

# AHA/ASA Guideline

## Guidelines for Adult Stroke Rehabilitation and Recovery

A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association

Endorsed by the American Academy of Physical Medicine and Rehabilitation and the American Society of Neurorehabilitation

The American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists and the American Congress of Rehabilitation Medicine affirms the educational value of these guidelines for its members



science is why

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on Quality of Care and Outcomes Research



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# Outline

I. Introduction

II. The Rehabilitation Program

III. Prevention and Medical Management of Comorbidities

IV. Assessment

V. Sensorimotor Impairments and Activities

VI. Transitions in Care and Community Rehabilitation

VII. Conclusion

# I. Introduction

- Each year, stroke affects nearly 800,000 people in the US.
- From 2000 to 2010 there has been a remarkable 36% decline in the relative rate of stroke deaths, in large part due to improvements in stroke prevention, symptom recognition, prompt and effective treatment, and overall systems-of-care.
- Despite these advances, more than 2/3 of stroke survivors receive rehabilitation services after hospitalization. This need for effective stroke rehabilitation will likely remain an essential part of stroke care for the foreseeable future.
- This set of practice guidelines will present most the current recommendations in stroke rehabilitation, based on evidence and consensus opinion.

# Rating of the Evidence: Classification of Recommendations and Levels of Evidence

		SIZE OF TREATMENT EFFECT												
		CLASS I <i>Benefit &gt;&gt;&gt; Risk</i> Procedure/Treatment <b>SHOULD</b> be performed/administered	CLASS IIa <i>Benefit &gt;&gt; Risk</i> Additional studies with <i>focused objectives</i> needed <b>IT IS REASONABLE</b> to perform procedure/administer treatment	CLASS IIb <i>Benefit ≥ Risk</i> Additional studies with <i>broad objectives</i> needed; additional <i>registry data</i> would be helpful Procedure/Treatment <b>MAY BE CONSIDERED</b>	CLASS III <i>No Benefit</i> or CLASS III <i>Harm</i> <table border="1"> <thead> <tr> <th></th> <th>Procedure/Test</th> <th>Treatment</th> </tr> </thead> <tbody> <tr> <td>COR III: No benefit</td> <td>Not Helpful</td> <td>No Proven Benefit</td> </tr> <tr> <td>COR III: Harm</td> <td>Excess Cost w/o Benefit or Harmful</td> <td>Harmful to Patients</td> </tr> </tbody> </table>		Procedure/Test	Treatment	COR III: No benefit	Not Helpful	No Proven Benefit	COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients
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ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	<ul style="list-style-type: none"> <li>Recommendation that procedure or treatment is useful/effective</li> <li>Sufficient evidence from multiple randomized trials or meta-analyses</li> </ul>	<ul style="list-style-type: none"> <li>Recommendation in favor of treatment or procedure being useful/effective</li> <li>Some conflicting evidence from multiple randomized trials or meta-analyses</li> </ul>	<ul style="list-style-type: none"> <li>Recommendation's usefulness/efficacy less well established</li> <li>Greater conflicting evidence from multiple randomized trials or meta-analyses</li> </ul>	<ul style="list-style-type: none"> <li>Recommendation that procedure or treatment is not useful/effective and may be harmful</li> <li>Sufficient evidence from multiple randomized trials or meta-analyses</li> </ul>									
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	LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	<ul style="list-style-type: none"> <li>Recommendation that procedure or treatment is useful/effective</li> <li>Only expert opinion, case studies, or standard of care</li> </ul>	<ul style="list-style-type: none"> <li>Recommendation in favor of treatment or procedure being useful/effective</li> <li>Only diverging expert opinion, case studies, or standard of care</li> </ul>	<ul style="list-style-type: none"> <li>Recommendation's usefulness/efficacy less well established</li> <li>Only diverging expert opinion, case studies, or standard of care</li> </ul>	<ul style="list-style-type: none"> <li>Recommendation that procedure or treatment is not useful/effective and may be harmful</li> <li>Only expert opinion, case studies, or standard of care</li> </ul>									
Suggested phrases for writing recommendations		should is recommended is indicated is useful/effective/beneficial	is reasonable can be useful/effective/beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/effectiveness is unknown/unclear/uncertain or not well established	COR III: No Benefit is not recommended is not indicated should not be performed/administered/other is not useful/beneficial/effective	COR III: Harm potentially harmful causes harm associated with excess morbidity/mortality should not be performed/administered/other								
Comparative effectiveness phrases <sup>†</sup>		treatment/strategy A is recommended/indicated in preference to treatment B treatment A should be chosen over treatment B	treatment/strategy A is probably recommended/indicated in preference to treatment B it is reasonable to choose treatment A over treatment B											

## II. THE REHABILITATION PROGRAM

### Organization of Post-Stroke Rehabilitation Care: *The Dream Team*

- Ideally, the team has the following components:
  - Physician-leader(s) trained in Physical Medicine and Rehabilitation (physiatry) or trained Neurologists
  - Rehabilitation nursing
  - Physical therapy
  - Occupational therapy
  - Speech and language therapy
  - Social work
  - Psychology
  - Psychiatry
  - Counselors

# II. THE REHABILITATION PROGRAM

## Organization of Post-Stroke Rehabilitation Care: *Settings*

- INPATIENT REHABILITATION FACILITIES (IRF) – ***the most intense***, 24/7 hospital-level care
  - For patients likely to return to the community, rather than a SNF or long-care facility
  - CMS regulations generally specify providing at least 3 hours/day of therapy, at least 5 days/week
- SKILLED NURSING FACILITIES (SNFs) – subacute rehab, less intense than an IRF
  - For patients requiring skilled nursing service to maintain or prevent deterioration.
  - Rehabilitation RNs on site a minimum of 8 hours/day (but must follow a physicians plan). No requirement for daily supervision by a physician.
- NURSING HOMES
  - Long-term residential care for individuals unable to live in the community
  - Medicare will generally cover up to 100 days in a SNF. Longer term care generally paid out of pocket, by long-term insurance, or through the Medicaid program.
- LONG-TERM ACUTE CARE HOSPITALS
  - Extended care to stroke patients with complex medical needs due to a combination of acute and chronic conditions. Average LOS 25+ days.
- HOME
  - Provided by Home Health Care Agencies or in outpatient clinics



## II. THE REHABILITATION PROGRAM

### Trends in utilization of acute and post-acute stroke rehab in the US

- Data strongly suggests that there are benefits to starting rehab as soon as the patient is ready and can tolerate it. Prior to discharge from the hospital, all patients should undergo a formal assessment of the patient's rehabilitation needs.
- Multiple transitions in care are typical for stroke survivors, and pose particular challenges to maintain continuity of care and avoid laps in the rehab program
- Early supported discharge may be considered for patients with mild to moderate stroke when adequate community services for both rehab and caregiver support are available
- The 1st setting following acute hospitalization: SNF (32%), IRF (22%), Home Health (15%)
- Major changes in Medicare reimbursement policies since the 1990s have dramatically impacted utilization patterns. Currently, ~70% of Medicare beneficiaries discharged for acute stroke use Medicare-covered post-acute services.



# II. THE REHABILITATION PROGRAM

## Organization of Post-Stroke Rehabilitation Care

- Stroke patients who are candidates for post-acute rehab should receive organized, coordinated, inter-professional care *(Class I, LOE A)*
- Stroke survivors who qualify for and have access to IRF care should receive treatment in an IRF in preference to a SNF *(Class I, LOE B)*
- Organized community-based and coordinated inter-professional rehab is recommended in the outpatient and/or home-based settings *(Class I, LOE C)*
- Early Supported Discharge (ESD) services may be reasonable for people with mild to moderate disability *(Class IIb, LOE B)*

# II. THE REHABILITATION PROGRAM

## Rehabilitation Interventions in the In-Patient Setting

- In comparison to acute stroke units, acute rehab units have greater emphasis on recovery and rehab, have increased staff education and training, have greater patient and care-giver participation, and have early mobilization protocols.
- There is strong evidence that organized, inter-professional stroke care reduces mortality rates, the likelihood of institutional care, and long-term disability -- and enhances recovery & increases independence in ADLs.
- Early rehab for hospitalized stroke patients should be provided in environments with organized inter-professional stroke care. *(Class I, LOE A)*

# II. THE REHABILITATION PROGRAM

## Rehabilitation Interventions in the In-Patient Setting

- Unfortunately, the only large randomized clinical trials in stroke recovery and rehab have focused on the *chronic* recovery phase. Studies on interventions in the *acute* rehab phase are generally small and more limited.
- Timing and intensity of acute rehab are important issues, but remain controversial.
  - Example: *Early mobilization after stroke* -- recommended in many practice guidelines, but one meta-analysis in 2009 had insufficient evidence to support or refute its efficacy, and another randomized controlled trial (AVERT) showed high dose mobilization within 24 hours of stroke was detrimental to achieving a favorable outcome at 3 mos.
- Stroke survivors should receive rehab at an intensity commensurate with anticipated benefit and tolerance (*Class I, LOE B*)
- High dose, very early mobilization within 24 hours of stroke onset can reduce the odds of a favorable outcome at 3 months and is not recommended. (*Class III, LOE A*)

# II. THE REHABILITATION PROGRAM

## Rehabilitation Interventions in the In-Patient Setting

- Various complementary medicine techniques, including acupuncture and somatosensory stimulation, have been studied, but have not shown significant benefit over conventional rehabilitation alone.
- Evidence related to interventions to treat dysphagia, upper and lower limb rehabilitation, mobility, balance/vestibular rehab, cognitive impairment, and hemi-spatial neglect will be covered later in this guidelines slide deck.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Skin Breakdown and Contractures

