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Inequities in access to inpatient rehabilitation after stroke: an international scoping review

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Topics in Stroke Rehabilitation

Inequities in access to inpatient rehabilitation after stroke: an international scoping review

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Abstract:	Background Inequities in accessing inpatient rehabilitation after stroke have been reported in many countries and impact on patient outcomes. Objective To explore variation in international recommendations regarding which patients should receive inpatient rehabilitation after stroke and to describe reported access to rehabilitation. Methods A scoping review was conducted to identify clinical guidelines with recommendations regarding which patients should access inpatient rehabilitation after stroke, and data regarding the proportion of patients accessing stroke rehabilitation. Four bibliographic databases and grey literature were searched. Results Twenty-nine documents were included. Selection criteria for post-acute inpatient rehabilitation were identified for 15 countries or regions and summary data on the proportion of patients receiving inpatient rehabilitation were identified for 14 countries. In Australia, New Zealand and United Kingdom it is recommended that that all patients with stroke symptoms should access rehabilitation, whereas guidelines from the United States, Canada and Europe did not consistently recommend rehabilitation for people with severe stroke. Access to inpatient rehabilitation ranged from 13% in Sweden to 57% in Israel. Differences in availability of early supported discharge/home rehabilitation programs and variations in reporting methods may influence the ability to reliably compare access to rehabilitation between regions. Conclusion Recommendations regarding which patients with moderate and severe strokes should access ongoing rehabilitation are inconsistent. Clinical practice guidelines from different countries regarding post-stroke rehabilitation do not always reflect the evidence regarding the likely benefits to people with stroke. Inequity in access to

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Title

Inequities in access to inpatient rehabilitation after stroke: an international scoping review

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Cover title: Access to inpatient rehabilitation after stroke

Table 1: Published recommendations regarding access to inpatient rehabilitation

Table 2: Access to inpatient rehabilitation

Figure 1: Process for identification of included studies

Word count: 2482

Editor
Topics in Stroke Rehabilitation
29th March 2017

Dear editors

Please find attached our scoping review titled:

Inequities in access to inpatient rehabilitation after stroke: an international scoping review.

This scoping review presents data from around the globe regarding the variations in recommendations regarding rehabilitation for people with stroke and variations regarding access to post-stroke inpatient rehabilitation services. We believe it is important to highlight that there is evidence that people with stroke benefit from rehabilitation, but this is not consistently recommended for, nor provided to, people with stroke.

An earlier version of this review was presented at the Asia Pacific Stroke Conference in Brisbane Australia in July 2016, and generated lively discussion. We believe it will generate further comment, interest and citations when it is published. The paper has not been submitted elsewhere.

All authors have read and approved the submitted manuscript, the manuscript has not been submitted elsewhere nor published elsewhere in whole or in part, except as an abstract (Asia Pacific Stroke Conference 2016).

Sincerely,

Elizabeth Lynch (Corresponding author)

On behalf of co-authors Dominique Cadilhac, Julie Luker, Susan Hillier

Cover title: Inequities in access to stroke rehabilitation

Table 1: Published recommendations regarding access to inpatient rehabilitation

Table 2: Access to inpatient rehabilitation

Figure 1: Process for identification of included studies

Word count: 2482

Abstract

Background

Inequities in accessing inpatient rehabilitation after stroke have been reported in many countries and impact on patient outcomes.

Objective

To explore variation in international recommendations regarding which patients should receive inpatient rehabilitation after stroke and to describe reported access to rehabilitation.

Methods

A scoping review was conducted to identify clinical guidelines with recommendations regarding which patients should access inpatient rehabilitation after stroke, and data regarding the proportion of patients accessing stroke rehabilitation. Four bibliographic databases and grey literature were searched.

Results

Twenty-nine documents were included. Selection criteria for post-acute inpatient rehabilitation were identified for 15 countries or regions and summary data on the proportion of patients receiving inpatient rehabilitation were identified for 14 countries.

In Australia, New Zealand and United Kingdom it is recommended that that all patients with stroke symptoms should access rehabilitation, whereas guidelines from the United States, Canada and Europe did not consistently recommend rehabilitation for people with severe stroke. Access to inpatient rehabilitation ranged from 13% in Sweden to 57% in Israel. Differences in availability of early supported discharge/home rehabilitation programs and variations in reporting methods may influence the ability to reliably compare access to rehabilitation between regions.

Conclusion

Recommendations regarding which patients with moderate and severe strokes should access ongoing rehabilitation are inconsistent. Clinical practice guidelines from different countries regarding post-stroke rehabilitation do not always reflect the evidence regarding the likely benefits to people with stroke. Inequity in access to rehabilitation after stroke is an international issue.

Key words: Stroke; rehabilitation; access; clinical practice guideline

Introduction

The global incidence of stroke is great, and is increasing.[1] Approximately one third of people who survive their stroke will have ongoing disability, and the global burden of disease from stroke is steadily growing.[1] The best available therapy for addressing disability which persists beyond the first few days post-stroke is rehabilitation,[2] which has been described as a bundle of interventions which are directed towards "enabling a person with impairment to reach their optional physical, cognitive, emotional, communicative and/or social functional level".[3, p460]

Summaries from international datasets provide evidence that the median length of stay in an acute hospital for a patient with stroke in many countries is less than a week (median 4 days in USA, 5 days in Australia and New Zealand, 7 days in Canada and UK).[4-8] Therefore, patients who require ongoing rehabilitation beyond the first week of stroke must be transferred to a rehabilitation service. Rehabilitation can be provided in an inpatient facility, in a person's home, or in an outpatient, day hospital or community clinic. Coordinated rehabilitation in the home environment is more effective than inpatient rehabilitation for reducing death or dependency for people with mild or moderate disability following stroke[9]. Inpatient rehabilitation programs tend to be provided to patients with more severe activity limitations[10] who cannot be discharged home directly from the acute hospital. However, inequities in access to inpatient rehabilitation after stroke have been reported in many countries including Australia,[11] Israel,[12] Ireland,[13] Sweden,[14] United Kingdom (UK)[15] and the United States of America (USA).[16] Further, differing rationale and criteria for acceptance into inpatient rehabilitation programs between UK, Belgium, Germany and Switzerland have been highlighted.[17].

Rehabilitation after stroke can improve a patient's motor function[18], speech and language function[19], swallow function[20] and upper limb function.[21] Rehabilitation can also increase a

person's ability to manage activities of daily living,[22] and urinary incontinence[23]. There is evidence that rehabilitation after stroke is beneficial for people with cognitive deficits[24] and people with severe stroke.[25] No literature has been identified where particular cohort(s) of patients have been shown to NOT improve their functional ability with rehabilitation. Therefore, when it comes to people with moderate and severe stroke, the Stroke Unit Trialists Collaboration have specifically stated that there are no firm grounds for restricting access to inpatient stroke rehabilitation based on a person's age, sex, stroke severity or stroke type.

