



Global Stroke Guidelines and Action Plan: **A Road Map for Quality Stroke Care**

STROKE SYSTEM DEVELOPMENT

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A ROAD MAP FOR QUALITY STROKE CARE

PURPOSE:

The WSO Roadmap to Delivering Quality Stroke Care is an implementation resource to accompany the WSO Global Stroke Services Guideline and Action Plan. This roadmap provides the framework for the implementation, monitoring and evaluation of stroke services globally.

It provides **standardization and consistency** for the selection of **evidence-based** recommendations, **approaches to implementations** in clinical practice, and the **calculation of performance measures** to create an environment of continuous quality improvement.

TARGET AUDIENCE:

The roadmap is intended to guide local healthcare officials and stroke care clinical groups in establishing stroke systems of care and implementing as many of the defined components as possible throughout the stroke continuum of care. The focus of the roadmap is on the processes of care and impacts on patient outcomes. It is recognized that not all regions will be able to provide all elements of quality stroke care; therefore the recommendations and performance indicators take into account what should be possible within three levels of service access.

It can be used by **local, regional, or country-level health authorities and service** providers as a foundation for their own evaluation frameworks for stroke.

Governments and funders should use these guidelines and action plan to review existing services, and identify service gaps. These groups could then prioritize gaps and look for solutions to improve access to services.

Clinicians and other healthcare workers should use these guidelines and roadmap to scrutinize local care delivery, access to care and ongoing support to achieve recovery goals.

This roadmap will also provide valuable guidance to stroke **programs under development**, to help ensure that all key elements defined here are considered from the beginning of development.

FORMAT:

The roadmap is **organized along the continuum of care** starting at the onset of a stroke event through the acute phase (emergency department and inpatient care), stroke rehabilitation, prevention of recurrent stroke and concludes with community reintegration and long term recovery.

Each section represents a part of the continuum and enables users to **review and assess the structural elements and services available** for stroke care; **core evidence-based best practice** recommendations related to processes of care that should be operational; and, a list of **key quality indicators to monitor levels** of care provided and impact on patient and economic outcomes.

HOW TO USE:

Users of this Roadmap should:

1. **Review** the sections relevant to their phase of stroke services;
2. **Complete an assessment** of current services and resources, current recommendations in place, and current data collection methods and access; then
3. **Develop an implementation plan** to ensure that these core elements are optimized and additional elements added to improve the stroke services they provide.

IMPLEMENTATION:

1. Hands-on hardcopy resource
2. **Electronic interactive app/resource** where users can enter what elements they have available from a master check list and the program identifies current level, recommendations and performance measures.

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HEALTH SYSTEM DEVELOPMENT AND SURVEILLANCE

This section addresses public recognition of stroke and also system development. This section crosses all phases and settings of stroke care.

Health Service Capacity for Stroke Care Checklists[^]



Please complete the following information to clearly identify the stroke services you are developing or assessing.

REGION:	ORGANIZATION COMPLETING CHECKLIST:	PRIMARY CONTACT PERSON:
SERVICE SCOPE:	GOALS OF THIS ASSESSMENT/COMMENTS: To be completed by local group	
<ul style="list-style-type: none"> <input type="radio"/> Provincial/State/National Assessment <input type="radio"/> Regional/Local assessment <input type="radio"/> Large urban hospital with advanced stroke services (comprehensive stroke services) <input type="radio"/> Community hospitals with access to some stroke services <input type="radio"/> Community with health clinic as only health services available <input type="radio"/> Rural community with a visiting health worker 		

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A. Stroke Services and Resource Availability



Please review each of these lists and tick all services and resources that you currently have in place and available for providing stroke care. Once completed, review your responses to determine which category of stroke services you most closely fit into.