- Hemiparesis, sensory changes, and altered level of consciousness place the patient with stroke at risk for contractures and skin breakdown.
- Pressure ulcers are also associated with impaired circulation, older age, and incontinence.
- Regular assessment of skin and use of objective scales, such as the Braden scale, are valuable in the prevention of skin injury and should be followed by regular skin inspection with documentation. *(Class I, LOE C recommendation)*
- It is recommended to minimize or eliminate skin friction, minimize skin pressure, provide appropriate support surfaces, avoid excessive moisture, and maintain adequate nutrition & hydration to prevent skin breakdown. Regular turning (at least every 2 hours), good skin hygiene, use of specialized mattresses and wheelchair cushion and seating are recommended until mobility returns *(Class I, LOE C recommendation)*
- Patients, staff, and caregivers should be educated about the prevention of skin breakdown *(Class I, LOE C)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Skin Breakdown and Contractures

- 60% of patients develop joint contractures on the hemiparetic side within the 1<sup>st</sup> year. These contractures can cause pain and make dressing, hygiene, & other self-care difficult.
- Many clinicians recommend daily stretching to avoid contractures, and patients & their families should be taught proper stretching exercises to avoid injury and maximize effectiveness:
  - Positioning of hemiplegic shoulder in maximum external rotation either while sitting or in bed 30 minutes daily is probably indicated to prevent shoulder contractures. *(Class IIa, LOE B)*
  - Resting hand/wrist splints along with regular stretching and spasticity management in patients lacking active hand movement may be considered. *(Class IIb, LOE C)*
  - Use of serial casting or static adjustable splints may be considered to reduce mild to moderate elbow and wrist contractures *(Class IIb, LOE C)*
  - Surgical release of brachialis, brachioradialis, and biceps muscles may be considered for substantial elbow contractures and associated pain *(Class IIb, LOE B)*
  - Resting ankle splints used at night and during assisted standing may be considered for prevention of ankle contracture in a hemiplegic limb *(Class IIb, LOE B)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Deep Venous Thrombosis

- Acute stroke survivors are at high risk of deep venous thrombosis (DVT) and pulmonary embolism (PE) due to a combination of limb immobility and reduced activity level.
- Prevention of DVT and PE can be divided into pharmacological and mechanical methods in both ischemic and hemorrhage strokes.
- Prophylactic treatment is initiated depending upon the type of stroke and use of thrombolytic therapy.
- Therapy usually is continued throughout the rehabilitation stay or until the stroke survivor regains mobility, with few studies examining the optimal duration of prophylaxis.
- For patients with mild motor impairments who are discharged directly home from the hospital, DVT prophylaxis may not be needed.
- For patients discharged to SNF with stays that extend beyond the active rehabilitation program, the duration of prophylactic treatment remains at the discretion of the treating physician.



# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Deep Venous Thrombosis

- Recommendations for prevention of DVT and PE in ischemic stroke are described in great detail in the American College of Chest Physicians (ACCP) Antithrombotic Therapy and Prevention of Thrombosis. (9<sup>th</sup> ed.)
- Overall, the ACCP guidelines found an estimated reduction in overall mortality of 12 deaths per 1000 individuals receiving either UFH or LMWH compared with no anticoagulation. No form of prophylaxis is 100% effective in preventing venous thromboembolism in this population, however.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Deep Venous Thrombosis in Ischemic Stroke

- Prophylactic-dose subcutaneous heparin (UFH or LMWH) should be used for the duration of the acute and rehabilitation hospital stay, or until the stroke survivor regains mobility. *(Class I, LOE A)*
- It is reasonable to use prophylactic-dose LMWH over prophylactic-dose UFH for prevention of DVT. *(Class IIa, LOE A)*
- It may be reasonable to use intermittent pneumatic compression over no prophylaxis during the acute hospitalization. *(Class IIb, LOE B)*
- It is not useful to use elastic compression stockings. *(Class III, LOE B)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Deep Venous Thrombosis in Intracerebral Hemorrhage

- Comparisons of the effects between UFH & LMWH, and the effects of intermittent pneumatic compression and elastic compression stockings have not been studied in stroke survivors with primary ICH. Therefore, recommendations are based on those of ischemic stroke:
- It may be reasonable to use prophylactic-dose SQ heparin (UFH or LMWH) started between days 2 and 4 over no prophylaxis. *(Class IIb, LOE C)*
- It may be reasonable to use prophylactic-dose LMWH over prophylactic-dose UFH. *(Class IIb, LOE C)*
- It may be reasonable to use intermittent pneumatic compression devices over no prophylaxis. *(Class IIb, LOE C)*
- In ICH it is not useful to use elastic compression stockings. *(Class III, LOE C)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Treatment of Bowel and Bladder Incontinence

- Urinary and fecal incontinence are common problems after stroke.
- Approximately, 40%-60% of stroke patients have urinary incontinence during their acute admission for stroke, falling to 25% by hospital discharge. At one year, 15% will remain incontinent of urine.
- Age, cognition, and motor impairments are risk factors for bladder incontinence.
- Fecal incontinence prevalence is approximately 40% acutely, but diminishes to 20% by discharge from rehabilitation.
- Age and functional impairment are risk factors for fecal incontinence on admission for stroke.
- Impaired awareness of urinary incontinence is correlated with mortality and the need for nursing home care 3 months post stroke.
- On a positive note, many patients recover continence post stroke.
- Because of the risk of skin breakdown, social stigma, and burden of care associated with incontinence, management of bowel and bladder continence is an essential part of the rehabilitation process.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Treatment of Bowel and Bladder Incontinence

- Recommend assessment of bladder function in acutely hospitalized stroke patients. Specifically:
  - a. A history of urological issues prior to stroke should be obtained. *(Class I, LOE B)*
  - b. Assessment of urinary retention through bladder scanning or intermittent catheterizations post voiding while recording volumes is recommended for patients with urinary incontinence or retention. *(Class I, LOE B)*
  - c. Assessment of cognitive awareness of need to void or having voided is reasonable. *(Class IIa, LOE B)*
- Removal of the foley catheter (if any) within 24 hours after admission for acute stroke is recommended, based on the CDC recommendations for *all* hospitalized patients. *(Class I, LOE B)*
- It is reasonable to use the following treatment interventions to improve bladder incontinence in stroke patients: *(Class IIa, LOE B)*
  - a. Prompted voiding;
  - b. Pelvic floor muscle training (after discharge home)
- It may be reasonable to assess prior bowel function in acutely hospitalized stroke patients and include the following: *(Class IIb, LOE C)*
  - a. Stool consistency, frequency, and timing (pre-stroke).
  - b. Bowel care practices prior to stroke.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Assessment, Prevention and Treatment of Hemiplegic Shoulder Pain

- Shoulder pain is common after stroke, with an incidence during the first year of 1% to 22%, and prevalence 5% to 84%.
- The development of shoulder pain after a stroke is associated with shoulder subluxation and motor weakness. Spasticity may be a contributing factor in some patients as well.
- The underlying causes of pain are multifactorial: Pain may be associated with shoulder tissue injury, abnormal joint mechanics, and central nociceptive hypersensitivity.
- Recent evidence supports both a peripheral and central neuropathic role for shoulder pain as well. There is growing recognition that hemiplegic shoulder pain is a syndrome with **bio mechanical** and **central nervous system components**, and overlaps with *complex regional pain syndrome* (a.k.a., *shoulder hand syndrome*), characterized by allodynia and hyperpathia, but also includes shoulder pain.
- Interventions to prevent onset, as well as treat shoulder pain, in patients with stroke-related hemiplegia include: proper positioning, maintenance of shoulder range of motion, and motor retraining.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Assessment, Prevention and Treatment of Hemiplegic Shoulder Pain

- **Patient and Family education** (i.e., range of motion, positioning) is recommended regarding shoulder pain and shoulder care after stroke, particularly prior to discharge or transitions in care. *(Class I, LOE C)*
- **Botulinum toxin injection** can be useful to reduce severe hypertonicity in hemiplegic shoulder muscles. *(Class IIa, LOE A)* Results have been mixed in the management of shoulder pain in general.
- A trial of **neuromodulating pain medications** is reasonable for patients with hemiplegic shoulder pain who have clinical signs and symptoms of neuropathic pain manifested as sensory change in the shoulder region, allodynia, or hyperpathia. *(Class IIa, LOE A)*
- It is reasonable to consider **positioning** and use of **supportive devices and slings** for shoulder subluxation *(Class IIa, LOE C)*
- A **clinical assessment** can be useful including: musculoskeletal evaluation, evaluation of spasticity, identification of any subluxation, testing for regional sensory changes *(Class IIa, LOE C)*
- Neuromuscular **electrical stimulation (NMES)** may be considered (surface or intramuscular) for shoulder pain. *(Class IIb, LOE A)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Assessment, Prevention and Treatment of Hemiplegic Shoulder Pain