The aim of this review was to explore access to inpatient rehabilitation after stroke on an international level. Of interest were recommendations included in clinical practice guidelines from government agencies or peak national stroke organisations regarding access to inpatient rehabilitation for people with stroke. In addition, data on access to inpatient rehabilitation services were also considered to be important.

The research questions were:

- What criteria are recommended in clinical guidelines from different countries to determine whether inpatient rehabilitation is suitable for a person with stroke?
- What proportion of patients with stroke access inpatient rehabilitation in different countries?

Methods

A scoping review was undertaken to synthesise the evidence regarding access to inpatient rehabilitation. Scoping reviews are recommended for clarifying key concepts and providing overviews of specific topics, which have not previously been reviewed.[26]

Data sources

The search strategy was developed with support from an academic librarian. A computerised search was conducted by a single reviewer (X) of Scopus, CINAHL, Pubmed and Embase databases, from 2010 to July 2016, using a combination of the terms 'stroke', 'rehabilitation', 'patient selection', 'critical pathways', 'clinical practice guideline' and 'access'. In addition, the names of individual stroke registries identified in a recent systematic review[27] were entered as search terms.

Grey literature was identified through searching websites including the Internet Stroke Center[28] and the Inventory of International Stroke-Related Best Practice Guidelines[29] and searching Google with terms 'stroke guideline', 'stroke audit' and the names of the individual stroke registries.

Reference lists of all identified sources were examined for additional relevant literature.

Literature selection

Inclusion criteria were that the literature or data were available in English, and contained recommendations regarding which patients with stroke should receive inpatient rehabilitation or summary data regarding the proportion of patients who accessed inpatient stroke rehabilitation.

One author (X) examined titles and abstracts against the inclusion criteria. Following removal of duplicates, full text articles were obtained for a detailed assessment to determine eligibility. When multiple clinical practice guidelines were identified for the same country for different professional bodies, all guidelines were reviewed. When author X was unable to identify recommended criteria for inpatient rehabilitation from clinical practice guidelines, a second reviewer (Y) reviewed the full-text guideline. When multiple studies regarding access to rehabilitation were available for the same country or region, two reviewers (X and Y)

independently selected the study which reported on the larger, more recent, or more comprehensive (i.e. included all stroke subtypes) dataset. Reports were excluded when data about inpatient rehabilitation could not be separated from the initial acute hospital admission data (acute medical assessment, management and stabilisation) or from community/outpatient rehabilitation data.

If further details were required, one author (X) contacted the corresponding author.

Data extraction

Clinical guidelines

One author (X) copied text verbatim regarding inpatient rehabilitation selection criteria.

Access to inpatient rehabilitation

One author (X) extracted data regarding the number of patients with stroke, the number of patients who were discharged alive, and the percentage of stroke survivors who were discharged to inpatient rehabilitation. This sometimes required the author to perform simple calculations (for instance when the proportion of patients who accessed inpatient rehabilitation was presented per patients admitted with stroke rather than per patients discharged alive). Extracted data were checked by a second author (Y). All authors considered the included articles for their relevance and to ensure no major report/publication had been missed.

Results

The database search yielded 1741 titles and abstracts, of which 18 articles were retained for the review. The grey literature search identified 11 items that were included in the review.

Figure 1 presents the process for identification of the included studies. Details of the 31 items that were eligible but not included (larger or more recent data regarding access to

rehabilitation available, more recent guideline available or affiliated report of included guideline or audit publication) are presented in Appendix 1.

Clinical guidelines regarding access to inpatient rehabilitation

Fifteen clinical guidelines or pathways regarding which patients with stroke should access inpatient rehabilitation were identified, and are presented in Table 1. Twenty-two clinical guidelines were identified that did not present a definition regarding which patients should access rehabilitation. Clinical guidelines from Spain[30] (2009) and UK[31] (2012) had been updated in 2011 and 2016 respectively, but the new guidelines did not include reference to criteria for inpatient rehabilitation so the earlier versions were retained for the review. Guidelines from nine countries recommended that inpatient rehabilitation be provided to people with rehabilitation needs that could not be met in the acute stroke unit (Australia,[32] New Zealand[33]), people with ongoing disability or rehabilitation needs after stroke (Ireland,[34] Japan,[35] United Kingdom, UK[31]), people with more severe impairments or multiple medical comorbidities (France[36] Croatia[37]) people who required input from 2 or more professional disciplines (South Africa[38]), or people with mild, moderate or severe stroke (Philippines,[39] Singapore[40]). The South African guidelines included the caveat that while inpatient rehabilitation was recommended for people with stroke, there were insufficient stroke rehabilitation services available in South Africa.

Guidelines from Europe, USA, Canada and Spain included some reservations regarding access to rehabilitation for people with severe stroke. In order to access inpatient rehabilitation in Canada, patients must demonstrate the potential to return to premorbid or baseline functioning or to increase post-stroke functional level[3]; in USA, patients must be expected to improve significantly and be discharged to the community;[41] and in Spain rehabilitation was not deemed suitable for people with severe strokes with poor recovery prognoses.[30] No definitive criteria were recommended to determine a person's prognosis.

European guidelines state that there is limited evidence to guide therapy provision for people with severe stroke.[42]

Access to rehabilitation

Data regarding proportions of people with stroke who accessed inpatient rehabilitation were identified for 14 countries, which were all identified as high income countries by the World Bank.[43] These results are presented in Table 2. The sample sizes ranged from 509 in Switzerland to 738 459 in USA. Stroke rehabilitation services were reported to be scarce or unavailable in low-income countries[38, 44] The proportion of stroke survivors who accessed inpatient rehabilitation ranged between 13.4% in Sweden (where an additional 10.7% of patients accessed rehabilitation at home)[45] to 56.5% in Israel.[46] In the majority of countries, data were collected from records written by hospital personnel.[4-6, 45, 47-54] Data were collected via surveys of carers or people with stroke in Switzerland and Israel.[46, 55]

Discussion

The World Stroke organisation recommends that "all patients with acute stroke should have an initial functional assessment to determine rehabilitation needs and receive an individualised rehabilitation plan"[56, p4] However, it seems that individualised rehabilitation plans are not consistently being delivered to all people with moderate and severe stroke given the marked and unexplained variation in inpatient stroke rehabilitation provision. For instance, the difference in the proportion of people accessing inpatient rehabilitation in Sweden compared to Denmark (13.4% of stroke survivors compared to 47.9% respectively) is not clearly explained by differences in length of stay in acute stroke units (mean length of stay 15 days in Sweden, 12 days in Denmark)[45, 47] or home rehabilitation service availability. There is the possibility that factors unrelated to patients with stroke (such as availability of services, insurance models and coverage) influence access to inpatient rehabilitation.

