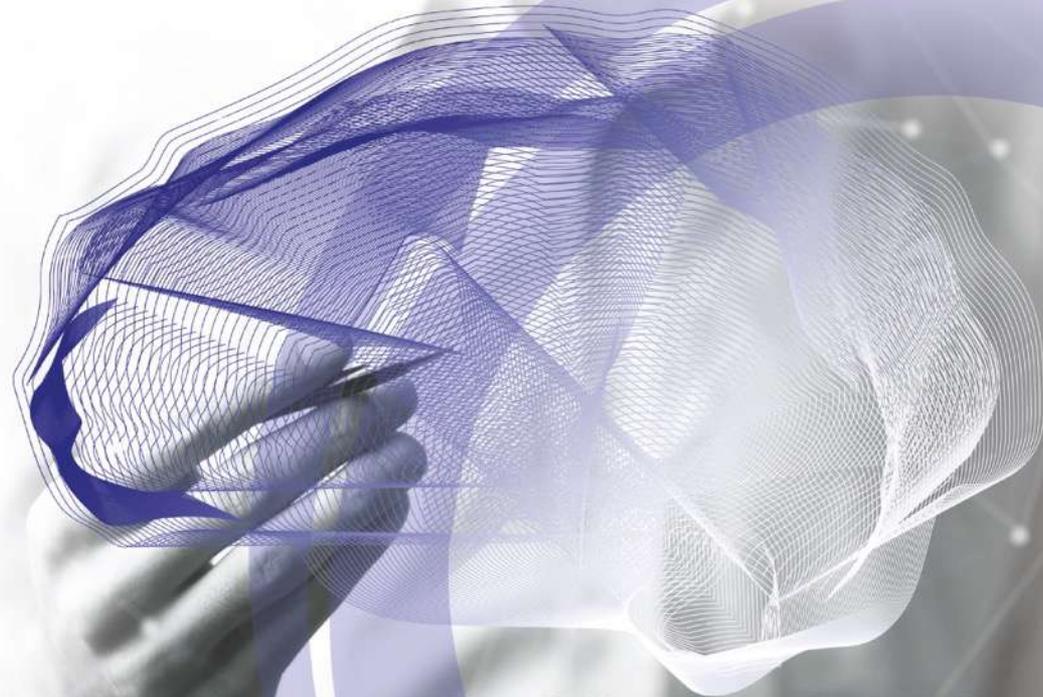




World Stroke
Organization



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World Stroke Organization (WSO):

Global Stroke Fact Sheet 2019



Authors:

M Patrice Lindsay (Corresponding Author)¹, Bo Norrving², Ralph L. Sacco³, Michael Brainin⁴, Werner Hacke⁵, Sheila Martins⁶, Jeyaraj Pandian⁷, Valery Feigin⁸



Affiliations:

Heart and Stroke Foundation of Canada, Toronto, Canada; 2. Department of Clinical Sciences, Section of Neurology, Lund University, Skåne University Hospital, Lund, Sweden; 3. Department of Neurology, Miller School of Medicine, University of Miami, Miami, Florida, United States; 4. Professor of Clinical Neurology, Danube University Krems, Austria; 5. Dep. of Neurology, Ruprecht-Karls-University Heidelberg, Heidelberg Germany; 6. Department of Neurology, Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil; 7. Department of Neurology, Christian Medical College, Ludhiana, Punjab, India; 8. National Institute for Stroke and Applied Neurosciences, Auckland University of Technology, Auckland, New Zealand.