- **Ultrasound** may be considered as a diagnostic tool for shoulder soft tissue injury *(Class IIb, LOE B)*
- The usefulness of **acupuncture** as an adjuvant treatment for hemiplegic shoulder pain is of uncertain value. *(Class IIb, LOE B)*
- The usefulness of subacromial and/or glenohumeral **corticosteroid** injection for patients with inflammation in these locations is not well established. *(Class IIb, LOE B)*
- Suprascapular **nerve block** may be considered as an adjunctive treatment for hemiplegic shoulder pain. *(Class IIb, LOE B).*
- **Surgical tenotomy** of pectoralis major, latissimus dorsi, teres major, or subscapularis may be considered for patients with severe hemiplegia and restrictions in shoulder range of motion. *(Class IIb, LOE C)*
- The use of **overhead pulley exercises** is not recommended. *(Class III, LOE C)*



# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Central Pain Post Stroke

- Central post stroke pain is pain that results from a lesion in the **somatosensory system**, rather than from a peripheral nociceptive or psychogenic cause.
- The diagnosis of central post stroke pain should be based on established diagnostic criteria after other causes of pain have been excluded. *(Class I, LOE C)*. Diagnostic **criteria** include requirements that the pain occur after stroke, be located in an area of the body that corresponds to the lesion in the central nervous system, and not be accounted for by nociceptive or peripheral neuropathic pain.
- Central pain is classically associated with **thalamic stroke** (Dejerine–Roussy syndrome), but can result from a lesion anywhere along the **spinothalamic** and **thalamocortical tracts** within the central nervous system
- Central pain symptoms are usually described as **burning** or **aching**, and often include **allodynia** associated with touch, cold, or movement.
- Incidence of central post stroke pain is estimated at 7%-8%, and typically begins within a few days following stroke, with the majority becoming symptomatic within the first month

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Central Pain Post Stroke: *Pharmacological approaches*

- Pharmacotherapy, in combination with a therapeutic exercise and psychosocial support, is a reasonable approach.
- Inter-professional pain management is probably useful in conjunction with pharmacotherapy as well. *(Class IIa, LOE C)*.
- The choice of pharmacologic agent for the treatment of central post-stroke pain should be individualized to the patient's needs, response to therapy, and any side effects. *(Class I, LOE C)*
- Standardized serial measurements, such as pain diaries, visual analog scales, or pain questionnaires, may be useful to monitor response to treatment *(Class IIb, LOE C)*
- Pharmacotherapy has primarily relied on antidepressant medications and anticonvulsants. Amitriptyline and lamotrigine are reasonable first-line pharmacologic treatments *(Class IIa, LOE B)*
- Pregabalin, gabapentin, carbamazepine, and phenytoin may be considered as second-line treatments *(Class IIb, LOE B)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Central Pain Post Stroke: *Non-pharmacological approaches*

- Transcutaneous Electrical Stimulation (TENS) has not been established as an effective treatment. *(Class III, LOE B)*
- Motor cortex stimulation -- given using a surgically implanted dural electrode overlying the motor cortex connected to a subcutaneous pulse generator -- might be reasonable for the treatment of intractable central post-stroke pain that is not responsive to other treatments in carefully selected patients. *(Class IIb, LOE B)*
- Deep brain stimulation has conflicting evidence and not been established as an effective treatment *(Class III, LOE B)*.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Falls

- Falls and their prevention in persons with stroke require special considerations. Impairments in balance, gait, motor control, perception, and vision all contribute to falls, as well as a heightened fear of falling.
- Up to 70% of persons with a stroke fall during the first six months after discharge from the hospital or rehabilitation facility.
- Persons with stroke are also at risk to be repeat fallers and experience an injury associated with a fall.
- The loss of bone mineral density associated with stroke may contribute to the higher hip fracture rate for persons with stroke.
- In addition to the physical consequences associated with fractures and related injuries, falls also have psychological and social consequences. The reduction in physical activity resulting from fear of falling can itself contribute to an increased risk of falls.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Prevention of Falls

- The evidence specific for fall prevention and interventions in persons with stroke is limited. Most assessment tools and evidence-based recommendations are derived from studies on general population of older adults.
- It is recommended that persons with stroke discharged to community participate in exercise programs with balance training to reduce falls. *(Class I, LOE B)*
- It is recommended that persons with stroke be provided a formal fall prevention program during hospitalization. *(Class I, LOE A)*
- It is reasonable that persons with stroke be evaluated for fall risk annually using an established instrument appropriate to the setting. *(Class IIa, LOE B)*
- It is reasonable that persons with stroke, and their caregivers, receive information targeted to home and environmental modifications designed to reduce falls. *(Class IIa, LOE B)*
- Tai Chi training may be reasonable for fall prevention. *(Class IIb, B)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Seizure Management

- The percentage of patients reported to have a seizure during the first few days after a new stroke ranges from 2%-23%. Estimates for the incidence of a seizure developing beyond the first few days after stroke are even more variable, ranging from 3%-67%.
- A minority of such patients will have a recurrent seizure, and status epilepticus is uncommon.
- A seizure is most likely to arise during the first 24 hours after stroke onset, is usually partial at onset, and has a variable tendency to secondarily generalize. The probability of a seizure beyond the first few days is higher in patients with preexisting dementia.
- A post-stroke seizure is more common with ICH, or when the stroke involves cerebral cortex. Seizures in patients with lacunar-type strokes are rare.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Seizure Management

- There are no good data available to guide the utility of **prophylactic** administration of antiepileptic drugs after stroke, including patients with ICH & SAH. In addition to the risk of drug side effects, there is some evidence to suggest that many of the medicines used to treat seizures, including phenytoin and benzodiazepines, may dampen mechanisms of neural plasticity that contribute to behavioral recovery. Therefore, routine seizure prophylaxis for patients with ischemic or hemorrhagic stroke is not recommended.  
*(Class III, LOE C)*
- Data are also limited on the efficacy of antiepileptic drugs in the **treatment** of stroke patients who have experienced a seizure. Any patient who develops a seizure should be treated using standard management approaches, including a search for reversible causes of seizures and potential use of antiepileptic drugs  
*(Class I, LOE C)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Secondary Stroke Prevention

- Stroke shares many risk factors with other forms of cardiovascular disease, such as hypertension, smoking, hyperlipidemia, and inactivity.
- With hospitalization for acute stroke brief, it is particularly important to address secondary prevention of stroke and other cardiovascular diseases during the post-acute rehabilitation phase of care.
- See the 2014 AHA/ASA secondary stroke prevention guidelines [here](#) for further information:
  - Kernan WN, Ovbiagele B, Black HR, Bravata DM, Chimowitz MI, Ezekowitz MD, Fang MC, Fisher M, Furie KL, Heck DV, Johnston SC, Kasner SE, Kittner SJ, Mitchell PH, Rich MW, Richardson D, Schwamm LH, Wilson JA. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2014;45:2160-2236.





# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Post-Stroke Depression, including Emotional and Behavioral State

- Depression and anxiety are important to diagnose after a stroke because
  - They are common.
  - They are associated with increased mortality & poor functional outcomes.
  - They can negatively impact a patient's ability to actively participate in rehabilitation therapies, which is increasingly an issue given the time windows for rehab & recovery.
  - They are treatable.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Post-Stroke Depression, including Emotional and Behavioral State

- **Depression** has been reported in up to **33%** of stroke survivors, compared with 13% of age- and sex-matched controls, and its likelihood may increase with stroke severity; however, reliable estimates of the incidence and prevalence in a stroke population are limited.
- **Anxiety**, in particular, is found to coexist with depression in the post-stroke patient population, but frequently goes undiagnosed. Any patient with one mood disorder should be assessed for others.
- These and other psychological disorders can occur at any time -- continual screening is important.
- **Predictors** of post-stroke depression include
  - prior history of depression,
  - severe disability,
  - cognitive impairment,
  - previous stroke,
  - a positive family history of psychiatric disorder, and
  - female sex.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Post-Stroke Depression Including Emotional and Behavioral State: *Screening and Non-Pharmacological Therapy*

- Administration of a structured depression inventory, such as the PHQ-2, is recommended to routinely screen for post-stroke depression. *(Class I, LOE B)*
- Periodic reassessment of depression, anxiety, and other psychiatric symptoms may be useful in the care of stroke survivors. *(Class IIa, LOE B)*
- Patient education about stroke is recommended. Patients should be provided with information, advice, and the opportunity to talk about the impact of the illness on their lives. *(Class I, LOE B)*
- Patient education, counseling, and social support may be considered as components of treatment for post-stroke depression. *(Class IIb, LOE B)*
- Consultation by a qualified psychiatrist or psychologist for stroke survivors with mood disorders causing persistent distress or worsening disability can be useful. *(Class IIa, LOE C).*
- An exercise program of at least 4 weeks duration may be considered as a complementary treatment for post stroke depression. *(Class IIb, LOE B)*
- Early effective treatment of depression may have a positive effect on the rehabilitation outcome. *(Class IIb, LOE B)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Post-Stroke Depression, including Emotional and Behavioral State: *Pharmacological Therapy*

- Patients diagnosed with post-stroke depression should be treated with antidepressants in the absence of contraindications, and closely monitored to verify effectiveness.  
*(Class I, LOE B)*
- No recommendation for the use of any particular class of antidepressants is made. SSRIs are commonly employed and generally well-tolerated in this patient population.  
*(Class III, LOE A)*
- A therapeutic trial of an SSRI or dextromethorphan/quinidine is reasonable for patients with emotional lability or pseudobulbar affect causing emotional distress *(Class IIa, LOE A)*
- The usefulness of routine use of prophylactic antidepressant medications is unclear.  
*(Class IIb, LOE A)*
- Combining pharmacologic and non-pharmacologic treatments of post-stroke depression may be considered. *(Class IIb, LOE A)*
- The efficacy of individual psychotherapy alone in the treatment of post-stroke depression is unclear. *(Class IIb, LOE B)*

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Post-Stroke Osteoporosis

- Bone mineral density and lean tissue mass commonly decline follow stroke, in particular involving the paretic side (can be >10% in < 1yr).
- The decline in bone density, coupled with balance problems and the risk for falls after a stroke, significantly increases the risks for fractures.
- The US Preventative Services Task Force (USPSTF) recommends screening for osteoporosis in all women 65 years and older, even if they have no risk factors, and in younger, post-menopausal women who do have risk factors for osteoporosis (such as having parents who fractured bones, being white, a history of smoking, alcohol abuse). No recommendations were made for men, due to a lack of evidence of either benefit or harm.
- Limited research indicates increased levels of physical activity can minimize the decline in -- and possibly increase -- bone density and muscle mass after a stroke.

