

Review and prioritization of stroke research recommendations to address the mission of the World Stroke Organization: a call to action from the WSO Research Committee

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Introduction

The World Stroke Organization (WSO) Stroke Research Committee has been working to establish a set of research recommendations relevant to the WSO mission for stroke treatment, prevention, and recovery. To establish these recommendations the committee systematically collated, categorized, and reviewed research recommendations from multiple other national, regional, and patient-centered stroke organizations. The WSO board members were asked to review and prioritize these research recommendations. The top WSO research priorities are the following:

- (1) Stroke treatment
 - establish stroke centers and stroke units to assist patients with acute stroke
 - expand and integrate existing stroke trial networks to accelerate translation
- (2) Stroke prevention
 - establish a global chronic disease prevention initiative that includes stroke as a major focus among a cluster of conditions including cardiovascular disease, diabetes mellitus, and dementia
 - prevent vascular cognitive impairment.
- (3) Stroke recovery
 - standardize the practice of poststroke rehabilitation based on best evidence
 - evaluate the best ways to address and improve life after stroke

The WSO Research Committee was convened to evaluate research issues that are relevant to the WSO, suggest opportunities to improve research training, and set potential research priorities. Literature reviews were conducted in late 2013–2014 to identify published and nonpublished manuscripts on stroke research

priorities globally. The group, aiming to be as inclusive as possible, investigated individual, national, and regional stroke organizations including Internet searches and review of applicable websites. The documents were reviewed and summarized by the committee with a goal to identify existing research priorities aligned with the mission of the WSO (Table 1) (Appendix S1).

WSO Stroke Research Recommendations: creating priorities

It is clear that there are many stroke research priorities identified by multiple organizations regarding stroke treatment, prevention, recovery, and adaptation. As part of a priority setting exercise, the research aims highlighted in Table 1 were sent to all WSO board members who were asked to review the recommendations in the three key topic areas. Each board member was asked to rank recommendations in order of preference and to identify any other potential gaps in stroke research that could be relevant to the mission of the WSO. Board members were asked to rank the specific recommendation by addressing the following statement: *This research recommendation should DEFINITELY be included among the top research recommendations related to the WSO mission. For each specific recommendation, rate the statement from STRONGLY AGREE to STRONGLY DISAGREE depending on how strong you feel that this research recommendation should be definitely among the top research priorities for the WSO.* Recommendations were rated as to how strongly they were favored to be included among the top recommendations related to the WSO mission. The response rate was 60% (25 of 42 WSO board members). Results of this priority setting exercise are displayed in Fig. 1 and the top two ranked recommendations for stroke treatment, prevention, and recovery are shown in Fig. 2.

The priority recommendations were approved by the WSO Board in October 2014 and then posted for member and public comment in December 2014. WSO members and other stroke constituents were asked to review these draft recommendations and post any comments on the WSO Blog (16). Comments were collated and reviewed by the WSO Research Committee and are available from the WSO blog: <http://worldstrokeorganization.blogspot.com.au>. Because many of our recommendations were based on source documents from other organizations, we did not feel we could make major changes to the wording. Some minor edits were made to change the order of the acute treatment recommendations and include wording that would be consistent with the UN-WHO goals on noncommunicable diseases in our first stroke prevention recommendation. We continue to encourage others to review these recommendations and add comments.

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Table 1 Summary of selected research recommendations made by specific stroke organizations that were reviewed by the WSO Research Committee