In order to compare "like" services, our review only included data or recommendations regarding post-acute inpatient rehabilitation. Access to rehabilitation was rarely reported as the primary outcome measure, and different researchers reported data from varying patient cohorts over differing time periods. Further, different countries report rehabilitation differently. We did not include data from the UK national (SSNAP) audit[8] or the Austrian Stroke Unit registry audit [57] because inpatient rehabilitation could not be separated from acute or ambulatory services respectively. We did not include access to home or community rehabilitation, so our findings are most relevant for people with moderate or severe stroke, who usually require inpatient rehabilitation services.

International guideline developers and researchers recommend that clinical practice guidelines should be informed by systematically reviewing the evidence and seeking input from experts to assess the benefits and harms of alternative care options.[58] Concerns arise when recommendations included in guidelines are not aligned with evidence for best patient outcomes. This can occur when there is a lack of available evidence, when evidence is misinterpreted by guideline developers, or when guideline development is influenced by factors other than patient benefit, such as the need to control healthcare costs.[59] In the case of stroke, it is concerning that 4 guidelines include recommendations that inpatient rehabilitation should not routinely be provided to people with severe stroke guidelines. It is also concerning that some comprehensively developed guidelines (such as those developed by Scottish Intercollegiate Guideline Network)[60] do not include specific recommendations regarding who should access inpatient rehabilitation after the initial acute hospital stay, or that recommendations regarding who should access inpatient rehabilitation were not retained when stroke guidelines in Spain and the UK were updated.

Anticipated discharge destination is recommended for use as a criterion for inpatient rehabilitation suitability by insurers in the USA[41], and is commonly used to determine

rehabilitation suitability by Australian clinicians working in acute stroke units.[61] Clinicians have reported not prioritising or providing therapy during the acute stroke unit stay to patients who are anticipated to be discharged to residential care, with this decision being made within the first few days after stroke.[62] When clinicians consider the primary benefit from rehabilitation to be discharge destination, patients with severe stroke or cognitive impairment are often not provided with a trial of rehabilitation in acute or post-acute settings, and instead are recipients of "therapeutic nihilism" under the assumption that rehabilitation would be of no benefit.[63] This view is not supported by evidence. When inpatient rehabilitation is provided to people with severe stroke, there are significant reductions in mortality,[25] significant improvements in function[64] and significant decreases in the proportion of people who are discharged to residential care.[64] Further, evidence is emerging that money spent on provision of rehabilitation for people with very severe stroke is likely to be a good investment on purely financial terms.[65] Rehabilitation for people with very severe stroke has been shown to result in reduced dependency and ongoing care costs; the time to offset the cost of inpatient rehabilitation is significantly less in more dependent patients.[65]

When guidelines do not routinely include recommendations for rehabilitation for all patients with stroke who are likely to benefit, patients, families and clinicians have little recourse to advocate for better rehabilitation services. Further, when guidelines are already being limited by non-evidence-based criteria, inequities can be compounded by clinicians short-circuiting best practice. If experts and policy makers in stroke care are not advocating for best evidence-based care for patients with stroke, it is unclear who will.

Summary

Stroke guidelines differ around the world regarding which patients with moderate or severe strokes should access inpatient rehabilitation. The majority of clinical guidelines recommended that all patients with moderate and severe stroke should access inpatient

rehabilitation, whereas two guidelines included recommendations that only patients likely to be discharged to the community were eligible. Inpatient rehabilitation in low-income countries is poorly reported and is likely to be scarce or non-existent. The proportion of patients accessing inpatient rehabilitation varies across high-income countries, suggesting inequities in access to rehabilitation that are not explained by clinical guidelines or availability of rehabilitation services.

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Removed to preserve anonymity

Declarations of Interest

The authors report no conflicts of interest.

References

1. Feigin VL, Forouzanfar MH, Krishnamurthi R, Mensah GA, Connor M, Bennett DA, et al. Global and regional burden of stroke during 1990-2010: Findings from the global burden of disease study 2010. *Lancet*. 2014;383:245-255
2. Langhorne P, Bernhardt J, Kwakkel G. Stroke rehabilitation. *The Lancet*. 2011;377:1693-1702
3. Vandenberk B, Garweg C, Voros G, FlorÉ V, Marynissen T, Sticherling C, et al. Changes in implantation patterns and therapy rates of implantable cardioverter defibrillators over time in ischemic and dilated cardiomyopathy patients. *Pacing & Clinical Electrophysiology*. 2016;39:848-857
4. Stroke Unit Trialists Collaboration. Organised inpatient (stroke unit) care for stroke. *Cochrane Database of Systematic Reviews*. 2013
5. Prvu Bettger J, Kaltenbach L, Reeves MJ, Smith EE, Fonarow GC, Schwamm LH, et al. Assessing stroke patients for rehabilitation during acute hospitalization: Findings from the get with the guidelines - stroke program. *Archives of Physical Medicine & Rehabilitation*. 2013;94:38-45
6. Engel F, Holmberg H-C, Sperlich B. Is there evidence that runners can benefit from wearing compression clothing? *Sports Medicine*. 2016;46:1939-1952
7. Zondervan DK, Friedman N, Chang E, Xing Z, Augsburger R, Reinkensmeyer DJ, et al. Home-based hand rehabilitation after chronic stroke: Randomized, controlled single-blind trial comparing the musicglove with a conventional exercise program. *Journal of Rehabilitation Research & Development*. 2016;53:457-472
8. Bernhardsson S, Larsson ME. Measuring evidence-based practice in physical therapy: Translation, adaptation, further development, validation, and reliability test of a questionnaire. *Physical Therapy*. 2013;96:819-832
9. Mahendran N, Kuys SS, Brauer SG. Accelerometer and global positioning system measurement of recovery of community ambulation across the first 6 months after stroke:

An exploratory prospective study. *Archives of Physical Medicine & Rehabilitation*. 2016;97:1465-1472
10. Conroy BE, DeJong G, Horn SD. Hospital-based stroke rehabilitation in the united states. *Topics in Stroke Rehabilitation*. 2009;16:34-43
11. Ilett PA, Brock KA, Graven CJ, Cotton SM. Selecting patients for rehabilitation after acute stroke: Are there variations in practice? *Archives of Physical Medicine and Rehabilitation*. 2010;91:788-793
12. Eunjin NA, Hyesun H, Youngkeun WOO. Study of acceleration of center of mass during sit-to-stand and stand-to-sit in patients with stroke. *Journal of Physical Therapy Science*. 2016;28:2457-2460
13. Cabral S, Fernandes R, Selbie WS, Moniz-Pereira V, Veloso AP. Inter-session agreement and reliability of the global gait asymmetry index in healthy adults. *Gait & Posture*. 2017;51:20-24
14. Radenzev Simões V, Harley Crisp A, Verlengia R, Pellegrinotti IL. Neuromuscular and blood lactate response after a motocross training session in amateur riders. *Asian Journal of Sports Medicine*. 2016;7:1-5
15. Mold F, Wolfe C, McKevitt C. Falling through the net of stroke care. *Health and Social Care in the Community*. 2006;14:349-356
16. Cruz-Flores S, Rabinstein A, Biller J, Elkind MSV, Griffith P, Gorelick PB, et al. Racial-ethnic disparities in stroke care: The american experience: A statement for healthcare professionals from the american heart association/american stroke association. *Stroke*. 2011;42:2091-2116
17. Putman K, De Wit L, Schupp W, Beyens H, Dejaeger E, de Weerdt W, et al. Inpatient stroke rehabilitation: A comparative study of admission criteria to stroke rehabilitation units in four european centres. *Journal of Rehabilitation Medicine*. 2007;39:21-26
18. Takashi H, Kazumi K, Hidefumi F, Keizo S, Megumi S, Tadashi O. Use of an arm weight-bearing combined with upper-limb reaching apparatus to facilitate motor paralysis recovery in an incomplete spinal cord injury patient: A single case report. *Journal of Physical Therapy Science*. 2017;29:176-180
19. Draghici AE, Picard G, Taylor JA, Shefelbine SJ. Assessing kinematics and kinetics of functional electrical stimulation rowing. *Journal of Biomechanics*. 2017;53:120-126
20. Landers MR, Oscar S, Sasaoka J, Vaughn K. Balance confidence and fear of falling avoidance behavior are most predictive of falling in older adults: Prospective analysis. *Physical Therapy*. 2016;96:433-442
21. English C, Healy GN, Coates A, Lewis L, Olds T, Bernhardt J. Sitting and activity time in people with stroke. *Physical Therapy*. 2016;96:193-201
22. Yang L, Lam FMH, Liao LR, Huang MZ, He CQ, Pang MYC. Psychometric properties of dual-task balance and walking assessments for individuals with neurological conditions: A systematic review. *Gait & Posture*. 2017;52:110-123
23. We ride a 2006 suzuki rm125 two-stroke. *Motocross Action Magazine*. 2016;44:108-112
24. McCluskey A, Vratsistas-Curto A, Schurr K. Barriers and enablers to implementing multiple stroke guideline recommendations: A qualitative study. *BMC Health Services Research*. 2013;13:323
25. Pereira S, Graham JR, Shahabaz A, Salter K, Foley N, Meyer M, et al. Rehabilitation of individuals with severe stroke: Synthesis of best evidence and challenges in implementation. *Topics in Stroke Rehabilitation*. 2012;19:122-131
26. Crisco JJ, Schwartz JB, Wilcox B, Costa L, Kerman K. Design and kinematic evaluation of a novel joint-specific play controller: Application for wrist and forearm therapy. *Physical Therapy*. 2015;95:1061-1066
27. Falvey JR, Mangione KK, Stevens-Lapsley JE. Rethinking hospital-associated deconditioning: Proposed paradigm shift. *Physical Therapy*. 2015;95:1307-1315

28. Zuern CS, Kilias A, Berlitz P, Seizer P, Gramlich M, MÜLler K, et al. Anticoagulation after catheter ablation of atrial fibrillation guided by implantable cardiac monitors. *Pacing & Clinical Electrophysiology*. 2015;38:688-693
29. Chua J, Culpan J, Menon E. Efficacy of an electromechanical gait trainer poststroke in singapore: A randomized controlled trial. *Archives of Physical Medicine & Rehabilitation*. 2016;97:683-690
30. Yong-Kyu C, Young-Han P, Jung-Ho L. Effects of kinesio taping and mcconnell taping on balance and walking speed of hemiplegia patients. *Journal of Physical Therapy Science*. 2016;28:1166-1169
31. Intercollegiate Stroke Working Party. *National clinical guidelines for stroke, 4th edition*. London: Royal College of Physicians; 2012.
32. National Stroke Foundation. *Clinical guidelines for stroke management 2010*. Melbourne Australia.
33. Risa O, Hiromi M, Masaru U, Kazutake U, Nobuko N, Mari O, et al. Automated stride assistance device improved the gait parameters and energy cost during walking of healthy middle-aged females but not those of young controls. *Journal of Physical Therapy Science*. 2016;28:3361-3366
34. Vinstrup J, Calatayud J, Jakobsen MD, Sundstrup E, Jay K, Brandt M, et al. Electromyographic comparison of elastic resistance and machine exercises for high-intensity strength training in patients with chronic stroke. *Archives of Physical Medicine & Rehabilitation*. 2016;97:429-436
35. Kyoung-Sim J, Hwi-Young CHO, Tae-Sung IN. Trunk exercises performed on an unstable surface improve trunk muscle activation, postural control, and gait speed in patients with stroke. *Journal of Physical Therapy Science*. 2016;28:940-944
36. Standen PJ, Threapleton K, Connell L, Richardson A, Brown DJ, Battersby S, et al. Patients' use of a home-based virtual reality system to provide rehabilitation of the upper limb following stroke. *Physical Therapy*. 2015;95:350-359
37. Hooker SP, Hutto B, Zhu W, Blair SN, Colabianchi N, Vena JE, et al. Accelerometer measured sedentary behavior and physical activity in white and black adults: The regards study. *Journal of Science & Medicine in Sport*. 2016;19:336-341
38. Givon N, Zeilig G, Weingarden H, Rand D. Video-games used in a group setting is feasible and effective to improve indicators of physical activity in individuals with chronic stroke: A randomized controlled trial. *Clinical Rehabilitation*. 2016;30:383-392
39. Komar A, Ashley K, Hanna K, Lavallee J, Woodhouse J, Bernstein J, et al. Retrospective analysis of an ongoing group-based modified constraint-induced movement therapy program for children with acquired brain injury. *Physical & Occupational Therapy in Pediatrics*. 2016;36:186-203
40. Dey SK, Bandyopadhyay AH, Jana S, Ganguly S. Effect of training on motor ability parameters and rowing ergometer performance of indian junior female rowers. *Biology of Exercise*. 2015;11:33-53
41. Cagney J, Budai M. Finding their own way. *Rehab Management: The Interdisciplinary Journal of Rehabilitation*. 2015;28:18-22
42. The European Stroke Organisation Executive Committee, the ESO Writing Committee. Guidelines for management of ischaemic stroke and transient ischaemic attack 2008. *Cerebrovascular Diseases*. 2008;25:457-507
43. Sirevaag EJ, Casaccia S, Richter EA, O'Sullivan JA, Scalise L, Rohrbaugh JW. Cardiorespiratory interactions: Noncontact assessment using laser doppler vibrometry. *Psychophysiology*. 2016;53:847-867
44. Myklebust H, Losnegard T, Hallén J. Differences in v1 and v2 ski skating techniques described by accelerometers. *Scandinavian Journal of Medicine & Science in Sports*. 2014;24:882-893