# III. PREVENTION AND MEDICAL MANAGEMENT OF COMORBIDITIES

## Post-Stroke Osteoporosis

- Stroke survivors residing in long-term care facilities should be evaluated for calcium and vitamin D supplementation. *(Class I, LOE A)*
- USPSTF osteoporosis screening recommendations should be followed in women who have suffered a stroke. *(Class I, LOE B)*
- Increased levels of physical activity are probably indicated to reduce the risk and/or severity of post-stroke osteoporosis. *(Class IIa, LOE B)*

# IV. ASSESSMENT

## Level of Disability

- During **ACUTE** stroke management, the focus tends to be more on measures of body function: e.g., cognitive changes, visual field deficit, aphasia, neglect, dysarthria, weakness, sensory deficits, problems with coordination, and major depression.
- Toward more **CHRONIC** phases of stroke management, the emphasis shifts towards activity limitations, restriction in participation, and quality of life.
- Formal standardized and validated measures should be used to the extent possible to gauge the total impact of a patient's stroke.
- Assessment of a patient recovering from stroke may be performed to predict outcome, monitor recovery, monitor response to a new therapy, guide new treatment decisions, document clinical status as part of reimbursement, inform patient stratification such as in selecting post-discharge setting, in the context of a clinical trial, as part of stroke/rehab center certification requirements, or in compliance with a stroke care plan protocol.



# IV. ASSESSMENT

## Level of Disability: SCALES

- **NIHSS:** the most widely used assessment of global impairment in the U.S.
  - Pros: good predictor of short- and long-term M&M; sensitive to change in numerous studies; training and certification process increases the chance the scoring is performed accurately and consistently
  - Cons: low granularity for defining differences in level of impairment; not sensitive to many common post-stroke deficits such as depression, hand motor deficits, swallowing or memory loss
- **Fugl-Meyer scale** and **Box & Block Test**: motor deficits
- **Western Aphasia Battery** and the **Boston Naming Test**: language deficits
- **Behavioral Inattention Test** and **The Line Cancellation test**: neglect
- **Hamilton Depression Scale** and the **Beck Depression Inventory II**: depression symptoms
- **Mini-Mental Status Exam** and **Trail Making Tests**: cognitive deficits
- **International Classification of Functioning, Disability, & Health**
- And, of course, many others...



# IV. ASSESSMENT

## Assessing Overall Rehabilitation Needs

- Selection of the most appropriate level of care after the acute hospitalization requires consideration of many factors – e.g., the severity of residual neurological deficits, resulting activity limitations, cognitive and communicative ability, psychological status, swallowing ability, pre-morbid functional ability, medical comorbidities, the level of family/caregiver support, the likelihood of returning to community living, and the ability to participate in a rehabilitation program.
- Presently, there is no single functional assessment with measurement properties that is used throughout the entire clinical course of stroke care (acute hospital, inpatient rehabilitation, and outpatient care) for tracking stroke rehabilitation outcome.
- Standardized assessments such as the **Barthel Index** or the **Functional Independence Measure (FIM)** appear to be useful – they are both strong predictors of discharge functional status, discharge destination following inpatient rehabilitation, and length of rehabilitation.
- **FIM is the most commonly used** functional measure in the US, as it is tied to the prospective payment system of the CMS.

# IV. ASSESSMENT

## ADLs, IADLs, and Disability: Definitions

- “ACTIVITIES OF DAILY LIVING” (ADLs) typically refers to routine self-care tasks people perform as part of their everyday life.
- ADLs may be subdivided into:
  - BASIC ADLs: personal self-care and fundamental mobility
  - INSTRUMENTAL ADLs (IADLs): more complex domestic, community, and leisure activities.
- DISABILITY:
  - A single consensus definition may not be feasible or desirable, esp. as it may depend on the context used, according to the Agency for Healthcare Research and Quality (AHRQ).
  - The International Classification of Functioning, Disability, and Health (ICF) uses it to describe aspects of body functions and structure, activity, and participation within the context of the environment and personal/social factors.

# IV. ASSESSMENT

## ADL, IADL, and Disability Measurement

- It is recommended that all persons with stroke be provided a formal assessment of their ADLs and IADLs, communication abilities, and functional mobility prior to discharge from acute care hospitalization, and that the findings be incorporated into the care transition and the discharge planning process. *(Class I, LOE B)*
- It is recommended that all persons with stroke who are discharged to an independent community living from post-acute rehabilitation or skilled nursing facilities receive ADL and IADL assessment directly related to their discharge living setting. *(Class I, LOE B)*
- A functional assessment by a clinician with expertise in rehabilitation is recommended for patients with an acute stroke with residual functional deficits. *(Class I, LOE C)*

# IV. ASSESSMENT

## ADL, IADL, and Disability Measurement

- Determination of post-acute rehabilitation needs should be based on assessments of residual neurological deficits, activity limitations, cognitive, communicative and psychological status, swallowing ability, determination of previous functional ability and medical comorbidities, the level of family/caregiver support, the capacity of family/caregiver to meet the care needs of the stroke survivor, the likelihood of returning to community living, and the ability to participate in rehabilitation. *(Class I, LOE C)*
- It is reasonable that persons with stroke discharged from acute and post-acute hospitals/centers receive formal follow-up regarding their ADL and IADL status, communication abilities, & functional mobility within 30 days of discharge. *(Class IIa, LOE B)*
- The routine administration of standardized measures can be useful to document the severity of stroke and resulting disability starting in the acute phase, and progressing over the course of recovery and rehabilitation. *(Class IIa, LOE C)*
- A standardized measure of balance and gait speed (for those who can walk) may be considered for planning post-acute rehabilitation care and for safety counseling with patient and family. *(Class IIb, LOE B)*

# IV. ASSESSMENT

## Assessment of Motor Impairment, Activity, and Mobility

- Assessment of motor impairments and activity is critical for delivering efficient, high-quality rehabilitation services to stroke patients.
- Assessment results are used to determine:
  - who needs further services,
  - what types of services are required,
  - what is the most appropriate setting for those services,
  - which interventions to select,
  - how to tailor the interventions to individual patients,
  - whether or not the rehabilitation services are achieving the desired outcomes.
- When implementing the use of standardized assessments within and across facilities, measures that are familiar, clinician-friendly, and meet the clinical needs of the service are generally implemented most easily.

# IV. ASSESSMENT

## Assessment of Motor Impairment, Activity, and Mobility

- Motor impairment assessments (paresis/muscle strength, tone, individuated finger movements, coordination) using standardized tools may be useful. *(Class IIb, LOE C)*
- Upper extremity activity/function assessment using a standardized tool may be useful. *(Class IIb, LOE C)*
- Balance assessment using a standardized tool may be useful. *(Class IIb, LOE C)*
- Mobility assessment using a standardized tool may be useful *(Class IIb, LOE C)*
- The use of standardized questionnaires to assess stroke survivor perception of motor impairments, activity limitations, and participation may be considered. *(Class IIb, LOE C)*
- The use of technology (accelerometers, step-activity monitors, pedometers) as an objective means of assessing real-world activity and participation may be considered. *(Class IIb, LOE C)*
- Periodic assessments using the same standardized tools to document progress in rehabilitation may be useful. *(Class IIb, LOE C)*

# IV. ASSESSMENT

## Assessment of Communication Impairment

- One million people in the United States are estimated to have aphasia, commonly as a result of stroke
- Communication impairment can negatively impact participation in life activities immediately after a stroke and can result in chronic deficits.
- It is important to identify strengths and compensatory strategies that can enable the patient to maximize independence and re-enter life activities with as much competency and confidence as possible.
- Rather than focusing on one's disability, attention is focused on maximizing quality of life and participating in daily activities.

# IV. ASSESSMENT

## Assessment of Communication Impairment

- By means of interview, conversation, observation, standardized tests, and/or non-standardized items, the communication assessment should:
  - evaluate speech, language, cognitive-communication, pragmatics, reading and writing,
  - identify communicative strengths & weaknesses,
  - identify helpful compensatory strategies. *(Class I, LOE B)*
- Tele-rehabilitation is reasonable when face-to-face assessment is impossible or impractical. *(Class IIa, LOE A)* However, this requires adequate technology.
- The communication assessment may consider the individual's unique priorities utilizing the ICF framework, including quality of life *(Class IIb, LOE C)*



# IV. ASSESSMENT

## Assessment of Cognition and Memory

- Cognitive impairment is found in a substantial portion of stroke survivors, affecting more than 1/3 of stroke survivors at 3 and 12 months post-stroke.
- These impairments are associated with poor long-term survival, higher disability, and greater institutionalization rates. Cognitive status is therefore an important determinant of post-stroke success.
- The cognitive domains most likely to be defective in stroke compared with control subjects were memory, orientation, language, and attention.

