CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

Stroke Rehabilitation Evidence Tables

Initial Stroke Rehabilitation Assessment

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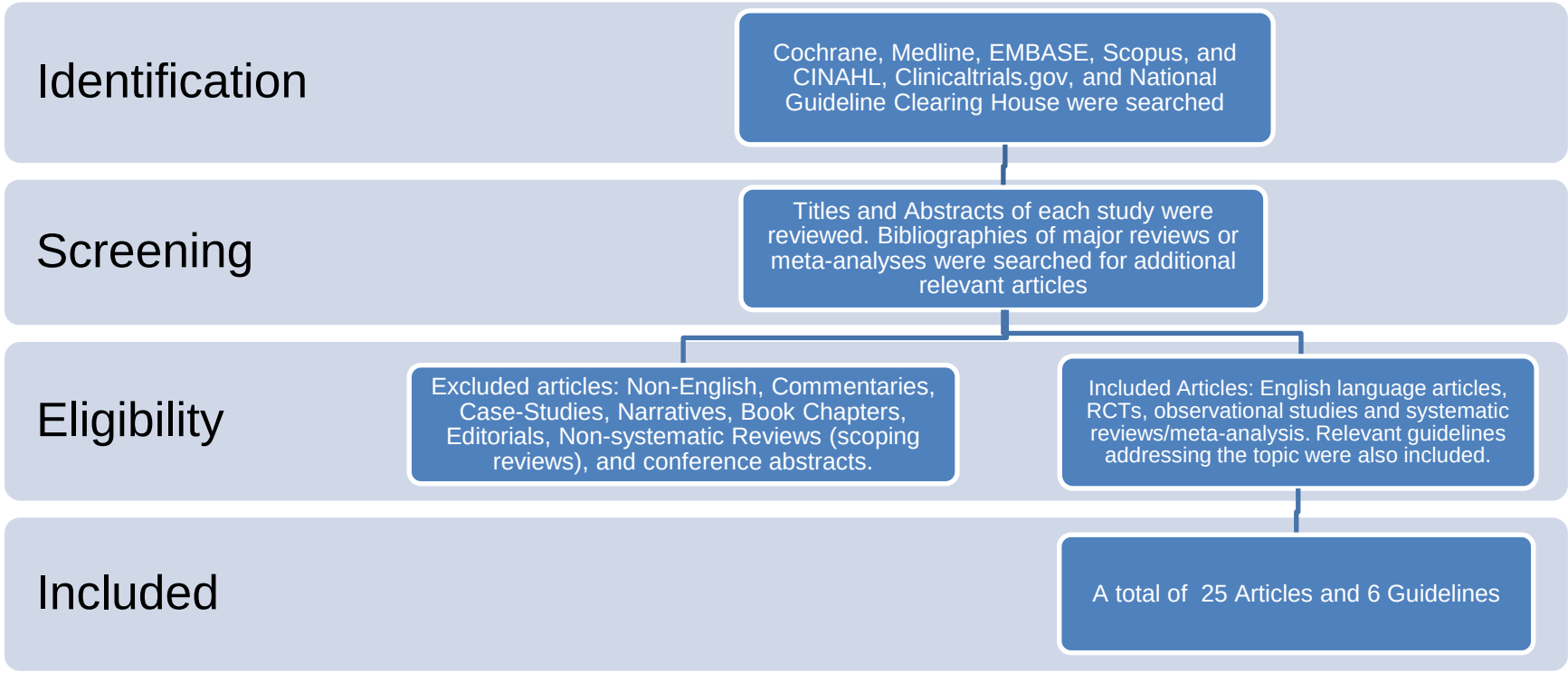
Search Strategy



Cochrane, Medline, and CINAHL, Clinicaltrials.gov, EMBASE, and Scopus were searched using the keywords: Stroke AND Rehabilitation AND (Assessment OR Admission OR Criteria OR Unit). The same databases were searched to identify paediatric related evidence using additional keywords: “(pediatric OR pediatrics OR paediatric OR paediatrics OR youth OR child OR children OR young)”. Titles and abstract of each article were reviewed for relevance. Bibliographies were reviewed to find additional relevant articles. Articles were excluded if they were: non-English, commentaries, case-studies, narrative, book chapters, editorials, non-systematic review, or conference abstracts. Additional searches for relevant best practice guidelines were completed and included in a separate section of the review. 25 articles and 6 guidelines were included and were separated into separate categories designed to answer specific questions.