45. Appelros P, Jonsson F, Asplund K, Eriksson M, Glader EL, Asberg KH, et al. Trends in baseline patient characteristics during the years 1995-2008: Observations from riks-stroke, the swedish stroke register. *Cerebrovascular Diseases*. 2010;30:114-119
46. Baran M, Lehrer N, Duff M, Venkataraman V, Turaga P, Ingalls T, et al. Interdisciplinary concepts for design and implementation of mixed reality interactive neurorehabilitation systems for stroke. *Physical Therapy*. 2015;95:449-460
47. Mohammadi R, Talebian S, Phadke CP, Yekaninejad MS, Hadian M-R. Effects of treadmill incline and speed on ankle muscle activity in subjects after a stroke. *Archives of Physical Medicine & Rehabilitation*. 2016;97:445-453
48. Buckeridge EM, Weinert-Aplin RA, Bull AMJ, McGregor AH. Influence of foot-stretcher height on rowing technique and performance. *Sports Biomechanics*. 2016;15:513-526
49. Kendall BJ, Gothe NP. Effect of aerobic exercise interventions on mobility among stroke patients. *American Journal of Physical Medicine & Rehabilitation*. 2016;95:214-224
50. Baldwin VN, Powell T. Google calendar: A single case experimental design study of a man with severe memory problems. *Neuropsychological Rehabilitation*. 2015;25:617-636
51. Fantozzi S, Giovanardi A, Magalhães FA, Di Michele R, Cortesi M, Gatta G. Assessment of three-dimensional joint kinematics of the upper limb during simulated swimming using wearable inertial-magnetic measurement units. *Journal of Sports Sciences*. 2016;34:1073-1080
52. Gorst T, Lyddon A, Marsden J, Paton J, Morrison SC, Cramp M, et al. Foot and ankle impairments affect balance and mobility in stroke (faimis): The views and experiences of people with stroke. *Disability & Rehabilitation*. 2016;38:589-596
53. Thingstad P, Taraldsen K, Hagen G, Sand S, Saltvedt I, Sletvold O, et al. Effectiveness of task specific gait and balance exercise 4 months after hip fracture: Protocol of a randomized controlled trial - the eva-hip study. *Physiotherapy Research International*. 2015;20:87-99
54. Terjesen T, Lofterød B, Skaaret I. Gait improvement surgery in ambulatory children with diplegic cerebral palsy. *Acta Orthopaedica*. 2015;86:511-517
55. Salot P, Patel P, Bhatt T. Reactive balance in individuals with chronic stroke: Biomechanical factors related to perturbation-induced backward falling. *Physical Therapy*. 2016;96:338-347
56. Kamper JE, Garofano J, Schwartz DJ, Silva MA, Zeitzer J, Modarres M, et al. Concordance of actigraphy with polysomnography in traumatic brain injury neurorehabilitation admissions. *Journal of Head Trauma Rehabilitation*. 2016;31:117-125
57. Sinae AHN. Analysis approaches and interventions with occupational performance. *Journal of Physical Therapy Science*. 2016;28:2681-2683
58. Buckley TA, Burdette G, Kelly K. Concussion-management practice patterns of national collegiate athletic association division ii and iii athletic trainers: How the other half lives. *Journal of Athletic Training (Allen Press)*. 2015;50:879-888
59. Sinae AHN. Association between daily activities, process skills, and motor skills in community-dwelling patients after left hemiparetic stroke. *Journal of Physical Therapy Science*. 2016;28:1829-1831
60. Scottish Intercollegiate Guidelines Network. *Management of patients with stroke: Rehabilitation, prevention and management of complications, and discharge planning. A national clinical guideline*. Edinburgh: Scottish Intercollegiate Guidelines Network,; 2010.
61. Lacroix J, Daviet JC, Bonis J, Salle JY, Mandigout S. Recommendations for physical activity after stroke: Are they achieved before discharge from rehabilitation units? *Science & Sports*. 2016;31:73-77
62. Lynch EA, Hillier S, Cadilhac DA. When should physical rehabilitation commence after stroke: A systematic review. *International Journal of Stroke*. 2014;9:468-478
63. Polese JC, Faria CDCM, Scianni AA, Teixeira-Salmela LF. Short- and long-term training effects on motor and functional performances of community-dwelling individuals with chronic stroke. *European Journal of Physiotherapy*. 2016;18:3-10

64. Khalil N, Chauvière C, Le Chapelain L, Guesdon H, Speyer E, Bouaziz H, et al. Plantar pressure displacement after anesthetic motor block and tibial nerve neurotomy in spastic equinovarus foot. *Journal of Rehabilitation Research & Development*. 2016;53:219-228
65. Zult T, Goodall S, Thomas K, Solnik S, HortobÁgyi T, Howatson G. Mirror training augments the cross-education of strength and affects inhibitory paths. *Medicine & Science in Sports & Exercise*. 2016;48:1001-1013

Table 1. Published recommendations regarding access to inpatient rehabilitation

Country or region	Published recommendations regarding access to inpatient rehabilitation
Recommendation for unconditional access to inpatient rehabilitation	
Australia[32]	All patient types benefit from rehabilitation. Inpatient rehabilitation should be organized if Acute Stroke Unit unable to meet the rehabilitation requirements of person with stroke
Croatia[37]	Patients who have more severe impairments or multiple medical comorbidities… are best managed in a subacute rehabilitation unit or should be admitted to a specialized rehabilitation hospital.
Ireland[34]	All stroke patients who need rehabilitation should be referred to a specialist team on a geographically defined unit after admission to acute care: this may be integrated with the acute elements of the stroke unit
France[36]	All stroke patients who need rehabilitation should be referred to a specialist team on a geographically defined unit after admission to acute care: this may be integrated with the acute elements of the stroke unit
Japan[35]	For patients with residual impairment in multiple areas such as movement, self-care, swallowing, communication and cognition, it is recommended to carry out (inpatient rehabilitation) after the acute hospitalization
New Zealand[33]	All people with stroke benefit from rehabilitation, probably more so those who are severely affected by stroke. If the Acute Stroke Unit services are unable to provide necessary ongoing rehabilitation… then rehabilitation …ideally on a stroke rehabilitation unit needs to be … organized
Philippines[39]	Inpatient rehabilitation is indicated for people with mild moderate and severe strokes
Singapore[40]	Stroke patients should receive organized inpatient multidisciplinary rehabilitation, early after stroke
United Kingdom[31]	People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit

South Africa[38]	Where patients require 3 modalities of intervention, or where patients are unable to transfer independently, inpatient rehabilitation is justified
Recommendation includes caution or exclusion criterion for access to inpatient rehabilitation for patients with severe stroke	
Canada[3]	Patients must demonstrate by their post-stroke progress the potential to return to premorbid/baseline functioning or to increase post-stroke functional level with participation in rehabilitation program. To be eligible for rehabilitation, patients must demonstrate at least a minimum level of function, including having stamina to participate in the program, ability to follow 1-stage commands and sufficient attention, memory and insight to progress with rehabilitation.
Europe[42]	It is recommended that rehabilitation be considered for all stroke patients, but there is limited evidence to guide appropriate treatment for the most severely disabled
Spain[30]	Patients who have … suffered a serious stroke with major functional impairment or are very dependent for ADL, with an unfavourable recovery prognosis are not candidates for rehabilitation.
United States of America[41]	Medicare (Centers for Medicare & Medicaid Services) regulations specify that admission to inpatient rehabilitation facilities should be limited to patients for whom significant improvement is expected within a reasonable length of time and who are likely to return to a community setting (rather than being transferred to another setting such as a Skilled Nursing Facility or long-term care facility).

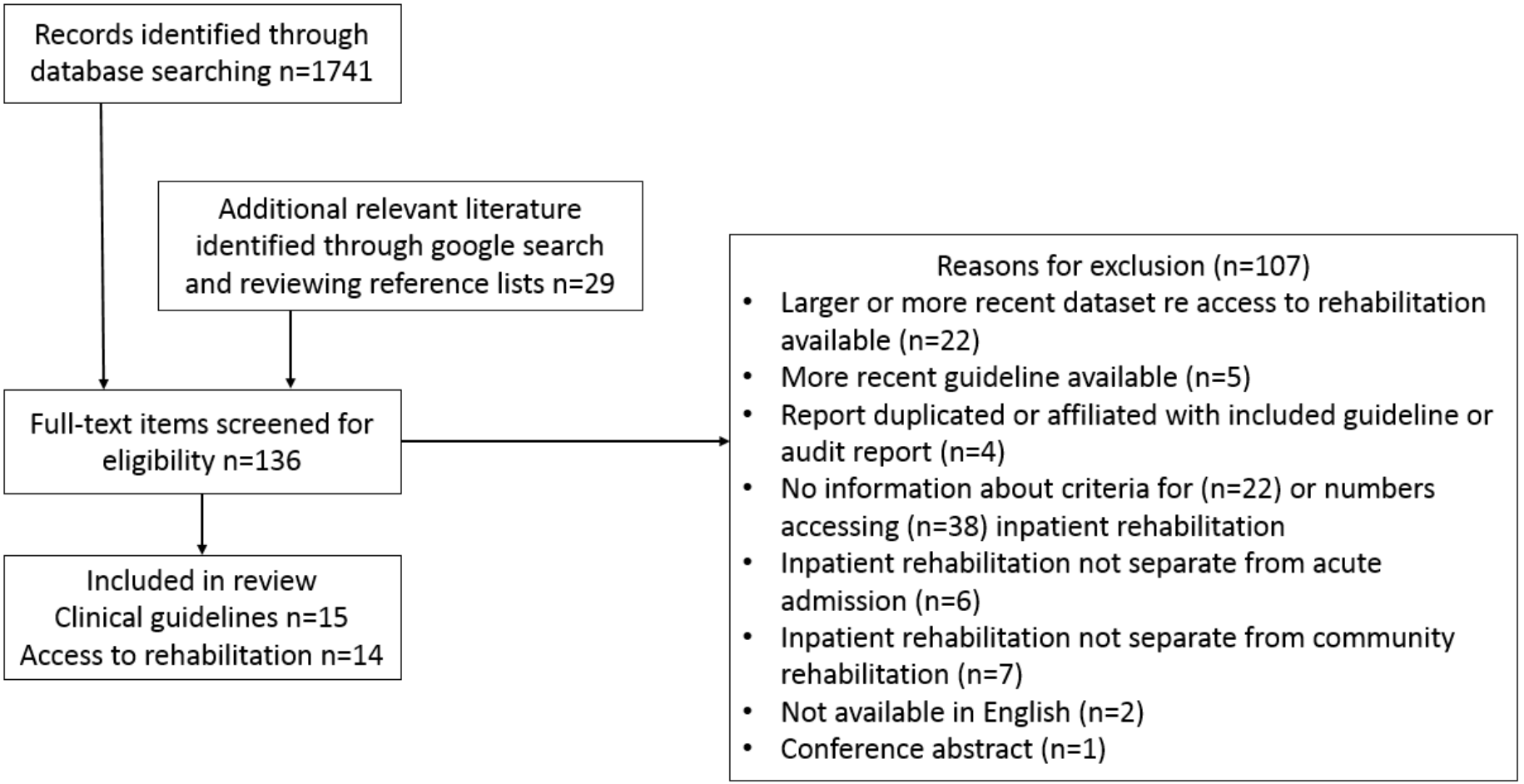
Table 2. Access to inpatient rehabilitation

Country	Year(s) data collected	Total N admitted with stroke	Total N discharged alive	Proportions of stroke survivors accessed inpatient rehabilitation following discharge from hospital
Australia[13]	2013	3741	3289	30.5%
Canada[51] (Ontario)	2014-2015	14287	12604	35%
Denmark[47] (Aarhus county)	2005-2009	5909	Not presented	44.3% [c]
France[52]	2009	Not presented	83505	34.0%
Germany[48]	2010-2011	Not presented	96955	40.8%
Ireland[49]	2014	874	753	18.6%
Israel[46] [a]	2009-2010	570	489	56.5%
Italy[50] (Lazio)[b]	2011-2012	9958	7984	33.0%
New Zealand[14]	2008	832	712	31.5%
Korea[53]	2008-2009	2159	1985	14.1%
Poland[54]	2010	34029	Not presented	15.1% [c]
Sweden[45]	2010	Not presented	25558	13.4%