# IV. ASSESSMENT

## Assessment of Cognition and Memory

- Screening for cognitive deficits is recommended for all stroke patients prior to discharge home. *(Class I, LOE B)*
- The **Neurobehavioral Cognitive Status Examination (NCSE)** is a brief screening tool that assesses cognition in the ability areas of language, constructions, memory, calculation and reasoning. It provides both a rapid and sensitive measure of cognitive function, and it appears to predict functional status.
- When a screening exam reveals cognitive deficits, a more detailed or **formal neuropsychological evaluation** to identify areas of cognitive strength and weakness may be beneficial. *(Class IIa, LOE C)*
- Specific areas that may be assessed include: processing speed; simple & complex attentional skills; language abilities; praxis (performing skilled actions); visual-spatial abilities (including visual fields & neglect); language-based and visual-spatial memory; executive functioning (including organization, prioritization, reasoning, problem-solving, judgment, & emotional responses, etc.)

# IV. ASSESSMENT

## Sensory Impairments, including Touch, Vision, & Hearing

- Stroke may result in a variety of different types of sensory impairment, such as loss of vision, touch, proprioception, hearing and others.
- Sensory impairments are directly linked to activity limitations and participation restrictions after stroke, but can improve with therapeutic intervention.
- Evaluation of stroke patients for sensory impairments including touch, vision, and hearing is probably indicated. (*Class IIa, LOE B*)

# IV. ASSESSMENT

## Sensory Impairments: *Touch*

- Sensory modalities include tactile, pain, temperature, pressure, vibration, proprioception, stereognosis, and graphesthesia.
- Tactile sensation may be the most common form of sensory deficit after stroke.
- In the months following a stroke, patients may show substantial but variable somatosensory recovery, especially for proprioception.
- Assessment of sensory deficits remains largely a matter of the bedside exam, though various scales and devices that can quantitate deficits are under study.

# IV. ASSESSMENT

## Sensory Impairments: *Vision*

- A reduction in vision can impact many roles, quality of life, motivation, and social behaviors.
- Numerous forms of visual impairment may be seen after stroke: e.g., visual field loss, abnormal eye movements, reduced visual acuity, diplopia, impaired color vision, difficulty with reading, and deficits in higher order visual processing.
- The most common visual impairment after stroke is visual field loss, affecting approximately 30% of stroke survivors.
- Some degree of spontaneous restoration of visual fields generally occurs after stroke. However, the degree of recovery is variable and chance for significant recovery uncertain. As with other aspects of stroke, gains are highest early after the stroke.

# IV. ASSESSMENT

## Sensory Impairments: *Hearing*

- Stroke can result in acute hearing loss. This may be present in as many as 21% of patients with posterior circulation strokes.
- Stroke-related hearing loss is usually accompanied by vertigo, and often with additional deficits related to brainstem/cerebellar infarction as well.
- Audiometry is more sensitive than bedside assessment of hearing loss.
- Neuro-otologic testing may help characterize and measure associated vestibular dysfunction.
- Most patients show partial or complete recovery by one year post-stroke.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Dysphagia Screening, Management, & Nutritional Support

- Dysphagia is common after stroke, affecting 42% - 67% of patients within 3 days.
- Of these patients, about ½ aspirate – and 1/3 of those develop pneumonia.
- Dysphagia and/or aspiration can lead to pneumonia, malnutrition, dehydration, weight loss and overall decreased quality of life.
- Aspiration may be “silent” or “occult,” and not clinically obvious.
- Early identification through screening can reduce the risk of developing these adverse health consequences.
- Additionally, observational studies suggest that dysphagia screening reduces the risk of pneumonia.



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Dysphagia Screening, Management, & Nutritional Support

- Early dysphagia screening is recommended for acute stroke patients to identify dysphagia and/or aspiration that can lead to pneumonia, malnutrition, dehydration, and other complications. *(Class I, LOE B)*
- Dysphagia screening is reasonable by a speech-language pathologist or other trained healthcare provider. *(Class IIa, LOE C)*
- Assessment of swallowing before the patient begins eating, drinking, or receiving oral medications is recommended. *(Class I, LOE B)*



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Dysphagia Screening, Management, & Nutritional Support

- An instrumental evaluation is probably indicated for those patients suspected of aspiration to verify the presence/absence of aspiration and to determine the physiological reasons for dysphagia to guide the treatment plan. *(Class IIa, LOE B)*
- Selection of instrumental study (FEES, video-fluoroscopy, FEESST) may be based on availability or other considerations. *(Class IIb, LOE C)*
- Oral hygiene protocols should be implemented to reduce the risk of aspiration pneumonia after stroke. *(Class I, LoE B)*
- Enteral feedings (tube feedings) should be initiated within 7 days of a stroke for patients who cannot safely swallow *(Class I, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Dysphagia Screening, Management, & Nutritional Support

- Nasogastric tube feeding should be used for short term (2-3 weeks) nutritional support for patients who cannot swallow safely. *(Class I, LOE B)*
- Percutaneous gastrostomy (PEG) tubes should be placed in patients with chronic inability to swallow safely. *(Class I, LoE B)*
- Nutritional supplements are reasonable to consider for patients who are malnourished or at risk of malnourishment. *(Class IIa, LOE B)*
- Incorporating principles of neuroplasticity into dysphagia rehabilitation strategies/interventions is reasonable. *(Class IIa, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Dysphagia Screening, Management, & Nutritional Support

- Behavioral interventions may be considered as a component of dysphagia treatment. *(Class IIb, LOE A)*
- Acupuncture may be considered as a adjunctive treatment for dysphagia. *(Class IIb, LOE B)*
- Drug therapy, neuromuscular electrical stimulation, pharyngeal electrical stimulation, physical stimulation, transcranial direct current stimulation, and transcranial magnetic stimulation are of uncertain benefit and not currently recommended. *(Class III, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Non-Pharmacological Therapies for Cognitive Impairment & Memory

- Impairments in multiple domains of cognition occur frequently after stroke including attention, processing speed, executive function, verbal and visual memory, language, and perception.
- Stroke doubles an individual's risk for dementia (including Alzheimer's disease).
- Cognitive rehabilitation has been the traditional non-pharmacological method to treat cognitive impairment and has been defined as a systematic, functionally-oriented service of therapeutic cognitive activities, based on an assessment and understanding of the person's brain-behavior deficits.
- These treatments are directed at the restoration or re-establishment of cognitive activity, the acquisition of strategies to compensate for impaired cognitive function, and the use of adaptive technique or equipment for increasing independence.



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Non-Pharmacological Therapies for Cognitive Impairment & Memory

- Enriched environments to increase engagement with cognitive activities are recommended. *(Class I, LOE A)*
- Use of cognitive rehabilitation to improve attention, memory, visual neglect and/or executive functioning is reasonable. *(Class IIa, LOE B)*
- Use of cognitive training strategies that consider practice, compensation and adaptive techniques for increasing independence is reasonable. *(Class IIa, LOE B)*
- Compensatory strategies may be considered to improve memory functions, including the use of internalized strategies (e.g., visual imagery, semantic organization, spaced practice) and external memory assistive technology (e.g., notebooks, paging systems, computers, other prompting devices). *(Class IIb, LOE A)*



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Non-Pharmacological Therapies for Cognitive Impairment & Memory

- Some type of specific memory training is reasonable, such as promoting global processing in visual-spatial memory and constructing a semantic framework for language-based memory. *(Class IIb, LOE B)*
- Errorless learning techniques may be effective for persons with severe memory impairments for learning specific skills or knowledge, although there is limited transfer to novel tasks or reduction in overall functional memory problems. *(Class IIb, LOE B)*
- Music therapy may be reasonable for improving verbal memory. *(Class IIb, LOE B)*
- Exercise may be considered as adjunctive therapy to improve cognition and memory after stroke. *(Class IIb, LOE C)*
- Virtual reality training may be considered for verbal, visual, and spatial learning, but efficacy is not well established. *(Class IIb, LOE C)*
- Anodal transcranial direct current stimulation over the left dorsolateral prefrontal cortex to improve language-based complex attention (working memory) remains experimental. *(Class III, LoE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Pharmacological therapies for Cognitive Impairments & Attention

- Several medications are used to treat cognitive disorders, but little literature addresses their use for post-stroke cognitive deficits.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Pharmacological Approaches to improve Cognitive Impairments, including Attention

- The usefulness of **donepezil** in the treatment of post-stroke cognitive deficits is not well established. *(Class IIb, LOE B)*
- The usefulness of **rivastigmine** in the treatment of post-stroke cognitive deficits is not well established. *(Class IIb, LOE B)*
- The usefulness of **anti-depressants** in the treatment of post-stroke cognitive deficits is not well established. *(Class IIb, LOE B)*
- The usefulness of **dextroamphetamine, methylphenidate, modafinil, and atomoxetine** in the treatment of post-stroke cognitive deficits is unclear. *(Class IIb, LOE C)*



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Limb Apraxia

- Limb apraxia is a **decrease or difficulty in performing purposeful, skilled movements**, which cannot be attributed to hemiplegia or lack of effort.
- It is more common after **left** hemisphere stroke than right.
- While not traditionally believed to impact daily life function, there is now evidence that apraxia is associated with reduced independence in daily life activities.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Limb Apraxia Recommendations

