

World Stroke Organization (WSO) rehabilitation certification program

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Abstract

Background: Rehabilitation has been identified by the World Stroke Organization (WSO) as a key priority to reduce the global burden of stroke. Global access to rehabilitation is inconsistent and is particularly limited in low-and-middle-income countries. Progress in rehabilitation has not been as well evidenced as progress in acute care. The WSO certification program, which commenced in 2021, focuses on acute interventions. A rehabilitation certification program, applicable in both inpatient and outpatient rehabilitation settings, has been developed to complement the acute certification program to address global implementation of evidence-based stroke care.

Aim: To develop globally applicable, evidence-based, stroke rehabilitation recommendations and performance metrics for use in a stroke rehabilitation certification program.

Methods: Strong recommendations were extracted from high-quality stroke rehabilitation Clinical Practice Guidelines, systematic reviews and syntheses of clinical practice guidelines, and from the defining criteria of the International Stroke Recovery and Rehabilitation Alliance (ISRR) Centers of Clinical Excellence. The WSO Rehabilitation Implementation Committee led the development of the recommendations and invited input from three international, multidisciplinary consultation groups. Group 1 compared strong recommendations from the Australia/New Zealand Living Guidelines with other international guidelines to identify consistent, high-quality recommendations. Group 2 mapped recommendations from global guideline syntheses against the Australia/New Zealand Living Guidelines. Group 3 reviewed and adapted the ISRR Center of Clinical Excellence recommendations. Recommendations were consolidated through consensus meetings involving representatives from each workgroup, including people from high, upper-middle, and lower-middle-income countries. Strong recommendations that were consistent across teams, alongside additional recommendations based on certainty of evidence, anticipated risk versus benefit, and relevance across settings, were included as patient-level recommendations in the implementation certification program. Service-level recommendations were generated through consensus or derived from existing guidelines. An implementation manual, outlining “what,” “who,” and “how,” as well as indicators to demonstrate performance of each recommendation, was developed to support clinical implementation and to facilitate assessment for certification. The criteria were piloted between November 2024 and September 2025 at 15 centers in six upper- and lower-middle-income countries (three continents) and subsequently refined. Expectations (mandatory or recommended) for each level of certification (Minimal, Essential and Advanced) were set post-pilot through rating strength of evidence, a series of group discussions and review of pilot data.

Results Fifty-five recommendations were included. Nine recommendations address service-level indicators, and 46 address patient-level indicators. Service-level indicators address defining features of rehabilitation services that are not apparent in individual patient medical record audits. Patient-level indicators address management of swallowing impairment, nutrition and hydration, information provision and goal setting, amount and timing of rehabilitation, exercise and motor rehabilitation, visual function, communication, mood and cognition, management of complications, and

discharge planning and support. An implementation manual complements the recommendations to guide clinical care and consistent assessment.

Conclusions The WSO rehabilitation recommendations and performance metrics incorporate the most current evidence and have been refined following pilot-testing. The recommendations are globally relevant and support both resource-limited and high-income settings in participating in the rehabilitation certification program to advance international stroke rehabilitation delivery.

Keywords

Stroke rehabilitation, guidelines, evidence-based practice, certification, care standards

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Background

Recognition of the importance of access to rehabilitation for improving health and reducing inequities is gaining momentum. In 2017, the World Health Organization convened the Rehabilitation 2030 Initiative, advocating for global action to enhance rehabilitation.^{1,2} More recently, the World Stroke Organization-Lancet Neurology Commission identified rehabilitation as a key priority to reduce the global burden of stroke.³ Despite these initiatives, advances in stroke rehabilitation have not kept pace with advances in evidence, infrastructure, and service developments in acute care.¹ Access to rehabilitation post-stroke remains inconsistent and is particularly limited in low-and-middle-income

countries (LMICs),⁴ where the highest stroke-related burden is experienced.^{3,5,6}

The World Stroke Organization (WSO) introduced a certification program in 2021, designed to promote implementation of evidence-based care in acute services.^{7,8} Acute stroke service certification has demonstrated effectiveness in ensuring the implementation of evidence-based acute stroke practices internationally, including in over 100 hospitals in LMICs.⁸

Prior to acute stroke certification, globally relevant recommendations and suggested performance metrics across acute and rehabilitation phases of care had been developed.⁹ First started in 2014,⁹ these were updated in 2023.¹⁰ The 2023 update had significant changes including an