Contributions:

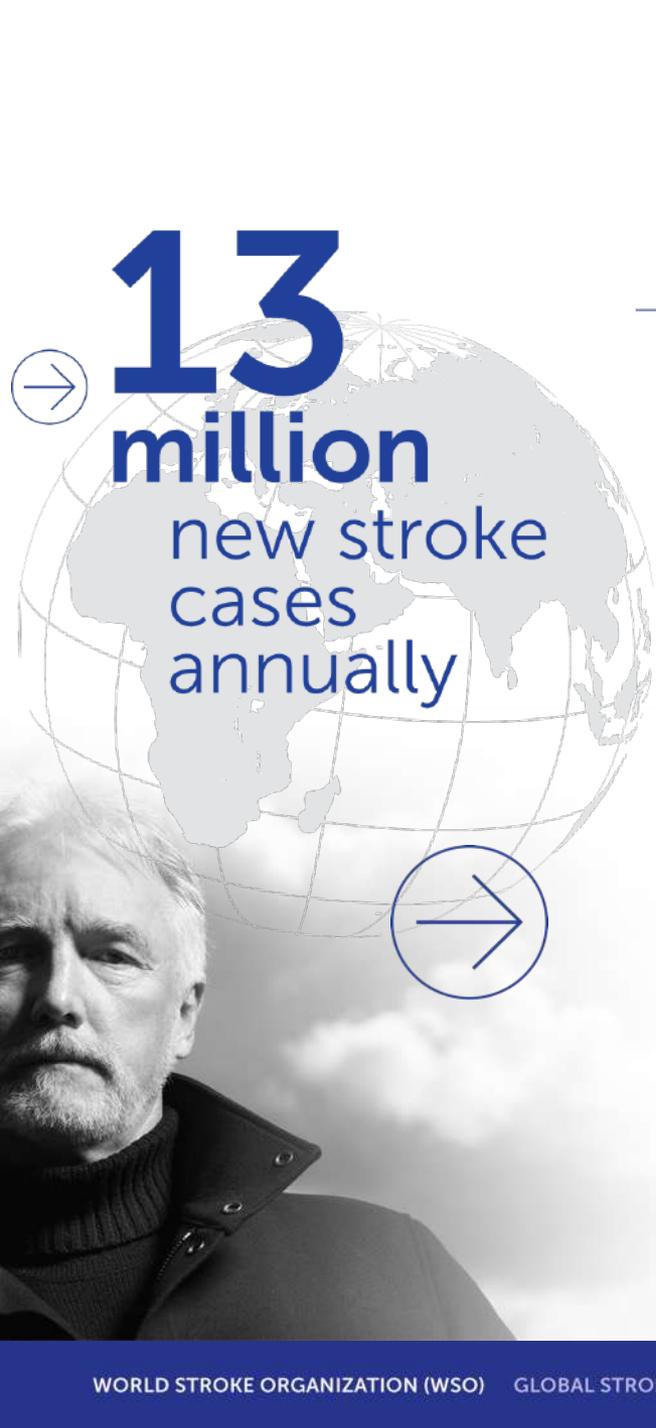
Patrice Lindsay and Valery Feigin conducted the literature reviews, calculated the statistics and developed the draft Fact Sheet. Bo Norrving, Ralph L. Sacco, Michael Branin, Werner Hacke, Sheila Martins, and Jeyaraj Pandian provided guidance, input, and edits throughout the development of this work.



Corresponding Authors:

M. Patrice Lindsay, RN, PhD
Director, Systems Change and Stroke Program, Heart and Stroke Foundation of Canada
Director, Executive Committee, World Stroke Organization
2300 Yonge Street, Suite 1300, P.O. Box 2414,
Toronto Ontario, Canada M4P 1E4
Ph: +1-647-943-3042
patrice.lindsay@heartandstroke.ca

Prof. Valery L. Feigin, MD, PhD
National Institute for Stroke and Applied Neurosciences
School of Public Health and Psychosocial Studies
Faculty of Health and Environmental Sciences
Auckland University of Technology
Auckland, New Zealand
Ph: +64 9 921 9166
valery.feigin@aut.ac.nz



13
million
new stroke
cases
annually

Introduction:

- The World Stroke Organization (WSO) leads many advocacy efforts as part of its initiative to reduce the global burden of stroke.
- Advocacy requires reliable and consistent stroke data to build awareness of the scale of the disease and support for calls for urgent action at global, regional and national levels.
- The WSO Global Stroke Fact Sheet provides information that can be used to inform communication with all internal and external stakeholders.