- Strategy training or gesture training for apraxia may be considered. *(Class IIb, LOE B)*
- Task practice for apraxia with and without mental rehearsal may be considered. *(Class IIb, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Hemispatial Neglect or Hemi-Inattention

- Hemispatial neglect – also called hemiagnosia, hemineglect, unilateral neglect, spatial neglect, contralateral neglect, unilateral visual inattentions, hemi-inattention, neglect syndrome, or contralateral hemispatialagnosia – is a neuropsychological condition in which after damage to a part of 1 hemisphere of the brain is sustained, a deficit in attention to, and awareness of, 1 side of space is observed. These symptoms are not attributable to a primary sensory (e.g., visual) or motor deficit; they are typically contralateral to the lesion. It cannot be attributed to primary sensory (e.g., visual) or motor deficits.
- Hemispatial neglect is common after stroke and significantly impairs the ability to participate effectively in rehabilitation.
- While neglect improves over time, neglect symptoms continue to interfere with daily functioning long after stroke.
- The interventions developed for neglect fall into two general categories:
  - **Bottom-up approaches:** designed to remediate attention processes for the left hemisphere and internal representations of space;
  - **Top-down approaches:** aimed at teaching strategies for compensating for neglect.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Hemispatial Neglect or Hemi-Inattention

- It is reasonable to provide repeated top-down and bottom-up interventions, such as prism adaptation, visual scanning training, optokinetic stimulation, virtual reality, limb activation, mental imagery, and neck vibration combined with prism adaptation to improve neglect symptoms. *(Class IIa, LOE A)*
- Right visual field testing may be considered. *(Class IIb, LOE B)*
- Repetitive Transcranial Magnetic Stimulation (rTMS) of various forms may be considered to ameliorate neglect symptoms. *(Class IIb, LOE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Communication Disorders

- Disorders of communication and related cognitive impairments are common after stroke and include aphasia, cognitive-communication disorders, dysarthria and apraxia of speech.
- Communication disorders may affect speaking, listening, reading, writing, gestures, and pragmatics.
- The presence of a communication disorder may negatively impact social participation, psychological well-being, and quality of life.
- A certified speech and language pathologist is normally the one who performs the evaluation and treatment of communication disorders.
- The overall goals of speech and language treatment are:
  - 1) Facilitate the recovery of communication,
  - 2) Assist patients in developing strategies to compensate for communication disorders,
  - 3) Counsel and educate people in the patient's environment on assistive communication supports to facilitate communication, decrease isolation, and meet the patient's wants and needs.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Cognitive-Communication Disorders

- Interventions for cognitive-communication disorders are reasonable to consider if they are individually tailored and target. *(Class IIa, LOE B)*
  1. The overt **communication deficit** affecting prosody, comprehension, and expression of discourse, and pragmatics
  2. The **cognitive deficits** that accompany and/or underlie the communication deficit, including attention, memory, and executive functions.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Aphasia Recommendations

- Speech and language therapy is recommended for persons with aphasia.  
*(Class I, LOE A)*
- Treatment for aphasia should include communication partner training.  
*(Class I, LOE B)*
- Intensive treatment is probably indicated but there is no definitive agreement on the optimum amount, timing, intensity, distribution or duration of treatment.  
*(Class IIa, LOE A)*
- Computerized treatment may be considered to supplement treatment.  
*(Class IIb, LOE A)*
- A variety of different treatment approaches for aphasia may be useful, but relative effectiveness is not known. *(Class IIb, LOE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Aphasia Recommendations

- Group treatment may be useful across the continuum of care, including the use of community-based aphasia groups. *(Class IIb, LOE B)*
- Pharmacotherapy for aphasia may be considered on a case-by-case basis in conjunction with speech and language therapy, but no specific regimen is recommended for routine use at this time. *(Class IIb, LOE B)*
- The use of brain stimulation techniques as adjuncts to behavioral speech and language therapy is considered experimental and therefore is not currently recommended for routine use. *(Class III, LOE B)*



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Motor Speech Disorders: Dysarthria and Apraxia of Speech

- **Dysarthria** is a collective term for a group of speech disorders that result from paralysis, weakness, or incoordination of the speech musculature following neurological damage.
- Dysarthria can affect, singly or in combination, any of the subsystems underlying speech production -- *i.e.*, respiratory, laryngeal, velopharyngeal, and oral-articulatory subsystems.
- It is estimated that 20% of stroke patients present with dysarthria, although the type of dysarthria and its specific characteristics vary depending on factors such as lesion site and severity.
- **Apraxia** of speech is a disorder of motor planning and/or programming, resulting in difficulty volitionally producing the correct sound of speech.
- In addition to articulatory disturbances, **prosodic deficits** – such as slow rate of speech and restricted variations in pitch and loudness – may be present.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Motor Speech Disorder Recommendations: Dysarthria & Apraxia

- Interventions for motor speech disorders should be individually tailored, and can include behavioral techniques and strategies that target: *(Class I, LOE B)*
  - 1) Physiologic support for speech, including respiration, phonation, articulation and resonance
  - 2) Global aspects of speech production, such as loudness, rate, and prosody
- Augmentative and alternative communication devices and modalities should be used to supplement speech. *(Class I, LOE C)*
- Tele-rehabilitation may be useful when face-to-face treatment is impossible or impractical. *(Class IIa, LOE C)*
- Environmental modifications, including listener education, may be considered to improve communication effectiveness. *(Class IIb, LOE C)*
- Activities to facilitate social participation and promote psychosocial well-being may be considered. *(Class IIb, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Spasticity

- Spasticity is classically defined as a **velocity-dependent resistance to stretch** of a muscle and is one component of the **upper motor neuron syndrome**.
- Post-stroke spasticity may have dystonic features, including involuntary muscle activity and limb positioning.
- Spasticity is correlated with activity limitations associated with hygiene, dressing, and pain.
- These activity limitations increase caregiver burden and reduce quality of life as measured by the EuroQol-5.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Spasticity Recommendations

- Targeted injection of **botulinum toxin** into localized upper limb muscles is recommended to reduce spasticity, improve passive or active range of motion, and improve dressing, hygiene and limb positioning. *(Class I, LOE A)*
- Targeted injection of botulinum toxin into lower limb muscles is recommended to reduce spasticity that interferes with gait function. *(Class I, LOE A)*
- **Oral antispasticity agents** can be useful for generalized spastic dystonia, but may result in dose-limiting sedation or other side effects. *(Class IIa, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Spasticity Recommendations

- Physical modalities such as **neuromuscular electrical stimulation (NMES)** or vibration applied to spastic muscles may be reasonable to improve spasticity temporarily as an adjunct to rehabilitation therapy. *(Class IIb, LOE A)*
- Intrathecal **Baclofen** therapy may be useful for severe spastic hypertonia that does not respond to other interventions. *(Class IIb, LOE A)*
- **Postural training and task-oriented therapy** may be considered for rehabilitation of ataxia. *(Class IIb, LOE C)*
- The use of splints and taping are not recommended for prevention of wrist and finger spasticity. *(Class III, LOE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Balance and Ataxia

- Balance depends on sensory inputs from the visual, vestibular, and somatosensory systems.
- These sensory inputs are integrated and used to control anticipatory and reactive motor output to postural disturbances.
- Balance impairment “inclusive” of postural control impairment) is common after stroke, since stroke can affect one or more of the sensory and motor networks.
- Impaired balance makes it difficult to safely complete activities of daily living, move about the home and community, and live independently.
- A large percentage of people report falling at least once in the first 6 months post-stroke.
- People with stroke who fall are twice as likely to sustain a hip fracture, compared to those who fall but do not have a stroke.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Balance and Ataxia Recommendations

- Persons with stroke who have poor balance, low balance confidence, fear of falls, and/or are at risk for falls should be provided with a balance training program. *(Class I, LOE A)*
- Persons with stroke should be prescribed and fit with an assistive device and/or orthosis if appropriate to improve balance. *(Class I, LOE A)*
- Persons with stroke should be evaluated for balance, balance confidence, and fall risk. *(Class I, LOE C)*
- Postural training and task-oriented therapy may be considered for rehabilitation of ataxia. *(Class IIb, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Mobility

- The loss or difficulty with ambulation is one of the most devastating sequel of stroke, and restoration of gait is often one of the primary goals of rehabilitation.
- Gait-related activities include tasks as mobility during rising to stand, sitting down, stair climbing, turning, transferring (e.g., wheelchair to bed or bed to chair), wheelchair use after stroke, walking quickly, and walking for specified distances.
- Limitations in gait and gait-related activities are associated with an increase in fall risk.