Minimum Healthcare Services	Essential Stroke Services (In addition to services listed under Minimal stroke services)	Advanced Stroke Services (In addition to services listed under Minimal and essential stroke services)
<ul style="list-style-type: none"> <input type="radio"/> Care provided in local communities without coordination across defined geographic regions <input type="radio"/> No access to diagnostic services or hospital care for hyperacute stroke treatment <input type="radio"/> Very limited access to physicians <ul style="list-style-type: none"> • Provide assessment skill development • Basic training in swallow screens and dysphagia management; and in temperature management <input type="radio"/> Variable access to healthcare workers (nurses or lay workers) <ul style="list-style-type: none"> • Basic training in swallow screens and dysphagia management; and in temperature management 	<ul style="list-style-type: none"> <input type="radio"/> Limited coordinated stroke care provided across geographically discrete regions <input type="radio"/> Stroke training programs for all levels of healthcare providers <input type="radio"/> Access to basic diagnostic services <input type="radio"/> Limited access to emergency medical services <input type="radio"/> Access to nurses and nursing assessment with stroke training <input type="radio"/> Access to physicians with stroke expertise (although may not be stroke specialists) <input type="radio"/> Access to acute thrombolysis with IV tPA <ul style="list-style-type: none"> • Intravenous tPA (Alteplase) <input type="radio"/> Access to core members of a interdisciplinary stroke team (MD, RN, PT, OT) <input type="radio"/> Access to basic diagnostic services <ul style="list-style-type: none"> • Laboratory blood test (CBC, electrolytes, urea, glucose, INR, PT) • Electrocardiogram (12 lead) • Computed Tomography (CT) scan brain and vasculature • Capability to do CT Angiography (CTA) • Echocardiography • Doppler ultrasound • Holter monitors <input type="radio"/> Limited access to emergency medical services <ul style="list-style-type: none"> • Training of ambulance crews to identify stroke signs using FAST mnemonic • Work with ambulance systems to have stroke identified as a high priority transport emergency, in addition to trauma and obstetrical crises 	<ul style="list-style-type: none"> <input type="radio"/> Fully coordinated stroke care provided across geographically discrete regions <ul style="list-style-type: none"> • Advanced stroke services rationalized to a smaller number of centres • Stroke pathways that define movement of stroke patients across region to higher and lower levels of services as required • Coordinated referral system • Provide telestroke consultations to smaller and more rural; centres • Ambulance bypass agreements in place • Repatriation agreements in place to transfer patients back to home communities • Printed stroke patient educational materials <input type="radio"/> Stroke training programs for all levels of healthcare providers <input type="radio"/> Data collection strategy and mechanisms <ul style="list-style-type: none"> • Acute inpatient stroke registry • Acute inpatient stroke database (local or regional) • Stroke prevention registry • Stroke prevention database • Stroke rehabilitation registry • Stroke rehabilitation database (local or regional) Access to advanced diagnostic services <ul style="list-style-type: none"> • Magnetic Resonance Imaging (MRI) • Capability to do MR Angiography • CT Perfusion scans • Prolonged ECG monitoring devices