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increase in recommendations focusing on rehabilitation. However, the authors acknowledged variation in the strength of rehabilitation recommendations in the update and the under-representation of guidelines from LMICs, leaving uncertainty around the feasibility of implementation in settings with limited resources and infrastructure.¹⁰ In aligned work, the World Health Organization published a guide and list of required resources to enable rehabilitation for neurological conditions, including stroke.¹¹

Building on prior work to improve access to acute stroke care globally,⁸ and responding to the World Health Organization's Rehabilitation 2030 Call to Action, the WSO convened a Rehabilitation Implementation Committee in 2022 to promote access to evidence-based stroke rehabilitation. The Rehabilitation Implementation Committee's remit was to establish a certification process by identifying globally relevant evidence-based stroke rehabilitation practices to be delivered with associated performance metrics and a feasible method of evaluating performance.

Separate from, but aligned with, the WSO mission to improve stroke care was the formation of the International Stroke Recovery and Rehabilitation Alliance (ISRRA) in 2020, an international expert group focused on improving stroke recovery and rehabilitation.¹² An early output from ISRRA was to define globally relevant criteria for health-care centers that aspire to deliver excellent stroke rehabilitation and generate exceptional outcomes for patients.¹³ The Centers of Clinical Excellence working group included medical, nursing, and allied health professionals from 10 countries from five continents (including LMICs and high-income countries (HICs)).¹³ Stroke survivors from Australia, India, Malaysia, the United Kingdom, and the United States were consulted at key timepoints, and the criteria were pilot-tested in five HICs and five LMICs between 2022 and 2024.¹⁴

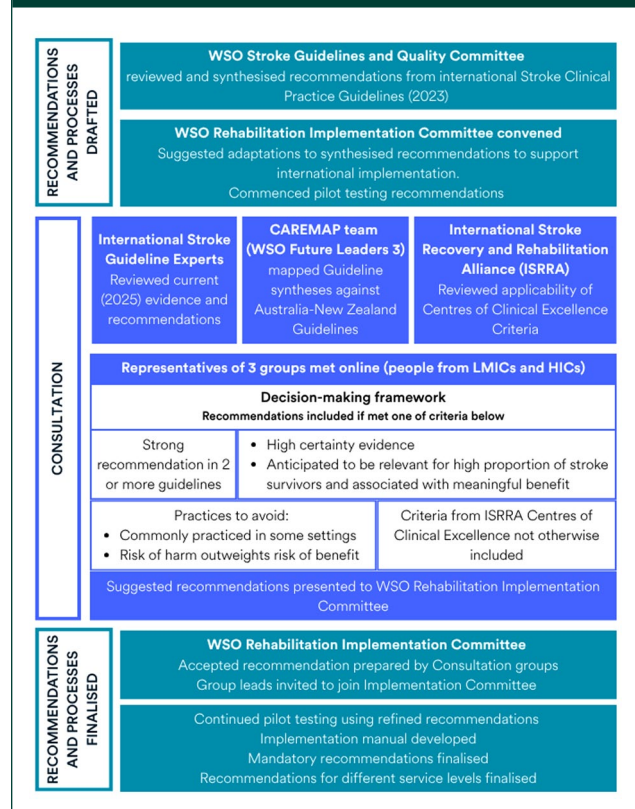
This paper reports the development and refinement of evidence-based, internationally relevant recommendations and performance indicators that were developed for use in the WSO Rehabilitation Certification program.

Methods

Collating globally relevant rehabilitation recommendations and performance measures

The WSO Executive Committee formed a rehabilitation committee as part of its implementation initiatives. The WSO Rehabilitation Implementation Committee, chaired by Sean Savitz, brought together international experts in neurorehabilitation, stroke neurology, and implementation science. The committee initially reviewed the existing WSO rehabilitation recommendations as presented in Mead et al.¹⁰ and suggested adaptations (including re-wording

Figure 1. Methods used to determine recommendations for the certification program.



and adding recommendations) to enable implementation of the recommendations in varying international contexts. In 2025, three groups were invited to consult on the recommendations for inclusion in a Certification Program, and worked separately using different methods before convening to reach consensus (Figure 1). Members of each working group and countries which they represent are presented in Supplemental Appendix 1.