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Mobility Recommendations

- Intensive, repetitive, mobility-task training is recommended for all individuals with gait limitations after stroke. *(Class I, LOE A)*
- An ankle-foot orthoses (AFO) following stroke is recommended in individuals with remediable gait impairments (e.g., foot drop) to compensate for foot drop, and to improve mobility and paretic ankle and knee kinematics, kinetics and energy cost of walking. *(Class I, LOE A)*
- Group therapy with circuit training is a reasonable approach to improve walking. *(Class IIa, LOE A)*
- Incorporating cardiovascular exercise and strengthening interventions is reasonable to consider for recovery of gait capacity and gait-related mobility tasks. *(Class IIa, LOE A)*
- Neuromuscular electrical stimulation (NMES) is reasonable to consider as an alternative to an AFO for foot drop. *(Class IIa, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Mobility Recommendations

- Practice walking using either treadmill (with or without body-weight support) or overground walking exercise training combined with conventional rehabilitation may be reasonable for recovery of walking function. *(Class IIb, LOE A)*
- Robot-assisted movement training to improve motor function and mobility post stroke in combination with conventional therapy may be considered. *(Class IIb, LOE A)*
- Mechanically-assisted walking (treadmill, electromechanical gait trainer, robotic device, servo-motor) with body weight support may be considered for patients who are non-ambulatory or have low ambulatory ability early after stroke. *(Class IIb, LOE B)*
- There is insufficient evidence to recommend acupuncture for facilitating motor recovery and walking mobility. *(Class IIb, LOE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Mobility Recommendations

- The effectiveness of Transcutaneous Electrical Nerve Stimulation (TENS) in conjunction with everyday activities for improving mobility, lower extremity strength, and gait speed is uncertain. *(Class IIb, LOE B)*
- The effectiveness of rhythmic auditory cueing to improve walking speed and coordination is uncertain. *(Class IIb, LOE B)*
- The usefulness of EMG biofeedback during gait training in patients post stroke is uncertain. *(Class IIb, LOE B)*
- Virtual reality may be beneficial for the improvement of gait. *(Class IIb, LOE B)*
- The effectiveness of neurophysiologic approaches (*i.e.*, NDT, PNF) in comparison to other treatment approaches for motor retraining following an acute stroke has not been established. *(Class IIb, LOE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

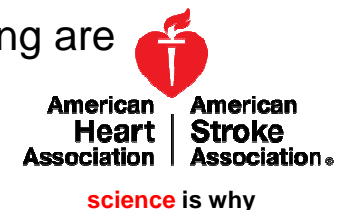
## Mobility Recommendations

- The effectiveness of water-based exercise for motor recovery following an acute stroke is unclear. *(Class IIb, LOE B)*
- The effectiveness of fluoxetine or other SSRI's to enhance motor recovery is not well established. *(Class IIb, LOE B)*
- The effectiveness of levodopa to enhance motor recovery is not well established. *(Class IIb, LOE B)*
- The use of dextroamphetamine or methylphenidate to facilitate motor recovery is not recommended. *(Class III, LOE B)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Upper Extremity Activity (includes ADL, IADL, touch, proprioception)

- The majority of persons with stroke experience problems with the upper extremity, most commonly paresis, which is the key impairment in most cases.
- Only a small portion of people fully recover from upper limb paresis after a stroke, with the remainder left with lingering upper extremity impairments, activity limitations, and participation restrictions.
- An inability to use the upper extremity in daily life can lead to loss of independence with ADLs, loss of important occupations (e.g., work, driving), and even contribute to institutionalization.
- Task-specific training, or functional task practice, is based on the premise that practice of an action results in improved performance of that action, and is focused on learning or re-learning a motor skill.
- Across a large number of studies, the key elements of task-specific training are repeated, challenging practice of functional, goal-oriented activities.



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Upper Extremity Activity Recommendations

- Functional tasks should be practiced, i.e. task-specific training, where the tasks are graded to challenge individual capabilities, practiced repeatedly, and are progressed in difficulty on a frequent basis. *(Class I, LOE A)*
- All persons with stroke should receive ADL training, tailored to individual needs and eventual discharge setting. *(Class I, LOE A)*
- All persons with stroke should receive IADL training, tailored to individual needs and eventual discharge setting. *(Class I, LOE B)*
- Constraint-induced movement therapy (CIMT) or its modified version (mCIMT) is reasonable to consider for eligible stroke survivors. *(Class IIa, LOE A)*
- Robotic therapy is reasonable to consider to deliver more intensive practice for persons with moderate to severe upper limb paresis. *(Class IIa, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Upper Extremity Activity Recommendations

- Neuromuscular electrical stimulation is reasonable to consider for persons with minimal volitional movement within the first few months after stroke or for persons with shoulder subluxation.  
*(Class IIa, LOE A)*
- Mental practice is reasonable to consider as an adjunct to upper extremity rehabilitation services.  
*(Class IIa, LOE A)*
- Strengthening exercises are reasonable to consider as an adjunct to functional task practice.  
*(Class IIa, LOE B)*
- Virtual reality is reasonable to consider as a method for delivering upper extremity movement practice.  
*(Class IIa, LOE B)*
- Somatosensory retraining to improve sensory discrimination may be considered for stroke survivors with somatosensory loss. *(Class IIb, LOE B)*
- Bilateral training paradigms may be useful for upper limb therapy. *(Class IIb, LOE A)*
- Acupuncture is not recommended for the improvement of ADLs and upper extremity activity.  
*(Class III, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Adaptive Equipment, Durable Medical Devices, Orthotics, & Wheelchairs

- Many patients require assistive devices, adaptive equipment, mobility aids, wheelchairs, and orthoses to maximize independent functioning following a stroke.
- Many types of adaptive devices and equipment are available.
- Type and level of functional deficit, degree of achieved adaptation, and the structural characteristics of the living environment determine the need for a particular item.
- There is a vast array of adaptive devices available, including devices to make eating, bathing, grooming, and dressing easier for patients with functional limitations.
- Many patients may need to use adaptive devices early during rehabilitation, but will not require long-term use. This should be taken into account when considering the provision of a device.



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Adaptive Equipment, Durable Medical Devices, Orthotics, & Wheelchairs

- Ambulatory assistive devices (e.g., cane, walker) should be used to help with gait and balance impairments, as well as mobility efficiency and safety, when needed. *(Class I, LOE B)*
- Ankle-foot orthoses should be used for ankle instability and/or dorsiflexor weakness. *(Class I, LOE B)*
- Wheelchairs should be used for non-ambulatory individuals, or those with limited walking ability. *(Class I, LOE C)*
- Adaptive and assistive devices should be used for safety and function if other methods of performing the task/activity are not available or cannot be learned or the patient's safety is a concern. *(Class I, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Motor Impairment and Recovery: Deconditioning and Fitness

- People having sustained a stroke present with varying degrees of compromised cardiorespiratory fitness (CFR), as reflected in peak oxygen consumption ( $VO_2$ ) levels of 8 - 22 mL  $O_2$ /kg/min (an average of ~ 54% of age and sex-matched normative values).
- Given that 15 - 18 mL  $O_2$ /kg/min is deemed necessary for independent living, the state of fitness post-stroke is a significant health, functional and quality of life issue.
- Multiple factors prior to stroke, at the time of stroke, and following stroke help explain this state.
- The result is often a profound and persistent deconditioned state that leads to further physical inactivity, reduced socialization, and heightened risk of further vascular events, including a 2<sup>nd</sup> stroke.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Chronic Care Management – Home and Community-based Participation

- Since exercise confers health benefits even years after stroke, participation in physical activity should be encouraged, regardless of how much time has elapsed since stroke onset.
- The effectiveness of exercise training in the chronic stages of stroke is no longer in question. In fact, the vast majority of fitness trials have involved people at this stage of stroke chronicity.
- It has been long recognized that benefits of training decline significantly without ongoing participation in physical activity.
- Physical activity designed to promote cardiovascular fitness should be an important aspect of community reintegration after stroke.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Motor Impairment and Recovery: Deconditioning and Fitness

- Following successful screening, an individually-tailored exercise program is indicated to enhance cardiorespiratory fitness and reduce the risk of stroke recurrence.  
*(Class 1, LOE A, for improved fitness; LOE B, for reduction of stroke risk)*
- After completion of formal stroke rehabilitation participation in a program of exercise or physical activity at home and/or in the community is recommended.  
*(Class 1, LOE A)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Treatment/Interventions for Visual Impairments

- Treatments and interventions for visual impairments after stroke focus on three areas:
  - 1) Deficits in **eye movements**,
  - 2) Deficits in **visual fields**,
  - 3) **Visual-spatial or perceptual** deficits.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Eye Movement Deficits

- Eye exercises for treatment of convergence insufficiency are recommended. *(Class I, LOE A)*
- Compensatory scanning training may be considered for improving functional activities of daily living. *(Class IIb, LOE B)*
- Compensatory scanning training may be considered for improving scanning and reading outcomes. *(Class IIb, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for Visual Field Deficits

- Yoked prisms may be useful to help compensate for visual field cuts  
*(Class IIb, LOE B)*
- Compensatory scanning training may be considered for improving functional deficits after visual field loss, but is not effective at reducing field deficits.  
*(Class IIb, LOE B)*
- Computerized vision restoration training may be considered to expand visual fields but evidence of its usefulness is lacking. *(Class IIb, LOE C)*

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Recommendations for *Visual-spatial/Perceptual* Deficits

- Multimodal audiovisual spatial exploration training does appear to be more effective than visual spatial exploration training alone, and is recommended to improve visual scanning. *(Class I, LOE B)*
- There is insufficient evidence to support or refute any specific intervention as effective at reducing the impact of impaired perceptual functioning. *(Class IIb, LOE B)*
- The use of virtual reality environments to improve visual-spatial/perceptual functioning may be considered. *(Class IIb, LOE B)*
- The use of behavioral optometry approaches involving eye exercises and the use of lenses and colored filters to improve eye movement control, eye focusing and eye coordination is not recommended. *(Class III, LOE B)*



# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Hearing Loss

- The healthcare provider's ability to effectively communicate with a patient who has had a stroke is essential in order to provide adequate patient care.
- Hearing impairment is commonly associated with aging and the associated communication difficulties are only further exacerbated following a stroke.
- It has been reported that **the most common type of communication impairment** on an acute hospital stroke unit is a hearing impairment with estimates that 67%-90% of these patients have a mild, or greater, hearing impairment.