Switzerland[55]	2004-2005	Not presented	509	32.8%
United States of America[12]	2008-2011	738459	672779	21.5%

a. People with stroke aged 65 and over
b. Ischaemic stroke only
c. Proportion of people admitted with stroke who accessed rehabilitation vs proportion of stroke survivors who accessed rehabilitation

Figure 1. Process for identification of included studies



Figure

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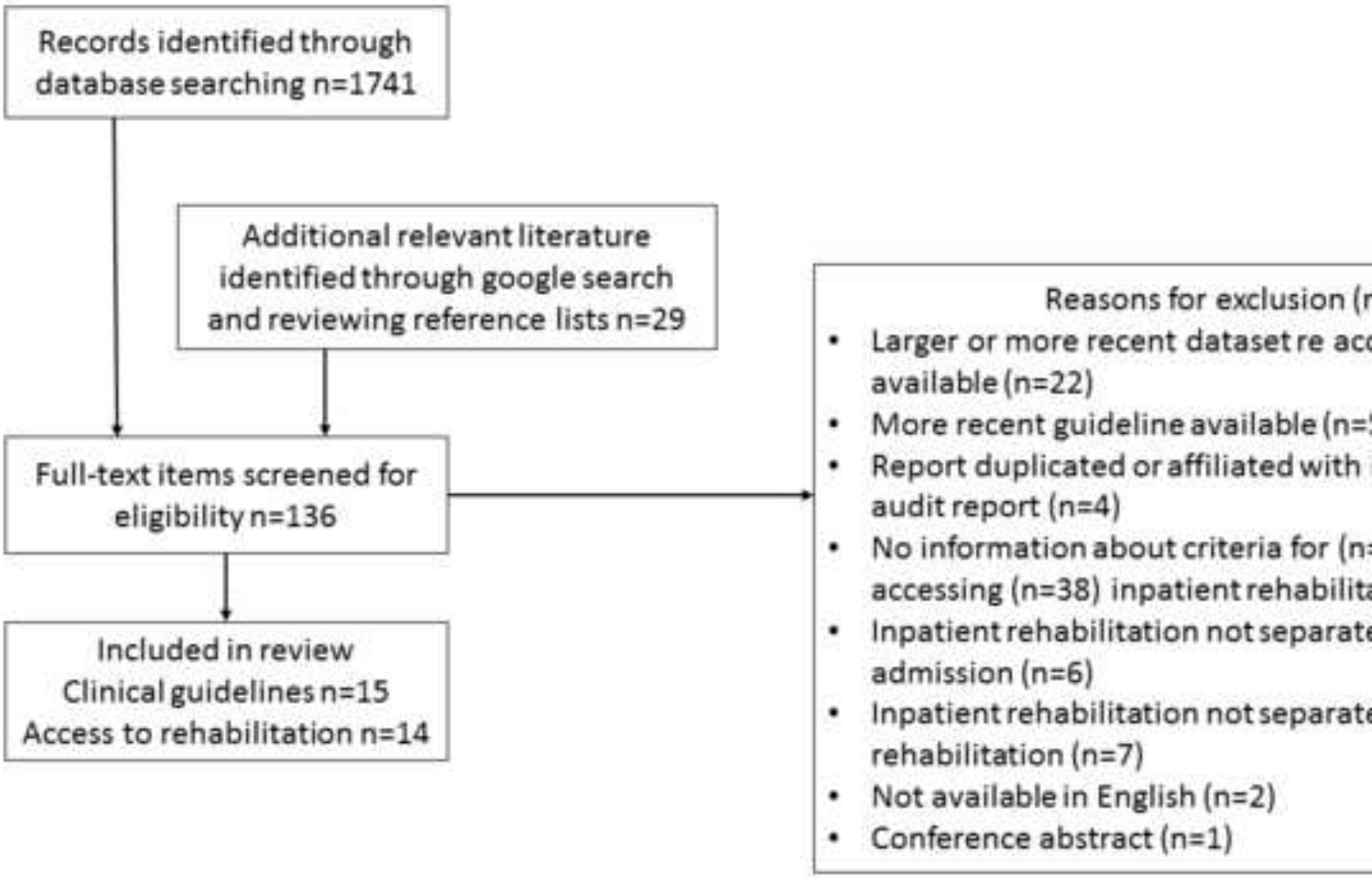


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Excluded document	Country
Report affiliated with included document regarding access to rehabilitation	
Hall R, Khan F, Levi J, Zhou L, Lumsden J, Martin C, et al: *Ontario and LHIN 2014/15 Stroke Report Cards and Progress Reports: Active knowledge exchange to drive system integration and stroke best practices*. Toronto, ON: Institute for Clinical Evaluative Sciences; 2016.	Canada (Ontario)
Larger or more recent dataset available	
Ali SF, Singhal AB, Viswanathan A, Rost NS, Schwamm LH: Characteristics and Outcomes Among Patients Transferred to a Regional Comprehensive Stroke Center for Tertiary Care. *Stroke* 2013;44:3148-3153	USA
Canadian Stroke Network: *The Quality of Stroke Care in Canada.* Ottawa, ON: Canadian Stroke Network; 2011	Canada
Fonarow GC, Reeves MJ, Zhao X, Olson DWM, Smith EE, Saver JL et al for the Get With the Guidelines–Stroke Steering Committee and Investigators: Age-Related Differences in Characteristics, Performance Measures, Treatment Trends, and Outcomes in Patients With Ischemic Stroke. *Circulation* 2010; 121: 879-891	USA
Fonarow GC, Liang L, Thomas L, Xian Y, Saver JL, Smith EE et al: Assessment of Home-Time After Acute Ischemic Stroke in Medicare Beneficiaries *Stroke* 2016; 47: 836-842	USA
Freburger JK, Holmes GM, Ku L-JE, Cutchin MP, Heatwole-Shank K, Edwards LJ: Disparities in Postacute Rehabilitation Care for Stroke: an Analysis of the State Inpatient Databases. *Archives of Physical Medicine and Rehabilitation* 2011; 92: 1220-1229	USA
Hakkennes S, Hill KD, Brock K, Bernhardt J, Churilov L: Accessing inpatient rehabilitation after acute severe stroke: age, mobility, prestroke function and hospital unit are associated with discharge to inpatient rehabilitation *International Journal of Rehabilitation Research* 2012; 35:323–329	Australia
Hall R, Khan F, O'Callaghan C, Kapral MK, Cullen A, Levi J et al: Ontario Stroke Evaluation Report 2014 On Target for Stroke Prevention and Care Toronto, ON: Institute for Clinical Evaluative Sciences; 2014.	Canada (Ontario)
Hall R, Linkewich B, Khan F, Levi J, Zhou L, Fang J et al: *Ontario and LHIN 2013/14 Stroke Report Cards and Progress Reports: Driving knowledge exchange and implementing stroke best practices*. Toronto, ON: Institute for Clinical Evaluative Sciences; 2015.	Canada (Ontario)