Published Guidelines

Guideline	Recommendations
Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke: rehabilitation, prevention and management of complications, and discharge planning. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2010 June.	**Organization of services:** • Stroke unit teams should conduct at least one formal multidisciplinary meeting per week at which patient problems are identified, rehabilitation goals set, progress monitored and discharge is planned.
Management of Stroke Rehabilitation Working Group. VA/DoD clinical practice guideline for the management of stroke rehabilitation. Washington (DC): Veterans Health Administration, Department of Defense; 2010. p.p.70-72	**Determining Need for Rehabilitation:** • Once the patient is medically stable, the primary physician should consult with rehabilitation services (i.e., physical therapy, occupational therapy, speech and language pathology, kinesiotherapy, and Physical Medicine) to assess the patient's impairments as well as activity and participation deficiencies to establish the patient's rehabilitation needs and goals. • A multidisciplinary assessment should be undertaken and documented for all patients. [A] • Patients with no residual disability post-acute stroke who do not need rehabilitation services may be discharged back to home. • Strongly recommend that patients with mild to moderate disability in need of rehabilitation services have access to a setting with a coordinated and organized rehabilitation care team that is experienced in providing stroke services. [A] • Post-acute stroke care should be delivered in a setting where rehabilitation care is formally coordinated and organized. • If an organized rehabilitation team is not available in the facility, patients with moderate or severe disability should be offered a referral to a facility with such a team. Alternately, a physician or rehabilitation specialist with some experience in stroke should be involved in the patient's care. • Post-acute stroke care should be delivered by a variety of treatment disciplines which are experienced in providing post-stroke care, to ensure consistency and reduce the risk of complications. • The multidisciplinary team may consist of a physician, nurse, physical therapist, occupational therapist, kinesiotherapist, speech and language pathologist, psychologist, recreational therapist, social worker, patient, and family/caregivers. • Patients who are severely disabled and for whom prognosis for recovery is poor may not benefit from rehabilitation services and may be discharged to home or nursing home in coordination with family/care giver.

Guideline	Recommendations
	Determining Setting: • The medical team, including the patient and family, must analyze the patient's medical and functional status, as well as expected prognosis in order to establish the most appropriate rehab setting. [I] • The severity of the patient's impairment, the rehabilitation needs, the availability of family/social support and resources, the patient/family goals and preferences and the availability of community resources will determine the optimal environment for care. [I] **Assessment of Progress:** • Patients should be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals. • Patients who show a decline in functional status may no longer be candidates for rehabilitation interventions. Considerations about the etiology of the decline and its prognosis can help guide decisions about when/if further rehabilitation evaluation should occur. • Psychosocial status and community integration needs should be re-assessed, particularly for patients who've experienced a functional decline or reached a plateau.
Clinical Guidelines for Stroke Management 2010. Melbourne (Australia): National Stroke Foundation; 2010 Sep. p. 81-82; 97-98.	**Ongoing Inpatient Rehabilitation:** • To ensure all stroke patients receive early, active rehabilitation by a dedicated stroke team, health systems should have comprehensive services which include and link the fundamentals of acute and rehabilitation care. [Grade B]. • Patients should be transferred to a stroke rehabilitation unit if ongoing inpatient rehabilitation is required [Grade B] • If a stroke rehabilitation unit is not available, patients who require ongoing inpatient rehabilitation should be transferred to a conventional rehabilitation unit where staff have stroke-specific expertise [Grade B]. • All patients, including those with severe stroke, who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability for ongoing rehabilitation [Grade GPP].
Duncan PW, Zorowitz R, Bates B, Choi JY, Glasberg JJ, Graham GD, Katz RC, Lamberty K, Reker D. Management of adult stroke rehabilitation care: a clinical practice guideline. Stroke, 2005;36:e117 -125	**Use of Standard Assessment Tools:** • Strongly recommend assessment of the stroke recovery using the National Institutes of Health Stroke Scale (NIHSS, http:// www.strokecenter.org/trials/scales/nihss.html; see Appendix E) at the time of presentation/hospital admission, or at least within the first 24 hours after presentation. • Recommend that all patients be screened for depression and motor, sensory, cognitive, communication, and

Guideline	Recommendations
	swallowing deficits by appropriately trained clinicians, using standardized and valid screening tools. • Recommend that if depression and motor, sensory, cognitive, communication, and swallowing deficits are found, all patients should be formally assessed by the appropriate clinician from the coordinated rehabilitation team. • Recommend that the clinician use standardized, valid assessments to evaluate the patient's stroke-related impairments and functional status and encourage patient's participation in community and social activities. • Recommend that the standardized assessment results be used to assess probability of outcome, determine the appropriate level of care, and develop interventions. • Recommend that the assessment findings be shared and the expected outcomes discussed with the patient and family members/caregivers. **Assess Need for Rehabilitation:** • Strongly recommend that once the patient is medically stable, the primary physician consult rehabilitation services (ie, physical therapy, occupational therapy, speech and language pathology, kinesiotherapy, and physical medicine), as indicated, to assess the patient's rehabilitation needs and to recommend the most appropriate setting to meet those needs. • Recommend that a multidisciplinary assessment, using a standard procedure, be undertaken and documented for all patients. Patients with need of rehabilitation intervention should be referred to a specialist stroke rehabilitation team, as soon as possible.
Intercollegiate Stroke Working Party. *National clinical guideline for stroke,* 4th edition. London: **Royal College of Physicians, 2012.**	**General Principles of Rehabilitation:** • All patients entering a period of rehabilitation should be screened for common impairments using locally agreed tools and protocols.
Stroke Rehabilitation. Long-term rehabilitation after stroke. Issued: June 2013. National Institute for Health and Care Excellence.	**Screening and assessment** 1.2.1 On admission to hospital, to ensure the immediate safety and comfort of the person with stroke, screen them for the following and, if problems are identified, start management as soon as possible: • orientation • positioning, moving and handling • swallowing • transfers (for example, from bed to chair) • pressure area risk • continence