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Minimum Healthcare Services	Essential Stroke Services (In addition to services listed under Minimal stroke services)	Advanced Stroke Services (In addition to services listed under Minimal and essential stroke services)
	<ul style="list-style-type: none"> ○ Access to nurses and nursing assessment with stroke training <ul style="list-style-type: none"> • Primary care settings • Acute care settings • Advanced practice nurses • Nurse practitioner ○ Access to physicians with stroke expertise (although may not be stroke specialists) <ul style="list-style-type: none"> • General/Family/Primary care physicians • Neurologist • Neurosurgeon • Internists • Cardiologist • Geriatrician • Emergency Medicine • Intensivist • Access to stroke specialists through telestroke modalities, and teleradiology ○ Access to acute thrombolysis with IV tPA <ul style="list-style-type: none"> • Intravenous tPA (Alteplase) ○ Members of a interdisciplinary stroke team <ul style="list-style-type: none"> • Physicians with stroke expertise • Stroke Nurses • Nursing assistants • Pharmacist • Social worker/case manager • Palliative Care team • Physiotherapist • Occupational Therapist • Speech-Language Pathologist ○ Protocols for rapid evaluation and diagnosis of stroke patients ○ Patient and family education, skills training, and involvement in care planning ○ Discharge planning ○ Limited coordinated stroke care provided across geographically discrete regions ○ Stroke training programs for all levels of healthcare providers 	<ul style="list-style-type: none"> ○ Access to physicians with stroke expertise in acute stroke care, stroke prevention and/or stroke rehabilitation <ul style="list-style-type: none"> • Neurologist • Neurosurgeon • Internist • Neuroradiologist / interventionalist • Geriatrician • Intensivist • Cardiologist • Emergency Medicine • General/Family/Primary care physician • Program to develop and maintain core competencies in stroke care ○ Access to additional acute interdisciplinary stroke team members <ul style="list-style-type: none"> • Nurses • Nursing assistants • Pharmacist • Palliative Care team ○ Access to advanced interventions: <ul style="list-style-type: none"> • Intravenous tPA (Alteplase) • Endovascular thrombectomy • Neurosurgery for hemorrhagic stroke • Hemicraniectomy for ischemic stroke • Acute inpatient stroke units • Products to reverse coagulopathy

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B. Core Stroke Care Recommendations



For each best practice recommendation, indicate with a tick whether the described practice is in place as a routine part of care; in development for implementation; not implemented, meaning the service/resource may be available but it is not currently part of stroke care within your services; or, the service/resource/equipment is not available within your facilities, therefore not possible to implement.

Health System and Stroke Recognition Core Evidence-Based Recommendations	Applicable Level of Health Services Capacity for Stroke Care			Supporting Evidence	Self Assessment
	Minimum	Essential	Advanced		
A. Systems for Stroke Recognition and Response					
1. All members of the public should be able to recognize the signs and symptoms of stroke (e.g., FAST)				Evidence level: C	<div><input type="checkbox"/> In place</div> <div><input type="checkbox"/> In development</div> <div><input type="checkbox"/> Not implemented</div> <div><input type="checkbox"/> Not available</div>
2. All healthcare personnel should be trained to recognize the warning signs and symptoms of stroke				Evidence level: C	<div><input type="checkbox"/> In place</div> <div><input type="checkbox"/> In development</div> <div><input type="checkbox"/> Not implemented</div> <div><input type="checkbox"/> Not available</div>
3. All geographic regions should have a local emergency call number or system in place, such as 9-1-1				Evidence level: C	<div><input type="checkbox"/> In place</div> <div><input type="checkbox"/> In development</div> <div><input type="checkbox"/> Not implemented</div> <div><input type="checkbox"/> Not available</div>
4. Protocols should be in place in emergency call centres to mobilize EMS personnel to respond to a stroke call with high urgency				Evidence level: B	<div><input type="checkbox"/> In place</div> <div><input type="checkbox"/> In development</div> <div><input type="checkbox"/> Not implemented</div> <div><input type="checkbox"/> Not available</div>

Which recommendations are your highest priorities to implement?

What are your next steps to start development and implementation of these best practices?

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C. Key Stroke Quality Indicators



For each quality indicator, please note whether data is being actively and routinely collected; or, data collection processes are in development for the indicator; or, data may be available but it is not currently being collected; or, data for this indicator is not available at all so not able to collect or report it. Please tick the most appropriate box for each indicator.