Consultation_1: Individuals with expertise in stroke rehabilitation guideline development who self-nominated to review the WSO criteria (representing stroke guideline committees from Australia/New Zealand, Europe, India, Singapore, and the United Kingdom/Ireland) reviewed Chapters 4 to 8 (Secondary prevention, Rehabilitation, Managing complications, Discharge planning and transfer of care, Community participation and long-term care) from the Australia/New Zealand Living Stroke Guidelines¹⁵ and compared consistency with guideline recommendations from five international guidelines (Canada, Europe, South Africa, the United Kingdom/Ireland, the United States).^{16–20} The Australia/New Zealand guidelines¹⁵ were selected as the base because they are living (i.e. recommendations are updated as new evidence becomes available)¹⁰ and use a rigorous process

(Grading of Recommendations Assessment, Development and Evaluation (GRADE))²¹ to rate evidence quality. The South African guidelines²⁰ were contextualized from prior (now out-dated) versions from Australia,¹⁵ the United Kingdom/Ireland,¹⁸ Canada,¹⁶ and the United States¹⁹ guidelines, so they were not used in further deliberations. Strong recommendations (using the GRADE framework,^{21,22} based on certainty/quality of evidence, situation, and risk of harm vs benefit) from Australia/New Zealand¹⁵ were included in the final set if also found in one or more additional guidelines. Details of the certainty of evidence for each recommendation are presented in Supplemental Appendix 2.

Consultation_2: An international multidisciplinary workgroup from the WSO Future Leaders Program (Cohort 3) CAREMAP Project team (50% of representatives from middle-income countries)²³ mapped rehabilitation recommendations from three systematic reviews and syntheses of global guidelines^{3,10,24} against the Australia/New Zealand guidelines¹⁵ (as with Consultation_1, selected as they are living). When strong recommendations²¹ from Australia/New Zealand¹⁵ were included in one or more syntheses,^{3,10,24} they were included in the final set.

Consultation_3: Individuals involved in developing or pilot-testing the ISRRA Centers of Clinical Excellence criteria¹³ reviewed these criteria for application in the WSO Rehabilitation Certification program. Methods used to define the criteria are described elsewhere.¹³ Service-level criteria that were not already covered by recommendations from the WSO guideline review¹⁰ or the Australia/New Zealand guidelines¹⁵ were nominated for inclusion and re-worded to align with other recommendations while maintaining consistency of meaning.

Suggested recommendations from all consultation groups were tabled alongside those from the WSO Rehabilitation Implementation Committee, and two or three representatives from each group (including representatives from upper-and-lower-middle-income countries and HICs) compared, discussed, and refined the nominated recommendations in a series of online meetings. Duplicated recommendations among the three consultation groups were removed. To avoid overlap, criteria that are addressed in the acute certification program and are expected to carryover to the rehabilitation program were also removed.

To ensure that the final list of recommendations was comprehensive, represented the existing evidence, and was fit-for-purpose for the WSO Rehabilitation Certification program, a decision-making framework (Figure 1) was agreed upon wherein all strong recommendations from two or more guidelines were included. Additional recommendations were included when certainty of evidence underpinning the recommendation was high (as per Australia/

New Zealand Guideline GRADE scores) or a benefit (or risk) associated with receiving or not receiving the practice outlined in the recommendation was identified and was anticipated by committee members to be relevant to a high proportion of stroke survivors (e.g. management of swallow, mood screening, details presented in Supplemental Appendix 2). Decisions regarding inclusion of recommendations addressing harmful interventions (marked as practices to avoid) were based on the frequency of, and anticipated risk associated with receiving the potentially harmful practice.²² In addition, the criteria from ISRRA Centers of Clinical Excellence¹³ were included to provide aspirational targets and enable recognition of clinical excellence but were initially anticipated to be applicable to well-resourced settings.

The suggested recommendations for inclusion were presented to the WSO Rehabilitation Implementation Committee in June 2025, and endorsed for use in pilot-testing, with some minor word changes to improve clarity, while maintaining alignment with the evidence base from which the recommendation was sourced. The leads of each Workgroup were invited to join the WSO Rehabilitation Implementation Committee to continue to provide input. When iterations were approved by the Committee, the latest version of the recommendations was pilot-tested. Three iterations of the criteria from June 2025 involved changes to the wording of recommendations for clarity, changes in the structure and organization of recommendations to facilitate ease of audit, and removal of recommendations duplicated in the acute certification program.

Setting

The Rehabilitation Certification program is intended to apply to both inpatient and outpatient rehabilitation settings. It is designed to work seamlessly with the acute certification program and with no overlap. In this way, both certification programs can be used at sites which provide both acute and rehabilitation services. All criteria apply to sites with both inpatient and outpatient rehabilitation services. For sites with inpatient or outpatient services only, criteria that do not apply may be scored as “Not Applicable.” A single rehabilitation certification program that does not delineate between inpatient and outpatient services was deliberately developed in consideration of the wide variation in health systems and structures globally.