Guideline	Recommendations
	• communication, including the ability to understand and follow instructions and to convey needs and wishes • nutritional status and hydration (follow the recommendations in Stroke [NICE clinical guideline 68] and Nutrition support in adults [NICE clinical guideline 32]). 1.2.2 Perform a full medical assessment of the person with stroke, including cognition (attention, memory, spatial awareness, apraxia, perception), vision, hearing, tone, strength, sensation and balance. 1.2.3 A comprehensive assessment of a person with stroke should take into account: • their previous functional abilities • impairment of psychological functioning (cognitive, emotional and communication) • impairment of body functions, including pain • activity limitations and participation restrictions • environmental factors (social, physical and cultural). 1.2.4 Information collected routinely from people with stroke using valid, reliable and responsive tools should include the following on admission and discharge: • National Institutes of Health Stroke Scale • Barthel Index. 1.2.5 Information collected from people with stroke using valid, reliable and responsive tools should be fed back to the multidisciplinary team regularly. 1.2.6 Take into consideration the impact of the stroke on the person's family, friends and/or carers and, if appropriate, identify sources of support. 1.2.7 Inform the family members and carers of people with stroke about their right to have a carer's needs assessment. **Setting goals for rehabilitation** 1.2.8 Ensure that people with stroke have goals for their rehabilitation that: • are meaningful and relevant to them • focus on activity and participation • are challenging but achievable • include both short-term and long-term elements. 1.2.9 Ensure that goal-setting meetings during stroke rehabilitation: • are timetabled into the working week

Guideline	Recommendations
	• involve the person with stroke and, where appropriate, their family or carer in the discussion. 1.2.10 Ensure that during goal-setting meetings, people with stroke are provided with: • an explanation of the goal-setting process • the information they need in a format that is accessible to them • the support they need to make decisions and take an active part in setting goals. 1.2.11 Give people copies of their agreed goals for stroke rehabilitation after each goal-setting meeting. 1.2.12 Review people's goals at regular intervals during their stroke rehabilitation. **Planning rehabilitation** 1.2.13 Provide information and support to enable the person with stroke and their family or carer (as appropriate) to actively participate in the development of their stroke rehabilitation plan. 1.2.14 Stroke rehabilitation plans should be reviewed regularly by the multidisciplinary team. Time these reviews according to the stage of rehabilitation and the person's needs. 1.2.15 Documentation about the person's stroke rehabilitation should be individualised, and should include the following information as a minimum: • basic demographics, including contact details and next of kin • diagnosis and relevant medical information • list of current medications, including allergies • standardised screening assessments (see recommendation 1.2.1) • the person's rehabilitation goals • multidisciplinary progress notes • a key contact from the stroke rehabilitation team (including their contact details) to • coordinate the person's health and social care needs • discharge planning information (including accommodation needs, aids and adaptations) • joint health and social care plans, if developed • follow-up appointments.