Organization	Year/Overview	Stroke treatment (highlighted)	Prevention (highlighted)	Recovery and adaptation (highlighted)
Stroke Synergium	A number of recommendations were made in the 2010 Synergium (a forum for working synergistically together) regarding working toward a prioritized world agenda. (1)	Establishment of stroke centers and stroke units to assist patients with acute stroke	Establishment of a global chronic disease prevention initiative that includes stroke as a major focus among a cluster of conditions.	The practice of poststroke rehabilitation needs to be standardized based on best evidence.
United States: National Institute of Neurological Disorders and Stroke (NINDS) – Stroke Research Priorities	2012 (2)	Treatment – Expand and integrate existing stroke trial networks to accelerate translation.	Prevention of vascular cognitive impairment	Program for translational research targeting early recovery after stroke in humans
European Stroke Organization (ESO): 1st and 2nd European Science Workshops	ESO held two European Stroke Science Workshop in Garmisch-Partenkirchen, Germany (2011 and 2013). (3, 4)	Hypothermia and neuroprotection. Need for quality of preclinical research to be improved, and for suitable surrogate end-points for clinical development	Need to focus on prevention of vascular contribution to cognitive decline and dementia	Prevention of any poststroke infections (which may delay recovery)
Canadian Stroke Network	2012 (5)	Optimizing acute stroke care thru hospital registries Minimizing stroke damage – development of preclinical stroke models and targeting cell death	Preventing stroke – improved understanding of reasons for inadequate risk factor control	Poststroke repair and recovery
UK Stroke Association	No other specific priority topics have been set. (6)	Establishing a National Hospital and Population-Based Stroke registry in the country	Long-term aim is to prevent strokes, and ensure when strokes do occur, they are treatable	Continue to support research to reduce the occurrence of first and subsequent strokes, and to improve the outcomes and quality of life in all those affected by stroke.
UK Medical Research Council Wellcome Trust	No specific priority topics related to stroke (7) No specific priority topics related to stroke, and no specific mention of stroke in the Trusts' Strategy 2010–2015 document. (8)			
National Institutes for Health Research and NHS Health Technology Assessment (HTA) Programme	Both agencies commission research into specific topics. No stroke-related topics currently being sought (9)			
National Health and Medical Research Council of Australia (NHMRC)	The goals of the NHMRC are to prioritize the bridging of gaps, work with the key authorities and decision makers and fund targeted research to identify what needs to be done (10)			

Table 1 Continued

Organization	Year/Overview	Stroke treatment (highlighted)	Prevention (highlighted)	Recovery and adaptation (highlighted)
National Stroke Foundation (NSF) of Australia	Has not formally established specific stroke research priorities (11)	Reducing stroke severity		Improved diagnosis and management of stroke consequences Organization of care and further development of rehabilitation strategies Quality of life, instrumental activities of daily living, and support. Many of their subtopics include patient-specific research such as management of shoulder pain, central poststroke pain, virtual reality training, and self-management strategies.
Japanese Stroke Society	No specific priority research topics have been identified.		Developing cognitive tools to diagnose vascular dementia Developing cost-effective interventions for stroke at the community level	
Indian Council of Medical Research	2013		Secondary prevention in cerebrovascular disease: antiplatelet drugs and anticoagulants	Quality of life and stroke, and training of primary care physicians in care of stroke patients.
Stroke Group of Peru	Broad topic areas, no formal research recommendations (12)	Epidemiological studies in the country including hospital-based and population-based studies Intravenous thrombolysis in acute cerebral infarction		
National Network for Research in Brazil		An acute stroke clinical trial among 15 comprehensive stroke centers in Brazil evaluating best medical treatment vs. thrombectomy in patients arriving up to eight-hours from onset	An epidemiological population-based study that will be conducted in five cities in Brazil (one in each region) including stroke, in each city to evaluate risk factors, incidence, mortality, disability and treatments using STEPS methodology from the World Health Organization	Basic research with stem cells
Priority setting exercises; James Lind Alliance (JLA)	Identify the top 10 research priorities relating to life after stroke. The detailed methods and results were published in the <i>International Journal of Stroke</i> (2012) and <i>Lancet Neurology</i> (2012) (13, 14)		Evaluation of benefits of exercise and fitness programs at improving function and quality of life and avoiding subsequent stroke	Evaluation of the best ways to Address Life After Stroke: improve cognition after stroke (help people come to terms with the long-term consequences of stroke; enhance recovery from aphasia; improve arm recovery and function) Expand dose response studies to evaluate the intensity, frequency, and duration of physiotherapy interventions related to outcomes for different stages of stroke recovery
Chartered Society of Physiotherapy	This society applied a modified Delphi method using SurveyMonkey software to identify priorities for physiotherapy research through national consensus. (15)			
List of topics selected from 'implications for research' of published Cochrane stroke reviews on CDSR	Suggest formal review of extensive list of 100+ 'implications for research' Cochrane systematic reviews by the WSO RC not priority at this stage of our work program.			

