 Stroke Rehabilitation CPG recommendations related to returning to work were supported by publications from other organizations.[16,126] Additional studies identified outside the scope of the systematic review conducted as part of this CPG update seem to suggest that stroke survivors may benefit from vocational rehabilitation services.[127,128]
- In general, there is a lack of evidence examining effectiveness of interventions, including vocational rehabilitation services, in improving the likelihood of returning to work.

42. There is insufficient evidence to recommend for or against using any specific assessments or interventions to facilitate return to driving. (Neither for nor against; Reviewed, Amended)

- There were no specific interventions to facilitate return to driving identified in the systematic evidence review. The literature search conducted as part of this guideline update focused on adults with subacute and chronic stroke and examined multiple outcomes, including improved driving skill, neuropsychological testing, quality of life, and safety (e.g., reduced accidents).
- Although the 2010 Stroke Rehabilitation CPG recommended assessment prior to return to driving, this recommendation was based on expert opinion, and, therefore, could not be carried forward in this updated guideline. Thus, the Work Group decided upon an insufficient evidence recommendation.

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*Access to the full guideline and additional resources
are available at the following link:*
<https://www.healthquality.va.gov/guidelines/Rehab/stroke/>