Evidence Tables

Rehabilitation Admission Criteria

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Hakkennes et. al 2011 **Australia** **Systematic Review**	N/A	This review included: 26 systematic reviews of prognostic indicators for stroke rehabilitation 48 studies examining discharge prediction from the acute care setting. 6 studies of rehabilitation admission criteria.	This review included studies which identified prognostic factors of functional outcome after acute stroke, prognostic indicators and models used to determine discharge disposition following acute stroke, and to identify selection criteria for rehabilitation.	Current selection criteria for rehabilitation.	There was a large variation in design and inclusion criteria in the 6 studies examined. Age, functional level pre-stroke, and functional level post stroke were found to be predictors for admission to rehabilitation in 5, 2, and 4 of the studies respectively. 3 of the 5 studies citing age as criteria for rehabilitation admission indicated an age of less than 70 years as criteria. Premorbid impairment resulted in decreased likelihood of rehabilitation admission, and moderate post stroke impairment was associated with a greater chance of admission. Other factors that may influence admission to inpatient rehabilitation include: level of social support, pre-stroke cognition, consciousness level, and the absence of behavioral problems.
Hakkennes et al. 2013 **USA** **Observational Study**	N/A	75 patients referred for rehabilitation assessment (76.5±11 years, 78.8% male). Exclusion criteria: time since stroke >3 days before presentation to hospital or admission to intensive or palliative care.	Questionnaires completed by 14 rehabilitation assessors to assess a patient's suitability for rehabilitation.	**Outcomes:** Strength of patient-related (15) and organizational-related (2) items in influencing a clinicians decision to refer a patient to rehabilitation. **Assessment time point:** Questionnaires were completed following a clinician's rehabilitation referral decision.	Factor analysis revealed three important factors for admission to inpatient rehabilitation: post-stroke status (OR 7.314, 95% CI 1.993 to 26.840), pre-morbid status (OR 2.677, 95% CI 1.277-5.614, p=0.003); and social attributes (OR 4.402, 95% CI 1.436-13.494, p=0.010). Patients accepted for rehabilitation were: Younger: (difference = –8 years (95% CI –13 to –3), p = 0.004); Independent in functional activities (difference = –0.21 (95% CI –0.03 to –0.48), p = 0.04); Living at home with support (p = 0.04); Employed (risk difference = 0.26 (95% CI 0.15 to 0.37), p = 0.03).
Stineman et al. 2013	N/A	8,783 Veterans admitted to a Veterans Affairs	PM&R staff assessed all patients to identify the	**Primary outcome:** Admission to the specialized	983 (11.2%) veterans were selected for comprehensive-level rehabilitation.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
USA **Observational**		Medical Center with a primary diagnosis of stroke (mean age 68.7 ± 11.5 years, 97.3% male).	type of care each patient would receive: a) Consultation-level rehabilitation or b) comprehensive-level rehabilitation. Multivariable regression analysis to assess reasons for the receipt of comprehensive-level rehabilitation.	rehabilitation unit. **Assessment time points:** Physical and cognitive scores were assessed at baseline. All demographic and diagnostic-related information was obtained from administrative data.	Patients at the lowest grades of physical independence (I, II, III, IV) and the middle cognitive stages (III, IV, V) were more likely to be admitted to inpatient rehabilitation units. (p<0.0001). Patients over the age of 60 years and living at home prior to hospitalization were more likely to be admitted to inpatient rehabilitation units (p<0.0001). Patients with chronic pulmonary disease (p=0.0002) and deficiency anemia (p=0.004) were less likely to be admitted to inpatient rehabilitation units.
Ilett et. al. 2010 **Australia** **Observational**	N/A	616 patients admitted to acute care with a primary diagnosis of stroke (mean age 72.2±12.7, 53% male).	7 acute stroke centers consecutively enrolled patients admitted with stroke. The day of the stroke was classified as day 0. Data was collected at 3 days post stroke (Mobility Scale, MBI scores for bowel and bladder management, demographic information).	To observe variations in practice for selection for rehabilitation.	Mobility Scale was a significant predictor of discharge to rehabilitation. Large variations in discharge selection practices were found between the participating centers.
Unsworth 2001 **Australia** **Observational**	N/A	223 patients admitted to acute care for stroke (47% male, mean age 77.1 years).	Within three days of acute care discharge, demographic data was collected and outcomes measures were completed (FIM, 10 item scale adopted from the Rehabilitation Institute of Chicago Functional Assessment Scale). Discharge destination was also recorded on the day of discharge (nursing home, inpatient	To determine which factors had the greatest impact on discharge destination following acute stroke.	A small set of items from the FIM, measured at the time of discharge, were able to predict discharge destination for the majority of patients. The mean FIM score of individuals referred to rehabilitation was 78.22(±23.14). Mean FIM of those discharged to a nursing home was 44.5(±28.2), and those discharged home was 108.96(±21.64). The mean age of individuals discharged to rehabilitation, a nursing home, and home was 75.8(±8.2), 85.0(±8.5), and 75.7(±7.8) respectively.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			rehabilitation, or home).		

Prognostic Factors for Function Gains during Inpatient Rehabilitation

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Hakkennes et. al. 2011 **Australia** **Systematic Review**	N/A	This review included: 26 systematic reviews of prognostic indicators for stroke rehabilitation; 48 studies examining discharge prediction from the acute care setting; 6 studies of rehabilitation admission criteria.	This review included studies which identified prognostic factors of functional outcome after acute stroke, prognostic indicators and models used to determine discharge disposition following acute stroke, and to identify selection criteria for rehabilitation.	To identify prognostic factors of functional outcome after acute stroke.	26 studies looked at prognostic indicators for functional outcome following acute stroke. The most common indicators were found to be age, stroke severity, severity of impairment, presence of hemiparesis, cognition and functional level following stroke. The less impairment in severity, cognition, and functional level, the more likely a patient was to have a better discharge outcome.
De Wit et al. 2014 **Europe (Belgium, Switzerland, UK and Germany)** **Observational**	N/A	153 stroke patients admitted to inpatient rehabilitation (mean age 67.8 ± 10.9, 51% male). **Inclusion criteria:** first stroke, 40-85 years old. **Exclusion criteria:** admission to rehabilitation >6 weeks post-stroke.	Patients enrolled in the CERISE study (comparison of stroke care/recovery in European rehab centers) were followed up with a home-visit to assess 5 year functional status.	**Primary outcome:** Independence (BI< BI>95/100) or dependence (BI>95/100) in personal ADL at 5 years. <u>Assessment time points:</u> Outcomes were assessed at admission, discharge, and 5 year follow-up.	Two variables were retained in the multivariate model as predictors of independence at 5 years: Independence in dressing (OR 5.22, 95% CI 1.85–14.76), p=0.002) and independence in bathing (OR 8.10, 95% CI 3.40–19.32, p<0.0001). <u>% chance of independence in personal ADLs at 5 years:</u> a) Independence in dressing and bathing at discharge: 74.1% (95% CI 57.6–85.8) chance of reaching BI ≥ 95/100 at five years after stroke. b) Dependence in dressing and bathing at discharge: 6.3% (95% CI 5.1–7.9) chance of reaching BI ≥ 95/100 at five years after