Pilot program

A convenience sample of 15 rehabilitation centers from six upper- and lower-middle-income countries (Brazil, Colombia, Egypt, India, Malaysia, and Vietnam, Supplemental Appendix 3) participated in pilot-testing the criteria for feasibility between November 2024 and September 2025. Prior to each visit, participating centers were made aware of the process to

enable preparation of the documentation required for the evaluation. The first nine pilots were conducted using an early version of the criteria (Supplemental Appendix 4), and the final six were conducted using the final criteria (pending minor wording changes for clarity and prior to assignment of mandatory vs recommended). Separate assessments were used for inpatient and outpatient services in the early pilots (Supplemental Appendix 4), before the committee reached consensus post-pilots that a single assessment program was most appropriate to reflect global variability in services.

Site visits were conducted by one or two assessors from the WSO Rehabilitation Committee, not affiliated with the site/s they assessed. Time spent at each center varied, with feedback from assessors guiding future site visits within the pilot to occur over 1–2 days to allow time to accomplish the following:

- Meeting to brief assessors about the center and its services;
- Documentation audits of five completed cases (selected by the site) showcasing management of people with a range of post-stroke impairments from admission to discharge;
- Interview with staff members from each professional discipline involved in stroke rehabilitation at the site, ensuring a range of seniority levels; and
- Observation of routine clinical activities (e.g. case discussions, ward rounds, therapy activity).

The assessor(s) evaluated and recorded evidence of the WSO rehabilitation recommendations having been fully met, partially met, or not met. For certification purposes, whether a recommendation is met is binary (fully met or not met); however, the “partially met” score was designed to provide feedback to support sites in their future implementation efforts. Sites were provided with written and verbal feedback on performance against each criterion with recommendations for improvement after completion of the assessment.

Finalizing the recommendations

On completion of the evidence review and pilot-testing, recommendations were finalized through consensus discussions at the Rehabilitation Implementation Committee meeting on 22 January, 2026. The GRADE ratings and source of evidence for each recommendation were reviewed (GRADE ratings were not reassessed), as were factors relating to their implementation in different settings. Using this information, criteria were deemed mandatory or recommended for the three levels of certification (minimal, essential, and advanced). When a potential conflict of interest was identified (e.g. involved in ISRRA criteria development), an online poll was conducted, with potentially conflicted members abstaining.

Mandatory and recommended criteria

In line with the acute program,⁷ mandatory criteria were identified which were limited to:

- Strong patient-level recommendations²¹ supported by high-certainty evidence;
- Staffing levels considered necessary by the Implementation Committee to deliver the defined level of service;
- Documentation considered necessary by the Implementation Committee to enable audit for certification; and
- Four recommendations sourced from the ISRRA Centers of Clinical Excellence (mandatory for advanced centers).

The remaining criteria were set as Recommended (Minimal and Essential services: 75% must be met at first certification; Advanced services: 85% must be met at first certification).⁷

Requirements for each level of certification

In line with the approach developed for the acute certification program,⁷ three levels of certification were set:

- *Minimal services* are newly developing services. Recommendations are designed to guide priorities for establishing a stroke rehabilitation service in a resource-limited setting.
- *Essential services* have access to a full multidisciplinary team and consistently deliver evidence-based rehabilitation.
- *Advanced services* provide highly specialized evidence-based rehabilitation and contribute to research and mentoring activities that have the potential to advance stroke rehabilitation knowledge beyond their service.

Decisions regarding the inclusion of recommendations for each level of certification (Minimal, Essential, and Advanced) were made collaboratively with the committee, based on the feasibility of implementation in different settings, informed by pilot-testing, and input from committee members from upper- and lower-middle-income countries. Accordingly, advanced services are expected to meet more recommendations than essential and minimal services. Scoring criteria are outlined in Supplemental Appendix 5.

Implementation manual

Building on the format used in the 2014⁹ guidelines, an Implementation manual, outlining “who” (who delivers and who receives the recommended practice), “what” (detailed definition of the recommended practice), and

“how” (detailed guide outlining how the recommended practice should be implemented) was developed for each recommendation (Supplemental Appendix 5). The guide is intended to be used by participating sites to inform implementation and by assessors to promote consistency when evaluating participating sites.