# V. SENSORIMOTOR IMPAIRMENTS AND ACTIVITIES

## Hearing Loss Recommendations

- If a patient is suspected of a hearing impairment, it is reasonable to refer to an audiologist for audiometric testing. *(Class IIa, LOE C)*
- It is reasonable to use some form of amplification (e.g., hearing aids). *(Class IIa, LOE C)*
- It is reasonable to use communication strategies such as looking at the patient when speaking. *(Class IIa, LOE C)*
- It is reasonable to minimize the level of background noise in the patient's environment. *(Class IIa, LOE C)*

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Ensuring Medical and Rehabilitation Continuity through the Rehabilitation Process and into the Community

- The transition from inpatient care to home following a stroke can be difficult for patients and caregivers.
- Those patients who require ongoing rehabilitation after discharge should be followed by a care team with expertise in stroke rehabilitation whenever possible.
- Patients who do not require additional rehabilitation services and are discharged to home, or who are profoundly and permanently disabled and discharged to a long term care setting, can be managed by a primary care provider.



# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations for Ensuring Medical and Rehabilitation Continuity through the Rehabilitation Process and into the Community

- It is reasonable to consider individualized discharge planning in the transition from hospital to home. *(Class IIa, LOE B)*
- It is reasonable to consider alternative methods of communication and support (e.g., telephone visits, tele-health or web-based support) particularly for patients in the rural settings. *(Class IIa, LOE B)*

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Social and Family Caregiver Support

- Due to the complexity of the disease, the deficits and disability, and change in family and significant other dynamics, the caregiver and family are integral to the post-stroke treatment plan.
- A major challenge is that 12% to 55% of caregivers suffer from some emotional distress – most commonly depression.
- There is a growing body of research focused on the caregiver's quality of life and on treatment strategies to benefit both the caregiver and the stroke survivor.

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations for Social and Family Caregiver Support

- It may be useful for the family/caregiver to be an integral component of stroke rehabilitation. *(Class IIb, LOE A)*
- It may be reasonable that family/caregiver support provide some or all of the following on a regular basis: *(Class IIb, LOE A)*
  - 1) Education
  - 2) Training
  - 3) Counseling
  - 4) Development of a support structure
  - 5) Financial assistance
- It may be useful to have the family/caregiver involved in decision making and treatment planning as early as possible, and throughout the duration of the rehabilitation process. *(Class IIb, LOE B)*

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Referral to Community Resources

- Successful transition to the community requires careful assessment of the match between patient needs and the availability of formal and informal resources.
- Referral to appropriate local community resources can help to support the needs and priorities of the patient and their family or caregiver.
- Some services can be organized and in place prior to hospital discharge, whereas referral to some community resources may be provided upon transition to the community.



# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations for Referral to Community Resources

- It is recommended that acute care hospitals and rehabilitation facilities maintain up-to-date inventories of community resources. *(Class I, LOE C)*
- Patient and family/caregiver preferences for resources should be considered. *(Class I, LOE C)*
- It is recommended that information about local resources be provided to the patient and family. *(Class I, LOE C)*
- It is recommended that contact with community resources be offered through formal or informal referral. *(Class I, LOE C)*
- Follow-up is recommended to ensure the patient/family receive necessary services. *(Class I, LOE C)*



# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Rehabilitation in the Community

- The Centers for Medicare and Medicaid Services (CMS) definition of a **Community** setting:
  - Home,
  - Board and care,
  - Transitional living,
  - Intermediate care, *or*
  - Assisted living residence.
- More than 80% of the >6 Million survivors of stroke in the U.S. live in the community – most of them at home – and the majority with some residual functional limitations.
- Studies have documented that 35%-40% of persons have limitations in basic activities of daily living even six months after a stroke.
- More than 50% have limitations in one or more instrumental activities of daily living.



# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations for Rehabilitation in the Community

- Patients with stroke receiving comprehensive ADL, IADL, and mobility assessments, including evaluation of the discharge living setting, should be considered candidates for community or home-based rehabilitation when feasible. Exclusions include persons with stroke who require daily nursing services, regular medical interventions, or specialized equipment or inter-professional expertise. *(Class I, LOE A)*
- It is reasonable that care-givers, including family members, be involved in training and education directly related to home-based rehabilitation programs and be included as active partners in the planning and implementation or treatment activities under the supervision of professionals. *(Class IIa, LOE B)*
- A formal plan for monitoring compliance and participation and participation in treatment activities may be useful for persons with stroke referred for home or community-based rehabilitation services. A case-manager or professional staff person should be assigned to oversee implementation of the plan. *(Class IIb, LOE B)*

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Sexual Function

- Sexuality is an important aspect of post-stroke quality of life for both patients and their significant others.
- Although there is substantial individual variation, overall, stroke survivors tend to experience a high prevalence of sexual dysfunction.
- Comorbid medical conditions (e.g., diabetes, hypertension, depression), medication side effects, stroke-related physical and functional deficits, lack of knowledge, and concerns about safety, role changes, and change in libido can affect the patient's sexual function.
- Healthcare workers need to help the patient and significant other navigate through the issues surrounding sexual function.

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations regarding Sexual Function

- An offer to patients and their partners to discuss sexual issues may be useful prior to discharge home, and again after transition to the community. Discussion topics may include: safety concerns, changes in libido, physical limitations due to stroke, and emotional consequences of stroke. *(Class IIb, LOE B)*

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recreational and Leisure Activity

- Engagement in leisure and recreational pursuits is important to health.
- Active leisure and recreational activities have been particularly targeted as important.
- Individuals with stroke are limited in their ability to engage in leisure and recreational activities, particularly active ones.
- In general, post-stroke rehabilitation in the United States provides little attention to leisure and recreation.
- Individuals with stroke report that they engage in significantly fewer leisure and recreation activities than they did prior to stroke.
- In addition, the leisure activities in which they do engage have shifted from active to sedentary activities, such as television watching and reading.

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations for Recreational and Leisure Activity

- It is reasonable to promote engagement in leisure and recreational pursuits, particularly through the provision of information on the importance of maintaining an active and healthy lifestyle. *(Class IIa, LOE B)*
- It is reasonable to foster the development of self-management skills for problem solving regarding overcoming barriers to engagement in active activities. *(Class IIa, LOE B)*
- It is reasonable to start education and self-management skill development about leisure/recreation activities during and in conjunction with in-patient rehabilitation. *(Class IIa, LOE B)*

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Return to Work

- In the United States, approximately 20% of strokes occur in individuals who are of vocational age.
- Vocational roles provide a social identity and contribute to increased self-esteem and life satisfaction.
- It is estimated that about 1/3 of the economic burden of stroke through the year 2050 will be due to lost earnings.



# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations regarding Return to Work

- Vocationally-targeted therapy or vocational rehabilitation is reasonable for individuals with stroke considering return to work. *(Class IIa, LOE C)*
- An assessment of cognitive, perception, physical, and motor abilities may be considered for stroke survivors considering return to work. *(Class IIb, LOE C)*



# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Return to Driving

- Driving is an essential instrumental activity of daily living for many individuals, for whom it has a major impact on participation in activities outside of the home.
- Between 1/3 and 2/3 of persons resume driving one year after a stroke.
- Yet, because driving is a highly complex activity that requires skills in cognition, perception, emotional control, and motor control, the ability to drive is often affected by stroke.
- The laws concerning when it is appropriate to return to driving vary by state.

# VI. TRANSITIONS IN CARE AND COMMUNITY REHABILITATION

## Recommendations: Return to Driving

- Individuals who appear to be ready to return to driving, as demonstrated by successful performance on fitness-to-drive tests, should have an **on-the-road test** administered by an authorized person. *(Class I, LOE C)*
- It is reasonable that individuals be assessed for cognitive, perception, physical, and motor abilities to ascertain readiness to return to driving, according to state and local laws. *(Class IIa, LOE B)*
- It is reasonable that individuals who do not pass an on-the-road driving test be referred to a **driver rehabilitation program** for training. *(Class IIa, LOE B)*
- A **driving simulation assessment** may be considered for predicting fitness-to-drive. *(Class IIb, LOE C)*

## VII. CONCLUSION

- **Stroke rehabilitation requires a sustained and coordinated effort from a large team**, including the patient and his or her goals, family, and friends, other caregivers (e.g., personal care attendants), physicians, nurses, physical and occupational therapists, speech/language pathologists, recreation therapists, psychologists, nutritionists, social workers, and others.
- **Communication and coordination among these team members is paramount** in maximizing the effectiveness and efficiency of rehabilitation, and underlies this entire guideline.

# VII. CONCLUSION

## Treatment Gaps and Potential Future Directions in Research

- Investigate multimodal interventions (e.g., drug and therapy, brain stimulation, and therapy).
- Consider including multiple outcomes such as patient-centered, self-report outcomes in future intervention effectiveness trials (see PROMIS).
- Consider computer-adapted assessments for personalized and tailored interventions.
- Explore effective models of care that consider stroke as chronic condition rather than simply a single acute event.
- Capitalize on newer technologies, such as virtual reality, body-worn sensors, and communication resources including social media.
- Develop better models to identify the optimal responders to various therapies.
- Develop better interventions for individuals with severe stroke.



**life is why**<sup>TM</sup>  
es por la vida<sup>TM</sup> 全為生命<sup>TM</sup>