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					stroke. c) Dependence in dressing, independence in bathing at discharge: 35.40% (95% CI 30.68-40.42) chance of reaching a BI ≥ 95/100 at five years after stroke. d) Dependence in bathing, independence in dressing at discharge: 26.1% (95% CI 20.7–32.3) chance of reaching a BI ≥ 95/100 at five years after stroke.
Van Bragt et al. 2014 **Netherlands** **Observational**	N/A	250 stroke patients admitted to inpatient rehabilitation (mean age 58.6 ± 11.7, 63% male).	Patients were assessed upon admission to the inpatient rehabilitation unit. Demographics, stroke-related characteristics (stroke severity, stroke side, presence of neglect, aphasia, apraxia), and presence of comorbidities were recorded.	To evaluate and predict outcomes of an inpatient stroke rehabilitation program by identifying a set of variables that can be useful for prognosis. <u>Dependent Variable:</u> Barthel Index (BI) and Modified Rankin Scale. Function was assessed at admission and discharge.	<u>Independent predictors of a worse outcome.</u> A lower functional admission score, older age, more severe stroke, more pain and more negative emotional reactions on admission.
Abdul-Sattar & Godab 2013 **Egypt** **Observational**	N/A	180 patients who were diagnosed with stroke were admitted to an inpatient rehabilitation unit (mean age 65 ± 12.1, 53.3% male).	Patients were assessed within 48 hours of transfer to the inpatient rehabilitation unit and demographic information in addition to data pertaining to stroke characteristics, severity of stroke using NIHSS, cardiovascular risk, medical complications of stroke, Geriatric Depression scale, MMSE, FIM on admission, and hospital length of stay	To identify predictors of rehabilitation outcomes in stroke patients.	The significant factors influencing functional outcome of stroke patients at discharge from rehabilitation included total FIM score at admission, severity of stroke, recurrent stroke, cognitive impairment, and depression. Higher admission FIM, less severe and less frequent strokes, fewer cognitive impairments were positive independent predictors of functional outcome following stroke on the inpatient rehabilitation unit. The presence of depression was a factor that negatively impacted functional outcomes following stroke.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			were collected.		
Cioncoloni et al. 2013 **Italy** **Observational**	N/A	104 stroke patients admitted to inpatient rehabilitation (mean age 69.74± 12.34, 47.1% male). **Inclusion criteria:** first stroke, paresis within 48 hours after stroke, >18 years.	Patients were assessed at 48 hours, day 10 and six months following stroke. Gender, age, left/right sidedness of stroke, NIHSS, upper limb muscle strength, lower limb muscle strength, presence or absence of sitting balance, Barthel Index were obtained or measured. Outcomes were assessed at 48 hours after stroke, and a 10 day and 6 month follow-up time point.	Probability of regaining independence in complex ADLs 6 months post stroke. Dependent variable: Modified Rankin Scale.	Age, gender, upper limb strength and BI measured 10 days post stroke are determinants for prediction of functional recovery of complex ADL at six months. BI >= 9, a Motricity Index-Upper Limb >= 75, being male and an age <= 70 conferred a 100% probability of achieving independence in complex ADLs. Three of the four determinants conferred a probability of more than 90%. Two of the determinants conferred a probability ranged from 28% to 87%. One determinant conferred a probability of 11%.
Ng et al. 2013 **Singapore** **Observational**	N/A	1332 stroke patients admitted to inpatient rehabilitation unit (64.1±12.5 years, 58.9% male).	Patients were assessed upon admission to the inpatient rehabilitation unit where patient demographics including age, gender, employment status, married status, presence of chronic disease, type of stroke and admission.	To identify factors associated with post-stroke gains in functional outcomes following inpatient rehabilitation. Dependent Variable: FIM at admission and (AFIM) discharge (DFIM).	Mean AFIM, DFIM, change in FIM: 67.9±23.0, 83.2±23.5, +15.4±12.3. Demographics: Younger, male, and haemorrhagic stroke patients had better functional outcomes. Higher DFIM score was associated with higher admission motor and cognitive FIM scores, younger age, male gender, employment at admission, single patients, presence of a caregiver, haemorrhagic stroke, right-sided motor impairments, absence of urinary tract infection or depression, acupunction treatment, and a longer LOS.
Gialanella, B., et al. 2013 **Italy** **Observational**	N/A	241 stroke patients admitted to inpatient rehabilitation.	Patients were assessed upon admission and discharge to the inpatient rehabilitation unit. Patient demographics collected: Age, gender,	To identify predictors of motor and functional outcome after stroke during inpatient rehabilitation. Dependent Variable: Admission FIM and	The admission Fugl-Meyer, neglect, grooming, dressing upper body, and social interaction scores were the most important predictors of FIM outcomes.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			stroke type, stroke-lesion size, aphasia, neglect, onset to admission interval, Cumulative Illness Rating Scale, National Institute of Health Stroke Scale (NIHSS), Fugl-Meyer Scale, Trunk Control Test.	Discharge FIM.	
Lo et. al. 2012 **Canada** **Observational Study**	N/A	891 individuals with stroke who were referred to inpatient stroke rehabilitation were identified using the E-Stroke referral system (mean age 70±13.3), 55.8% male).	Patients were identified through the E-Stroke referrals system between 2004 and 2009. The E-Stroke system contained information on each patient including demographics, stroke characteristics, medical history, and functional status.	To determine whether alphaFIM rating assessed in acute care is a predictor of: admission and discharge FIM in rehabilitation, rehabilitation length of stay, FIM gain, and FIM efficiency.	The alphaFIM was administered a median of 8.0 days after admission to acute care. The alphaFIM was found to be a significant predictor of admission (adjusted R^2 0.4, $p<0.001$) and discharge FIM scores (adjusted R^2 0.28, $p<0.001$), and was also a weak negative predictor of FIM gain (adjusted R^2 0.09, $p<0.001$) and length of stay (adjusted R^2 0.04, $p<0.001$). It was not found to be associated with FIM efficiency.
Kohler et. al. 2011 **Australia** **Observational**	N/A	Stroke patients (n=1154) admitted to a rehabilitation unit were studied retrospectively (mean age 69.9±13.1, 55.4% male).	Patients admitted during the study period were identified using the hospital ward database. Admission FIM scores, Oxfordshire classification subgroup, discharge FIM, length of stay, and discharge destination were identified.	To determine the best predictors of length of stay, discharge destination, and functional improvements in an inpatient rehabilitation unit.	Admission motor FIM was the best predictor for length of stay (38.9% of variance), functional improvement (37.4% of variance), and discharge destination (16% of variance).
Gialanella 2011 **Italy** **Observational**	N/A	Patients admitted to a rehabilitation unit post stroke. 51 patients did not have aphasia (71.3±10, 29% male), and 105 patients had a diagnosis of aphasia	Patients underwent individualized rehabilitation during stay in hospital. Outcomes assessments were completed for each	To determine if language assessments may predict functional and motor outcomes in aphasic stroke patients.	In the multivariate regression analysis, comprehension only was found to be a predictor of the final total-FIM (β = +0.35) and final cognitive-FIM (β = +0.61). Spontaneous speech (β = +0.41) was the only predictor of motor-FIM.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
		(mean age 67.4±9.8, 48% male).	patient (Aachen Aphasia Test, National Institute of Health Stroke Scale, Fugl-Meyer Scale, Trunk Control Test, and Functional Independence Measure).		
Toglia et. al. 2011 **US** **Observational**	N/A	72 Stroke patients admitted to a rehabilitation facility (mean age 70±17, 47% male).	Retrospective analysis of patients admitted to a rehabilitation unit between September 2008 and March 2010. Outcomes were assessed within 48 hours of admission (NIHSS, MMSE, MoCA, mFIM, mRFE). FIM was repeated within 72 hours of discharge.	To examine the relationship between each cognitive assessment to discharge functional status.	The MoCA visuoexecutive subscore was the strongest predictor of functional status (p=0.01).
Ones et. al. 2009 **Turkey** **Observational**	N/A	88 patients with stroke admitted to a rehabilitation facility (mean age 63.14±10.14, 56.8% male).	Demographic characteristics were recorded, as well as date, type and location of stroke. Functional condition was assessed using the Functional Independence Measure (FIM) both before and after rehabilitation treatment. Cognitive outcomes were assessed using the Mini Mental State Evaluation (MMSE) and FIM cognitive subscale. The Ashworth Scale was used to measure spasticity.	To evaluate the relationship between characteristics of stroke patients and functional outcome after rehabilitation.	Admission FIM (total p<0.002; motor p=p<0.001; cognitive p=0.001), cognitive function (MMSE p<0.001), Age (p=0.002), and spasticity (p=0.01) were all found to be significant predictors of discharge total FIM. Gender was not found to be a significant predictor.
Kalichman et.	N/A	84 stroke patients	Retrospective study of	To evaluate the association	During the first 12 weeks of rehabilitation, functional