Results

A total of 55 recommendations are included for use in the WSO Stroke Rehabilitation Certification Program. Nine recommendations address service-level performance, and 46 address patient-level factors (Table 1). One criterion (recommendation for swallow screen) was removed, as it is addressed in the acute certification program; however, recommendations about the management of swallow impairment were retained. The strength of recommendations and certainty of evidence underpinning each recommendation are presented in Supplemental Appendix 2.

Discussion

This work extends the reach of the WSO certification program from the acute sector, aiming to enhance global access to high-quality rehabilitation after stroke. Deliberate efforts were made to ensure the recommendations and performance metrics were internationally relevant, by including representatives from a range of global regions, from upper- and lower-middle-income countries and HICs, and from different professional disciplines. Piloting the program at 15 sites in six upper- and lower-middle-income countries (three continents) by eight assessors from five countries allowed the team to check whether the recommendations, metrics, and assessment processes could be applied cross-culturally. Pilot-testing facilitated refinement of some recommendations.

The implementation manual was developed to both support consistent evaluation practices by assessors and support rehabilitation centers to deliver evidence-based rehabilitation. By deliberately presenting who should deliver and who should receive each recommended practice, and how implementation of the practice can be achieved, we have sought to pro-actively address a lack of clarity, a commonly reported implementation barrier.²⁵ Furthermore, the systematic approach to appraising sources of evidence for initial consideration, and transparent reporting of the methods to select and refine the included recommendations, is intended to enhance credibility in the evidence underpinning the recommendations, another common implementation barrier.²⁵

The implementation manual (freely available, Supplemental Appendix 6) is both a source of pragmatic and usable information regarding evidence-based rehabilitation and an audit tool. Centers can use the manual to

deliver two of the most widely used implementation strategies in healthcare²⁶ (i.e. education and audit with feedback) to continually improve their delivery of evidence-based rehabilitation, regardless of whether they choose to take part in the WSO certification program. The WSO Rehabilitation Certification Program will be launched in 2026.

The certification program has been designed to recognize and address the global discrepancy in access to rehabilitation and resource availability. This work contributes to the promotion of equity, addressing the distribution bias of publication and funding for research in HICs, where the majority of high-quality guidelines are developed.^{5,15–19} In the absence of quality guidelines specific to each geographical area,⁵ this process begins to address this inequity and is anticipated to guide practice, funding, and policy internationally.

Limitations of the recommendations and the process by which they were compiled must be acknowledged. Certainty of evidence for stroke rehabilitation practices trails that of acute interventions.³ Accordingly, only one included patient-level recommendation is supported by high-certainty evidence (tailored repetitive practice of walking; the only mandatory patient-level criterion in the program). While multiple sources of evidence were considered, views and preferences of stroke survivors were not sought outside of the work conducted by ISRRRA, and representatives with lived experience of stroke were not members of any workgroups. Similar to prior work,¹⁰ recommendations that are important to stroke survivors may not have been included. While deliberate efforts were made to ensure the recommendations were applicable in low-resource settings, low-income countries⁴ were not represented in the committee, any consultation group, or any site in which pilots were conducted. This work has been demonstrated to be applicable in lower- and upper-middle-income countries, but future work should include consultation with, and pilot-testing in, low-income countries.

Considering the recognition of rehabilitation as a priority, it is anticipated that evidence to guide stroke rehabilitation delivery will evolve. In particular, a paucity of high-certainty evidence pertaining to the management of fatigue, mood, continence, and cognitive/perceptual and visual impairment limited the ability to make recommendations to guide their practice. Stroke rehabilitation researchers and research funders are called to action, to work to fill these evidence gaps. The WSO guidelines certification program will require regular updates as new evidence emerges. Future iterations of the included recommendations and performance metrics will include the perspective of people with lived experience of stroke and their caregivers and input from representatives from low-income countries.

Table 1. Rehabilitation criteria and requirements for each level of certification.