Ilett PA, Brock KA, Graven CJ, Cotton SM: Selecting patients for Rehabilitation After Acute Stroke: Are There variations in Practice? *Archives of Physical Medicine and Rehabilitation* 2010; 91:788-793	Australia
James ML, Grau-Sepulveda MV, Olson DWM, Smith EE, Hernandez AF, Peterson ED et al: Insurance Status and Outcome after Intracerebral haemorrhage: Findings from Get With The Guidelines-Stroke. *Journal of Stroke and Cerebrovascular Diseases* 2014; 23:283-292	USA
Lynch EA, Luker JA, Cadilhac DA, Hillier SL: Rehabilitation Assessments for Patients With Stroke in Australian Hospitals Do Not Always Reflect the Patients' Rehabilitation Requirements. *Archives of Physical Medicine and Rehabilitation* 2015; 96: 782-789	Australia
Masina M, Malservisi S, Censoni PF, Cicognani A, Marzaroli P, Pandolfi P et al: Post-stroke disposition from a geriatric-rehabilitative stroke care area: an Italian experience. *Italian Journal of Medicine* 2015; 9:49-56	Italy
O'Sullivan EJ , Williams DJ, Shanahan-O'Connell J, Kirrane K, Armitage D, Leahy W et al: Access to In-Patient Stroke Services and Multidisciplinary Team (MDT) Rehabilitation: Current Demands and Capacity. *Irish Medical Journal* 2014; 107:171-173	Ireland
Prvu Bettger J, McCoy L, Smith EE, Fonarow GC, Schwamm LH, Peterson ED: Contemporary Trends and Predictors of Postacute Service Use and Routine Discharge Home After Stroke. *Journal of the American Heart Association*. 2015; 4: e001038	USA
Reeves MJ, Vaidya RS, Fonarow GC, Liang L, Smith EE, Matulonis R, et al; for the Get With The Guidelines Steering Committee and Hospitals: Quality of Care and Outcomes in Patients With Diabetes Hospitalized With Ischemic Stroke Findings From Get With the Guidelines–Stroke. *Stroke* 2010; 41: e409-e417.	USA
Saposnik G, Cote R, Rochon PA, Mamdani M, Liu Y, Raptis S et al On behalf of the Investigators of the Registry of the Canadian Stroke Network and the Stroke Outcome Research Canada (SORCan) Working Group: Care and Outcomes in Patients With Ischemic Stroke With and Without Preexisting Dementia. *Neurology* 2011;77:1664–1673	Canada
Schmidt A, Heroum C, Caumette D, Le Lay K, Bénard S: Acute Ischemic Stroke (AIS) Patient Management in French Stroke Units and Impact Estimation of Thrombolysis on Care Pathways and Associated Costs. *Cerebrovascular Diseases* 2015;39:94–101	France
Skibicka I, Niewada M, Skowrońska M, Czonkowska A, Czonkowski A: Care for patients after stroke. Results of a two-year prospective observational study from Mazowieckie province in Poland. *Neurochirurgia Polska* 2010; 44, 3: 231–237	Poland
Smith EE, Fonarow GC, Reeves MJ, Cox M, Olson DWM, Hernandez AF, Schwamm LH: Outcomes in Mild or Rapidly Improving Stroke Not Treated With Intravenous Recombinant Tissue-Type Plasminogen Activator Findings From Get With The Guidelines–Stroke. *Stroke*. 2011; 42: 3110-3115.	USA
Stineman MG, Bates BE, Kurichi JE, Kwong PL, Cowper Ripley D, Vogel B et al: Initial Physical Grades and Cognitive Stages After Acute Stroke: Who Receives Comprehensive Rehabilitation Services? *PM&R* 2013; 5: 1007-1018	USA

Tong D, Reeves MJ, Hernandez AF, Zhao X, Olson DWM, Fonarow GC et al: Times From Symptom Onset to Hospital Arrival in the Get With The Guidelines–Stroke Program 2002 to 2009 Temporal Trends and Implications. *Stroke* 2012;43:1912-1917.	USA
Xian Y, Holloway RG, Smith EE, Schwamm LH, Reeves MJ, Bhatt DL et al: Racial/Ethnic Differences in Process of Care and Outcomes Among Patients Hospitalized With Intracerebral Hemorrhage. *Stroke* 2014; 45: 3243-3250	USA
More recent guideline/recommended pathway available	
Department of Veterans Affairs, Department of Defense and The American Heart Association/American Stroke Association: *VA/DoD Clinical Practice Guideline. Management of Stroke Rehabilitation.* The Management of Stroke Rehabilitation Working Group 2010.	USA
Miller EL, Murray L, Richards L, Zorowitz RD, Bakas T, Clark P et al on behalf of the American Heart Association Council on Cardiovascular Nursing and the Stroke Council: Comprehensive Overview of Nursing and Interdisciplinary Rehabilitation Care of the Stroke Patient A Scientific Statement From the American Heart Association. *Stroke* 2010; 41:2402-2448	USA
Mishina M, Matsumoto H: Inba Clinical Pathway for Local Stroke Network with Helicopter Emergency Medical Service in Chiba, Japan. *JMAJ* 2011; 54: 16–21	Japan
National Clinical Guideline Centre: Stroke Rehabilitation. Long term rehabilitation after stroke National Clinical Guideline Centre, 2013.	UK
Teasell R, Hossein N, Foley N: Chapter 5: Managing the Stroke Rehabilitation Triage Process. *In Evidence-Based Reviews of Stroke Rehabilitation.* London, Ontario: Heart and Stroke Foundation; 2015	Canada
Summary/affiliated report of included guideline	
Bryer A, Connor MD, Haug P, Cheyip B, Staub H, Tipping B et al: The South African guideline for the management of ischemic stroke and transient ischemic attack: recommendations for a resource-constrained health care setting. *International Journal of Stroke* 2011; 6:349–354	South Africa
Dworzynski K, Ritchie G, Fenu E, MacDermott, Playford D, on behalf of the Guideline Development Group: Rehabilitation after stroke: summary of NICE guidance. *BMJ* 2013; 346: f3615	United Kingdom
Dworzynski K, Ritchie G, Playford D: Stroke rehabilitation: long-term rehabilitation after stroke. *Clinical Medicine* 2015 Vol 15, No 5: 461–4	United Kingdom