Performance Measures	Numerator	Denominator	Self Assessment
Health System Monitoring			
1. Stroke incidence rates adjusted for age and sex in the population.	Total number of stroke cases in a population (stratified by stroke type).	Total population based on census information within a given time frame.	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
2.a Prevalence of stroke risk factors in the population.	Total number of people in a population who report or are documented to have one or more stroke risk factors (high blood pressure, elevated cholesterol, diabetes, atrial fibrillation, family history, inactive life style, obesity or over weight, etc) (stratified by stroke type and type of risk factor).	Total population based on census information within a given time frame.	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
2.b Prevalence of vascular risk factors in the population.	Total number of people in a population who report or are documented to have one or more vascular risk factors (high blood pressure, elevated cholesterol, diabetes, atrial fibrillation etc) (stratified by stroke type and type of risk factor).	Total population based on census information within a given time frame.	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
2.c Percentage of people undertaking a vascular risk assessment who have risk factors for stroke.	Number of people within a population found to have one or more identified vascular risk factors following risk assessment	Total population based on census information within a given time frame who undergo vascular risk assessment	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
3. Case fatality (mortality) rates for stroke patients by stroke type, adjusted for age, gender, comorbidities, and stroke severity. Measurements should take place overall in hospital, at 7 days, 30 days and one year post stroke.	Number of people with stroke or TIA who have in-hospital mortality within 7 days, 30 days, and within one year following index stroke symptom onset.	Total number of stroke cases.	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
4. Recurrent stroke rates within 3 months and one year following an initial stroke or transient ischemic attack.	Number of people with stroke who are readmitted to hospital for a new stroke or TIA within 90 days following index stroke symptom onset.	All stroke and TIA patients discharged alive following index stroke.	<input type="checkbox"/> In place <input type="checkbox"/> In development <input type="checkbox"/> Not implemented <input type="checkbox"/> Not available
5. Functional status measured using the modified Rankin Score at 3 months and one year following stroke or transient ischemic attack that are admitted to an acute care hospital.	Frequency distribution of modified Rankin scores for each patient at time of discharge from acute care and at 90 days post stroke onset. [(We will later use data to categorize MRS 0-2, MRS 0-5, or MRS 0-6.)]	All stroke and TIA patients admitted to an inpatient acute care hospital, and discharged alive	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available

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Performance Measures	Numerator	Denominator	Self Assessment
6. The country/region has acute thrombolytic agents available and accessible for use with stroke patients.	Descriptive list of facilities providing acute thrombolytic therapies for stroke patients within a region.		<input type="checkbox"/> In place <input type="checkbox"/> In development <input type="checkbox"/> Not implemented <input type="checkbox"/> Not available
7. The country/region has a coordinated system of stroke care in place which links stroke patients with access to essential diagnostic services and expertise in stroke care.	Descriptive list of regions with established stroke systems of care for stroke patients (need to identify and describe the core elements of stroke systems – see Step One WSO Stroke Services Checklist).		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
8. The country/region/facility has implemented evidence based clinical practice guidelines for stroke care.	Descriptive list of each hospital within a region that provides stroke care, and whether clinical practice guidelines are available and formally implemented on stroke patients following a systematic approach.		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
9. The country/region/facility collects data using International Classification of Disease (ICD) 9 or 10 coding system.	Descriptive list of regions collecting data on stroke patients in a systematic approach using ICD9 or 10 methodology. Include information on percentage of facilities and patients within facilities with data routinely collected.		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
10. The country/region participates in a quality register or routine and standardized clinical audits for monitoring stroke care.	Descriptive list of each facility within a region that provides stroke care, and whether routine and standardized data collection occurs on every stroke and TIA patient following a systematic approach.		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
Systems for Stroke Recognition and Response			
1. Availability of basic health services within a region	Descriptive counts and per capita rate data on currently available health services based on Step One checklist		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
2. Availability of diagnostic labs and imaging within region	Descriptive counts and per capita rate data on currently available diagnostic imaging services based on Step One checklist		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
3. Availability of inpatient hospital facilities within region	Number of acute care hospitals (public and private) – include count and then calculate number per capita	Total population of the region under study	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
4. Availability and level of training for healthcare workers and healthcare professionals within region	Counts – stratify by number of people attending training and type of training provided	All healthcare providers working within a specified stroke population.	<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available
5. Availability of relevant stroke pharmacotherapies in a region	Create list of possible therapies based on stroke services checklist, then count frequency available per therapy.		<input type="checkbox"/> Data collected <input type="checkbox"/> In development <input type="checkbox"/> Data not collected <input type="checkbox"/> Data not available

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What indicators are priority for us?