Shaded area highlights Research Recommendations made by various organizations, characterized as potentially relevant to the mission of the WSO and reviewed by the WSO Board.

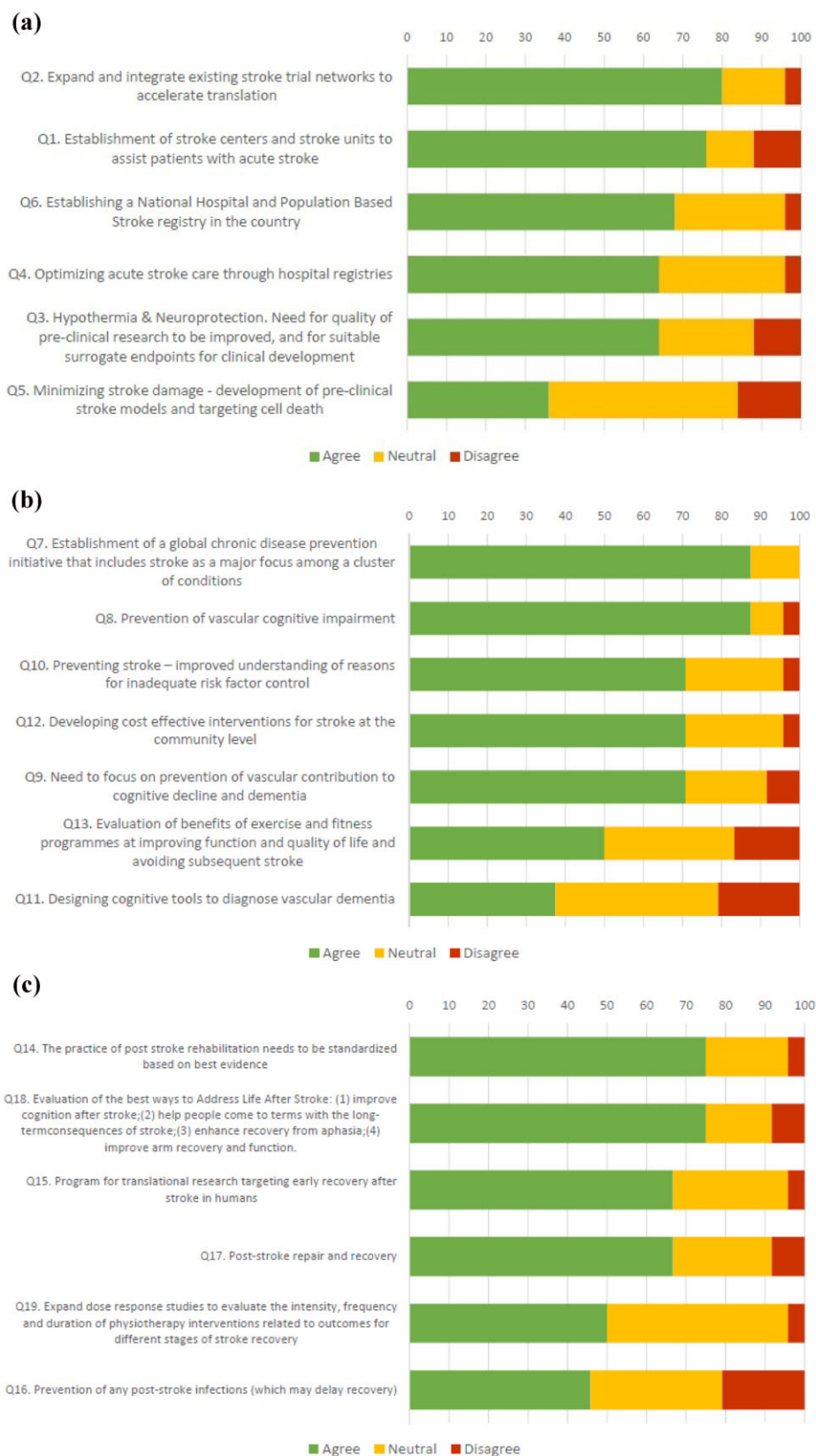


Fig. 1 Results of priority setting exercise of ranking those research recommendations most strongly related to the mission of the WSO. For each recommendation, the proportion of board members is shown who rated that specific recommendation as strongly agree or agree (green), neutral (yellow), or disagree or strongly disagree (red) that the specific recommendation should be included among the top research recommendations related to the WSO mission. (a) Stroke treatment; (b) prevention; (c) recovery and adaptation.