Recommendation	Minimal	Essential	Advanced
Service-level recommendations			
1 Center engages in quality improvement in stroke rehabilitation. This can occur on a hospital level (essential service) or national and/or international level (advanced service).		Mandatory	Mandatory
2 Center engages in stroke rehabilitation research at local, national, or international levels.			Mandatory
3 Center provides education about stroke and its management to the community and/or external agencies to promote awareness about stroke and/or advocacy.		Recommended	Mandatory
4 Center provides formal guidance/support to other centers to improve their rehabilitation service delivery (mentorship).			Mandatory
5 Center engages in continuing professional development for staff in stroke rehabilitation. A formal system/structure is in place.	Mandatory	Mandatory	Mandatory (20 hours/year)
6 Center maintains a data collection system to monitor performance metrics. Participation in an external stroke data repository is also recommended.		Mandatory	Mandatory
7 Center has a process within the rehabilitation team for communicating the goals, progress and management plans of stroke survivors.	Recommended	Recommended	Recommended
8 Center has a process for documentation of clinical assessment and other clinical interactions.	Mandatory	Mandatory	Mandatory
9 Center should provide communication partner training to health professionals or volunteers who interact with people with aphasia after stroke.		Recommended	Recommended
Patient-level recommendations: organization and commencement of rehabilitation			
10 Stroke survivors should commence mobilization out of bed between 24 and 48 hours of stroke onset unless otherwise contraindicated.	Recommended	Recommended	Recommended
11 Center provides stroke rehabilitation care conducted by a multidisciplinary team resourced to provide the recommended levels of rehabilitation therapy.	Mandatory: Medical, Nursing, Physiotherapy	Mandatory: team includes Medical, Nursing, Physiotherapy, Occupational Therapy, Speech Pathology, with access to dietetics, Psychology, Social Work	Mandatory: team includes Medical, Nursing, Physiotherapy, Occupational Therapy, Speech Pathology, Dietetics, Psychology, Social Work
12 For stroke survivors, inpatient rehabilitation should be structured to provide at least 3 hours of structured therapy (occupational therapy and physiotherapy) per day, 5 days per week.		Recommended	Recommended

(continued)

Table 1. (continued)

Recommendation	Minimal	Essential	Advanced
Patient-level recommendations: swallowing difficulties			
13 People who fail the swallowing screening are referred to a speech pathologist for a comprehensive swallowing assessment. Where available, this may include instrumental assessment (e.g. videofluoroscopic modified barium swallow (VMBS) and/or fiberoptic endoscopic evaluation of swallowing (FEES)). Where instrumental assessment is not available onsite, a referral pathway is in place to access it when clinically indicated.		Recommended: Speech pathology assessment and referral pathway for instrumental assessment where indicated	Recommended: onsite or timely access to instrumental assessment as part of standard practice
14 All stroke survivors, particularly those with swallowing difficulties, have assistance and/or education to maintain good oral and dental (including dentures) hygiene.	Recommended	Recommended	Recommended
15 For stroke survivors with swallowing difficulties, behavioral approaches such as safe swallowing advice and environmental and dietary modifications are employed as early as possible. Targeted swallowing exercises (e.g. Shaker exercises or chin tuck against resistance) are prescribed following comprehensive clinical and/or instrumental assessment by a qualified speech pathologist.		Recommended	Recommended
Patient-level recommendations: hydration and nutrition			
16 Stroke survivors have their hydration status assessed, monitored, and managed throughout their hospital admission. Where fluid support is required, crystalloid solution is used in preference to colloid solutions as the first option to treat or prevent dehydration.	Recommended	Recommended	Recommended
17 All stroke survivors should be screened for malnutrition at admission and on an ongoing basis (at least weekly) while in hospital.	Recommended	Recommended	Recommended
18 For stroke survivors with poor or deteriorating nutrition status, nutrition supplementation should be offered. Enteral diet should be started if required within a maximum of 7 days of admission (preferably within 24–48 hours).	Recommended	Recommended	Recommended
Patient-level recommendations: information provision and goal setting			
19 Stroke survivors and carers are offered information tailored to meet their individual needs (e.g. relevant language and communication formats) and given the opportunity to follow up and/or clarify.	Recommended	Recommended	Recommended
20 A person-centered and collaborative approach toward goal setting with stroke survivors and their families is recommended. Goals are clearly communicated and documented and regularly reviewed throughout the continuum of care.	Recommended	Recommended	Recommended

(continued)

Table 1. (continued)