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al. 2007 **Isreal** **Observational**		admitted to a rehabilitation facility (mean age 70.5±3.19, 50% male), admitted for a full 3 months, FIM scores between 40-60.	medical records from a rehabilitation department (demographics, Body Mass Index (BMI), FIM scores at admission, 6wks of hospitalization, 12 weeks after beginning of rehabilitation).	between a patients weight (BMI) and rehabilitation functional outcome.	gains were significantly decreased in overweight and obese patients A statistically significant negative correlation (r =-0.27, P = 0.014) was found between relative improvement of FIM score and body mass index (BMI).
Gillen et. al. 2001 **US** **Observational**	N/A	243 consecutive admissions to an inpatient rehabilitation facility (mean age 72.1±10.4, 49.4% male).	Patients were administered outcomes assessments approximately 4 days after admission (Geriatric Depression Scale, Cognistat). FIM was administered at admission and discharge. A history of depression was also recorded.	To evaluate the relationship between depressive symptoms and rehabilitation efficiency.	Patients with more depressive symptoms used rehabilitation services less efficiently but did not have longer length of stay than individuals with fewer depressive symptoms. A history of depression was associated with longer length of stay, as well as less efficient use of rehabilitation services. Cognitive impairment did not predict rehabilitation efficiency.
Ween et. al. 1996 **US** **Observational**	N/A	536 consecutive admissions for acute stroke (mean age 73± 12, 55% male) were assessed for inclusion. 376 cases were included in the final analysis.	Consecutive admissions for stroke to a rehabilitation hospital were included in the study. Demographic information and outcomes were assessed within 2-3 days of admission (age, FIM, lesion type and site, comorbidities, bladder and bowel incontinence, socioeconomic status).	The following outcomes were observed upon discharge: Change in Functional Independence Measure (FIM) score, FIM efficiency, and discharge disposition (home or skilled nursing facility).	Age was associated with FIM change (p=0.003) and FIM efficiency (p=0.002) Severity of deficit had an influence on all outcomes, with admission FIM being predictive of both FIM change and efficiency. An admission FIM ≥60 was associated with greater functional improvement. Lesion type and site both had an influence on outcome. Large vessel strokes did significantly worse than small vessel and hemorrhages, although FIM efficiency was not influenced. Patients experiencing a number of comorbidities experienced a decreased FIM gain (p<0.05) and FIM efficiency (p<0.05).