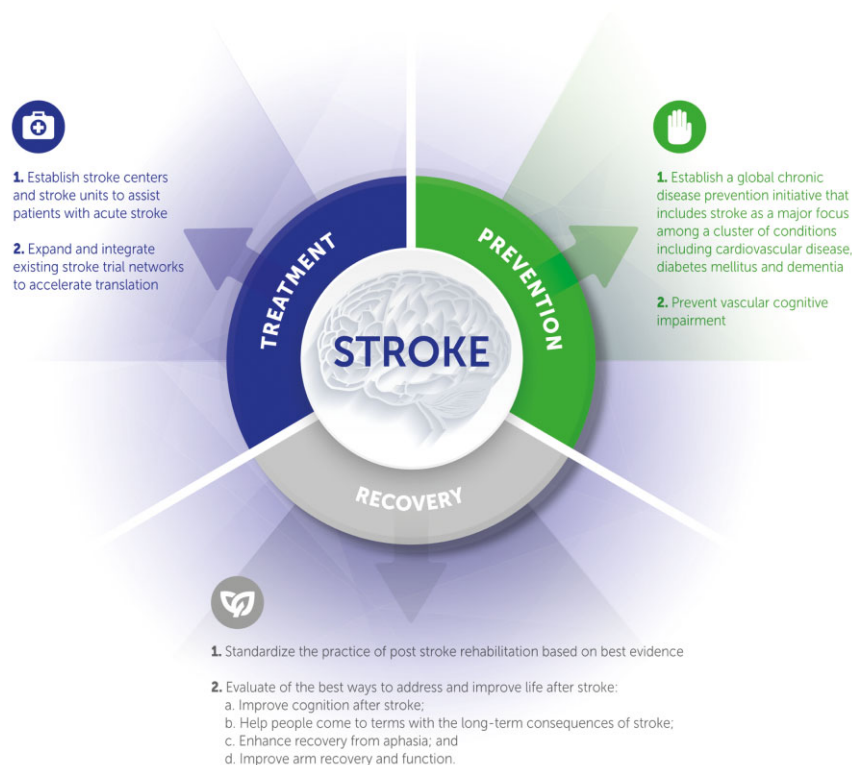


Fig. 2 Top ranking WSO Stroke Research priorities for stroke treatment, prevention, and recovery.

The WSO Research Committee will continue to monitor comments, and in future revisions of these recommendations, plan to make changes.

Call to action

The WSO calls all of its members and constituent organizations to strongly advocate for an increase in funding for stroke research across the globe to address these key research priorities. More funding is needed to address these gaps in our knowledge to meet the needs of the growing numbers of stroke patients globally. The top priorities in stroke treatment, prevention, and recovery and adaptation, provide some practical targets for funding agencies.

The WSO Research Committee also calls for more training and mentorship in stroke research to increase the pool of individuals capable of conducting high-quality stroke research in low and middle-income countries. To help address this gap in training, the World Stroke Academy has a number of online courses on stroke. A recent addition to this growing number of offerings includes a short course on research methods that was given at the World Stroke Congress in Istanbul 2014. We also encourage the WSO to raise funds to establish a visiting scholar program to allow young stroke professionals from low to middle-income countries to receive introduction to stroke research training, and establish a long-distance mentorship. The goals of such a program would be to increase the local expertise and workforce to address these research priorities. This training would allow for an introduction to research, and help plan projects that could be

implemented when the scholar returns home. The ongoing collaborative interaction among these scholars and their mentors will help share expertise to address the gaps in research in low and middle-income countries. The WSO is committed to fostering collaboration and cooperation across academic organizations, nongovernment organizations, and civil societies to increase stroke research and reduce the global burden of stroke.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix S1. Excerpts from source stroke research documents reviewed by the WSO Research Committee.