Who will collect the data?

How will the data be collected (electronically, on paper, etc)?

How will the data be analyzed? When? How often?

Who will receive the results?

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The Roadmap to implementation of the WSO Global Stroke Guidelines and Action Plan includes several modules that together address the full continuum of stroke care. The following modules are available for you to use as part of stroke service planning, self-assessment and implementation. Each Roadmap module includes the relevant service and resource checklist, applicable stroke best practice recommendations and important key quality indicators. Some modules in the Roadmap include additional elements and expanded information to those in the published WSO Global Stroke Care Guidelines and Action Plan to be of further practical use for all sites.

Users of these tools are encouraged to review all modules of the Roadmap.



The following modules are available as part of the WSO Roadmap for Quality Stroke Care:

Introduction and Overview

- ➔ 1. Stroke System Development
- 2. Prehospital and Emergency Care
- 3. Acute Inpatient Stroke Care
- 4. Secondary Stroke Prevention
- 5. Stroke Rehabilitation
- 6. Community Reintegration and Long Term Recovery

World Stroke Organization - Clinical Practice Guideline

<http://www.world-stroke.org>

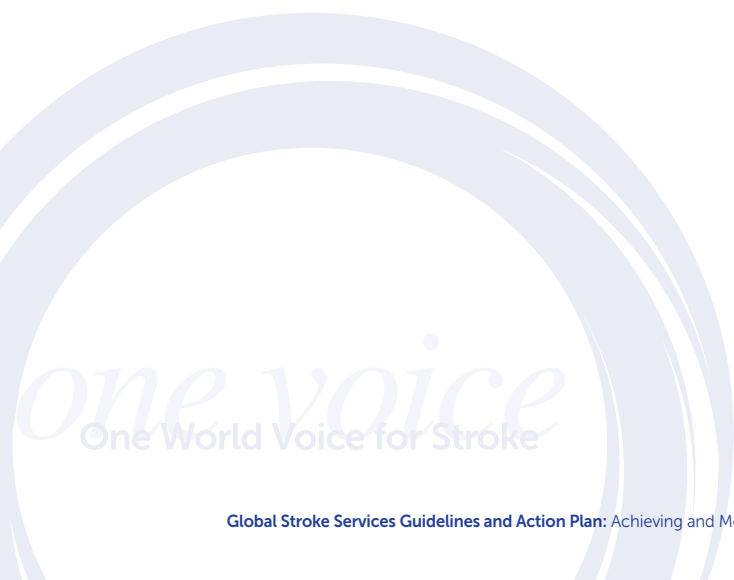
Clinical Practice Guideline Guidelines recommended by the WSO Guidelines and Quality subcommittee.

WSO International Stroke Guidelines 2012; American Academy of Neurology guideline publication.

Evidence-based Guideline: Prevention of stroke in nonvalvular atrial fibrillation. Summary of Evidence-based Guideline for CLINICIANS. Summary of Evidence-based Guideline for PATIENTS and their FAMILIES

More information: <https://www.aan.com/Guidelines/Home/ByTopic?topicId=20>

Heart and Stroke Foundation resource for healthcare providers. Taking Action for Optimal Community and Long-Term Stroke Care (TACLS). French version: Agir en vue de soins optimaux communautaires et de longue durée de l'AVC.



About the World Stroke Organization

OUR VISION: A LIFE FREE OF STROKE.

OUR MISSION:

The World Stroke Organization's mission is to reduce the global impact of stroke through prevention, treatment and long-term care. We work to reduce the impact of stroke on individuals, their families, and their communities. Our members campaign together to increase awareness of stroke risk and to improve treatment and care. We believe that reducing the global burden of stroke makes the world a healthier place for everyone.

Corporate partners

The World Stroke Campaign has been made possible through the generous financial contribution of its corporate partners.

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