Discharge to Outpatient Rehabilitation

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Lord et. al. 2008 **New Zealand** **RCT**	CA: ☑ Blinding: Assessor ☑ ITT: ☒	36 patients prior to discharge home from hospital following first or recurrent stroke whose rehabilitation goals included independent ambulation. Eligible patients could walk the estimated distance to their mailbox and were thought to require services for 5-7 weeks. The average time from stroke onset to study entry was 82 days.	Patients were randomized to a twice-weekly, 7 week program of physiotherapy that was hospital (control group) or community based (treatment group). The differences between the 2 programs were: the environment, the use of an assistant, rather than a physiotherapist (treatment group) and the content of the program, with a focus on intensive ambulatory tasks (treatment group).	**Primary outcome:** Gait speed. **Secondary measures:** 6-Minute walk test (6MWT), Activities-specific Balance Scale (ASBS), Subjective Index of Physical and Social Outcome (SIPSO). Assessments were conducted at baseline, at the end of treatment and at 6 months.	Patients in both groups improved over time but there were no significant differences between groups for any of the outcomes. Mean scores and mean between group differences (95% CIs) for hospital and community based programs at 6 months: 10-metre timed walk (m/min): 44.5 vs.48.1 (-2.5, -16.5 to 11.3), p=0.706. MWT (m): 206.7 vs. 256.5 (10.7, -50.2 to 71.7), p=0.72 ABCS: 69.3 vs. 66.1 (-4.9, -18.8 to 9.0), p=0.47.
Lincoln et. al. 2004 **UK** **RCT**	CA: ☑ Blinding: Assessor ☑ ITT: ☒	Patients referred to the Nottingham Community Stroke Team, the majority of whom were discharged from hospital following stroke, although some who were not admitted to hospital were also included. All individuals were in need of intervention from more than one discipline.	232 patients were randomized to receive routine care (day hospital, outpatient services). 189 patients were randomized to receive care from the community stroke team, for as long as was required. The team was multidisciplinary, including a mental health nurse with weekly team meetings. All therapists were based in the same department and were stroke specialists.	**Primary outcome:** Barthel Index. **Secondary outcomes:** Extended ADL (EADL), General Health Questionnaire (GHQ-12) by patient and carer, Carer Strain Index (CSI), and the EuroQoL. Assessments were conducted at baseline and 6 months.	Median (IQR) scores for patients in the community team group and routine care groups at 6 months: BI (mobility): 16 (12-18) vs. 16 (12-19), p=0.83 BI (domestic): 3 (0-9) vs. 2.5 (0-8), p=0.70 BI (leisure): 6 (3-9) vs. 7 (3-9), p=0.34 EADL: 24 (13-38) vs. 25.5 (11-39), p=0.94 GHQ-12: 13 (10-21) vs. 15 (11-230, p=0.79 Euro-QoL: Knowledge: 8 (2-3) vs. 2 (1-3), p=0.24 Practical help: 3 (2-3) vs. 3 (2-3), p=0.39 Emotional support: 3 (2-3) vs. 2 (2-3), p=0.02 Overall satisfaction: 3 (2-3) vs. 2 (2-3), p=0.08