Recommendation	Minimal	Essential	Advanced
Patient-level recommendations: exercise and motor rehabilitation			
21 Individually tailored aerobic training involving large muscle groups should be incorporated into rehabilitation to improve cardiorespiratory fitness.		Recommended	Recommended
22 Stroke survivors with difficulty walking should be given the opportunity to undertake tailored repetitive practice of walking (or components of walking) as much as possible. Modalities including but not limited to the following may be used: -Circuit class therapy (with a focus on overground walking practice), -Treadmill training with or without body weight support	Mandatory	Mandatory	Mandatory
23 Strength training should be undertaken by people with reduced strength in arms and/or legs to improve strength after stroke.	Recommended	Recommended	Recommended
24 For stroke survivors with impaired upper limb function but some active wrist and finger extension, intensive constraint-induced movement therapy (minimum 2 h of active therapy per day for 2 weeks, plus restraint of the less-affected upper limb for at least 6 h a day) should be provided.			Recommended
25 For stroke survivors with difficulty maintaining balance in sitting, practicing reaching beyond arm's length while sitting with supervision/assistance is undertaken.	Recommended	Recommended	Recommended
26 For stroke survivors with difficulty moving from sitting to standing, task-specific training of the sit-to-stand task is undertaken.	Recommended	Recommended	Recommended
27 For stroke survivors with impaired standing balance, task-specific training of standing balance, including activities that challenge balance, should be undertaken.	Recommended	Recommended	Recommended
28 Avoidance of potentially harmful practices Amphetamines should not be prescribed to improve activities of daily living due to the risk of harm outweighing benefits.	Recommended	Recommended	Recommended
Patient-level recommendations: visual function			
29 Stroke survivors are screened for impaired visual fields, visual perception, and oculomotor function with a valid and reliable tool. For stroke survivors with visual impairment, a formal assessment and management plan is undertaken, with referral to a vision specialist for further assessment and treatment if warranted.	Recommended	Recommended	Recommended
Patient-level recommendations: communication			
30 All stroke survivors are screened for communication disorders with a valid and reliable tool.	Recommended	Recommended	Recommended
31 People with communication disorders detected in screening should be referred to speech pathology for standardized and formal assessment. A system to facilitate communication should be established as early as possible.	Recommended	Recommended	Recommended

(continued)

Table 1. (continued)

Recommendation	Minimal	Essential	Advanced
32 For stroke survivors with aphasia, early aphasia therapy, starting within the first 4 weeks post-stroke is provided. Speech and language therapy is provided to improve functional communication, reading comprehension, auditory comprehension, general expressive language, and written language.		Recommended	Recommended
33 All written information (i.e. health, aphasia, social, and community supports) is available in an aphasia-friendly format.		Recommended	Recommended
34 People with aphasia are offered assessment and treatment in their preferred language.		Recommended	Recommended
Patient-level recommendations: mood and cognition			
35 Stroke survivors are screened for mood disturbances by trained personnel using a standardized tool. If mood disturbances are present, a structured management plan is implemented.		Recommended	Recommended
36 Stroke survivors are screened for cognitive and perceptual deficits by a trained person (e.g. neuropsychologist, occupational therapist, or speech pathologist) using validated and reliable tools. People with suspected cognitive and perceptual impairments (e.g. reduced attention, memory, executive function, limb apraxia, neglect) are formally assessed and managed by trained personnel. If cognitive and perceptual deficits are detected, a structured management plan is formulated, documented, and implemented.		Recommended	Recommended
Patient-level recommendations: prevention and management of complications			
37 Regular skin assessments using an objective scale of risk (e.g. Braden scale) are conducted within 8 h of admission to stroke rehabilitation and re-conducted after change of clinical status. A prevention and management plan including repositioning every 4–6 h, and use of barrier creams and/or pressure redistribution devices as appropriate, are enacted for people who are identified to be at high risk of pressure injury.	Recommended	Recommended	Recommended
38 For DVT prophylaxis in people with ischemic stroke who are immobile, low-molecular weight heparin in prophylactic doses may be used in the absence of contraindications. Antithrombotic stockings are not recommended for the prevention of DVT or PE post-stroke.	Recommended	Recommended	Recommended
39 Stroke survivors with suspected urinary incontinence are assessed by trained personnel using a structured functional assessment. If urinary incontinence is detected, a structured continence management plan is formulated, documented, and implemented. Routine use of indwelling catheters is not recommended.	Recommended	Recommended	Recommended

(continued)

Table 1. (continued)

Recommendation	Minimal	Essential	Advanced
40 Stroke survivors with suspected fecal incontinence or constipation are assessed by trained personnel using a structured functional assessment. If fecal incontinence or constipation are detected, a structured bowel management plan is formulated, documented, and implemented.	Recommended	Recommended	Recommended
41 For stroke survivors at risk of falling, multifactorial interventions, including an individually prescribed exercise program and advice on safety, are provided. People with severe vitamin D deficiency are offered supplementation.	Recommended	Recommended	Recommended
42 Stroke survivors with motor weakness are assessed for spasticity. Management should be organized if spasticity is contributing to pain, difficulty with personal hygiene and dressing activities, and/or for cosmesis. Management strategies may include medical interventions such as Botulinum Toxin A injections, accompanied by active movements and neuromuscular electrical stimulation.	Recommended	Recommended	Recommended
43 People with persistent or progressive focal spasticity after stroke affecting one or two areas for whom a therapeutic goal can be identified (e.g. ease of care, pain) may be offered intramuscular botulinum toxin. This should be accompanied by rehabilitation therapy.	Recommended	Recommended	Recommended
44 For stroke survivors at risk of shoulder subluxation, stroke survivors and carers/families are educated about proper manual handling, including how to position and support the arm (e.g. use of arm sling during standing/walking, use of lap trays in sitting). Interventions such as electrical stimulation may be considered. Shoulder strapping should not be routinely used.	Recommended	Recommended	Recommended
45 For stroke survivors at risk of shoulder pain, stroke survivors and carers/families are educated about proper manual handling, including how to position and support the arm and to avoid pulling or sleeping on the arm. Interventions such as shoulder strapping, electrical stimulation and shoulder injections may be considered. Overhead pulleys should not be used.	Recommended	Recommended	Recommended
46 For patients at risk of contractures or who have developed contractures, comprehensive active therapy should be used in the prevention and management of contractures, rather than splinting and/or stretching. Splinting and/or stretching should not be routinely used.	Recommended	Recommended	Recommended
Patient-level recommendations: discharge planning and support			
47 Center has a follow-up system in which stroke survivors are reviewed at least once after their discharge from hospital. During these follow-up sessions, their health and social care needs are assessed and addressed accordingly.	Recommended	Recommended	Recommended
48 Center should provide a documented comprehensive discharge plan, including ongoing therapy, plans for care and/or follow-ups (where relevant) for stroke survivors. Early Supported Discharge (ESD) services can be part of the comprehensive discharge plan, particularly if offered to stroke survivors with mild to moderate disability, where appropriate home-based coordinated stroke care is available.	Recommended	Recommended	Recommended

(continued)

Table 1. (continued)

Recommendation	Minimal	Essential	Advanced
49 Center refers patients for ongoing therapy delivered by trained clinicians for people with difficulty performing activities of daily living after leaving hospital.		Recommended	Recommended
50 Center provides telehealth services that may be used as an alternative approach to delivering rehabilitation, especially for stroke survivors who cannot access specialist rehabilitation in the community. It may also be used as an adjunct to in-person therapy. Delivering of specific interventions via telehealth should only be considered for those that have demonstrated benefits.			Recommended
51 Carers of stroke survivors (i.e. spouses, family members or friends who support the stroke survivor) should be provided with tailored support during the recovery process. The tailored support depends on the carer's needs and can include information provision, opportunities to talk with relevant health professionals and/or referrals to appropriate community services. Support is offered and delivered in a mode that suits the carer.	Recommended	Recommended	Recommended
52 Self-management interventions that are directed by the stroke survivor should be offered on discharge or within the first 4 months of transition to community living.	Recommended	Recommended	Recommended
53 Stroke survivors who are to be discharged to the community have their community mobility assessed and receive appropriate rehabilitation and help or support to return to mobility in the community.		Recommended	Recommended
54 Stroke survivors being discharged to the community are asked about their employment (paid and unpaid) prior to their stroke and if they wish to return to work or study. A formal assessment and management plan is initiated for stroke survivors who wish to return to work or study.		Recommended	Recommended
55 Stroke survivors are given information about the availability and potential benefits of a local stroke support group and/or other sources of peer support before leaving hospital and when back in the community.		Recommended	Recommended

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Author contributions

SS, SM, JP, and JBe conceptualized this work and provided strategic support throughout. JN, KKL, DG, JBa, ST, and EAL led the compilation of recommendations, which were finalized with the input of MC, ES, FR, MLB, NEN, SG, PM, SI, RS, NH, TK, and SS. Methodology was informed by SW and GM. Pilots were conducted by JN, KKL, ES, DG, JBa, ST, SM, and SS. KKL led the writing of the implementation manual, and JN, DG, JBa, ST, EAL, and ES contributed. JN and EAL led the writing of the manuscript. All authors provided feedback and approved the final version.

Declaration of conflicting interests

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Supplemental material

Supplemental material for this article is available online.

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