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Outpatient Service Trialists 2003 **UK** **Cochrane review**	N/A	14 trials (1,617 patients) including patients who were living at home prior to stroke and who were within 1 year of stroke onset. In 12 of the trials, patients were recruited following discharge from hospital. In 4 of these trials, patients had received a course of rehabilitation. In 2 studies, patients were recruited from home.	Service interventions examined included those that were outpatient based (home-based n=2, day hospital or outpatient clinic n=12), therapy-based and provided the services of OT/PT or multidisciplinary staff, whose aim was to improve task-oriented behavior. The focus of treatment was ADL performance, leisure (OT) n=8; mobility (PT) n=2 and was provided by a multidisciplinary team in 4 trials. In most of the trials the comparison was usual or routine care. Therapy duration ranged from 5 weeks to 6 months.	**Primary outcome:** Death or poor outcome (deterioration, dependency, need for institutionalization), Performance of ADL.. **Secondary outcomes:** Death at end of scheduled follow-up, death or need for institutional care, death or physical dependence, EADL, and mood. Duration of follow-up was between 3 and 12 months.	Death by end of scheduled follow-up: OR=1.10, 95% CI 0.76 to 1.59, p=0.60. Results from 14 trials included. Death or institutionalization at end of scheduled follow-up: OR=0.81, 95% CI 0.54 to 1.21, p=0.30. Results from 6 trials included: Death or dependency at end of scheduled follow-up: OR=0.93, 95% CI 0.70 to 1.22, p=0.60. Results from 7 trials included. Death or poor outcome: OR=0.72, 95% CI 0.57 to 0.92, p=0.009 (favours treatment). Results from 12 trials included. ADL score: SMD=0.14, 95% CI 0.02 to 0.025, p=0.02 (favours treatment). Results from 12 trials included. EADL scores: SMD=0.17, 95% CI 0.04 to 0.30, p=0.01 (favours treatment). Results from 9 trials included. Mood scores: SMD=0.11, 95% CI -0.04 to 0.26, p=0.02. Results from 7 trials included.
Walker et. al. 1999 **1-year follow-up Walker et. al. 2001** **UK** **RCT**	CA: ☑ Blinding: Assessor ☑ ITT: ☒	185 patients who sustained a stroke within the previous 6 months and who had not been admitted to hospital. 29% of patients had sustained a previous stroke. Individuals were excluded if they lived in a nursing or residential facility, or had a history of dementia.	1- month after stroke, patients were randomized to receive up to 5 months of occupational therapy (OT) at home at a frequency of service that was agreed upon by patient and therapist, or no intervention (control group), although patients could access existing services in the community. On average, patients in the OT group received 5.8	**Primary outcome:** Nottingham EADL. **Secondary outcomes:** Barthel Index, carer strain index, and the General Health Questionnaire (0-84) (GHQ). Assessment was conducted at baseline and 6 months.	**Median (IQR) scores at baseline and 6 months for patients in the OT and control groups:** EADL: 10 (4-15) to 16 (11-18.75) vs. 11 (3-16) to 12 (6-17), p=0.009 BI: 18 (15-20) to 20 (18-20) vs. 18 (15-20) to 18 (16-20), p=0.002 Carer Strain Index: 4 (1-7) to 1 (0-4) vs. 4 (1-7) to 3 (1-6). P=0.02 GHQ-28 (patient): 26 (18-35) to 20 914-30) vs. 27 (19-32) to 23 (15-35), p=0.29 **Median (IQR) scores at 1 year for patients in the OT and control groups**

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			visits (range 1-15), lasting an average of 52 minutes.		EADL: 13 (13–18) vs. 11 (4–17), p=0.04 BI: 19 (16–20) vs. 18 (15–20), p=0.16 GHQ 28 (patient): 20 (15–30) vs. 18 (13–31), p=0.62
Grant et al. 2014 **Canada** **Retrospective Review**	N/A	57 articles were identified with a total of 11 983 Canadian stroke patients admitted to inpatient stroke rehabilitation (Mean age 69.9 ± 8.2, 55.5% male). Inclusion Criteria: 18 years or older, LOS > 3 days.	A retrospective analysis of stroke patients admitted to inpatient rehabilitation using the National Rehabilitation Reporting service database. Patients categorized according to: sociodemographics, acute stroke events, medical complications and comorbidities, patient function, therapy, and administrative variables.	To summarize stroke rehabilitation LOS and identify factors that are important influences on individual stroke rehabilitation LOSs. Dependent Variable: Length of Stay.	Gender and rural/urban status did not affect LOS. Living arrangements, receiving informal supports at home, number of health comorbidities at admission, distribution of motor weakness, specific health comorbidities did not affect LOS. Age, FIM motor function score at admission, and geographic region predicted LOS and explained 16% of the variation in LOS.

Glossary
RCT= Randomized Controlled Trial
N/A = Not Applicable
CA = Concealed Allocation
ITT = Intention to treat
OR = Odds Ratio
CI = Confidence Interval
IQR = Interquartile Range
FIM = Functional Independence Measure

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