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Methods:

- The values contained in this Fact Sheet have all been extracted from the 2016 Global Burden of Disease Stroke Statistics.
- All statistics have been reviewed and approved for use by the WSO Executive Committee and will be updated on an annual basis.
- Values will be regularly updated as new data becomes available

1. Incidence and Prevalence for all Stroke Types Combined

All Stroke (B 2.3)

Measure: Incidence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	13,676,761	0.03	185.01 (171.98-198.75)	203.38 (189.24-218.16)	There are over 13.7 million new strokes each year ³ . Globally, one in four people over age 25 will have a stroke in their lifetime ⁴ .
1-69 years	7,994,163	-	-	-	Each year, almost 60% of all strokes occur in people under 70 years of age.
1-44 years	1,110,311	-	-	-	Each year, 8% of all strokes occur in people under 44 years of age.
Men (all ages)	7,192,679	0.03	193.05 (179.24-207.31)	231.02 (214.69-248.15)	Each year, 52% of all strokes occur in men.
Women (all ages)	6,484,083	0.03	176.85 (164.32-190.01)	179.13 (166.23-192.47)	Each year, 48% of all strokes occur in women.

Measure: Prevalence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	80,065,453	1.12	1,083.10 (1,002.23-1,167.80)	1,180.40 (1,093.20-1,273.43)	Globally, there are over 80 million people currently living who have experienced stroke.
1-69 years	49,693,284	-	-	-	60% of people who have experienced a stroke and are currently living are under the age of 70.
1-44 years	7,843,913	-	-	-	10% of people who have experienced a stroke and are currently living are under the age of 44.
Men (all ages)	38,968,949	1.10	1,045.89 (970.02-1,129.92)	1,232.57 (1,143.16-1,334.35)	49% of people who have experienced a stroke and are currently living are men.
Women (all ages)	41,096,505	1.15	1,120.90 (1,035.73-1,207.58)	1,136.08 (1,049.08-1,225.41)	51% of people who have experienced a stroke and are currently living are women. Globally, women account for just over half (51%) of all persons who have experienced a stroke

1. Mortality and Disability-Adjusted Life Years (DALYs) for all Stroke Types Combined

All Stroke (B 2.3)

Measure: Deaths	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	5,528,232	10.11	74.78 (72.16-77.58)	86.52 (83.34-89.92)	Five and a half-million people die from stroke annually.
1-69 years	2,135,159	-	-	-	39% of all deaths from stroke occur in people under 70 years old
1-44 years	230,025	-	-	-	4% of all deaths from stroke occur in people under 44 years old
Men (all ages)	2,931,769	9.77	78.69 (76.0-81.30)	103.21 (99.44-106.89)	53% of all deaths from stroke are in men
Women (all ages)	2,596,464	10.51	70.82 (67.00-74.86)	72.49 (68.60-76.54)	47% of all deaths from stroke are in women

Measure: DALYs	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	116,445,136	4.88	1,575.23 (1,506.78-1,642.35)	1,711.17 (1,635.32-1,784.40)	Over 116 million years of healthy life is lost each year due to stroke-related death and disability.
1-69 years	73,083,785	-	-	-	63% of healthy life lost due to stroke-related death and disability affects people under the age of 70 years.
1-44 years	13,249,535	-	-	-	18% of healthy life lost due to stroke-related death and disability affects people under the age of 44 years.
Men (all ages)	65,640,112	5.05	1,761.72 (1,692.60-1,829.59)	2,045.51 (1,960.85-2,126.23)	Men account for 56% of healthy life lost due to stroke-related disability.
Women (all ages)	50,805,025	4.68	1,385.70 (1,299.04-1,465.54)	1,407.74 (1,320.23-1,489.36)	Women account for 44% of healthy life lost due to stroke-related disability.

Notes: * (Uncertainty Interval [UI] represents a range of values that reflects the certainty of an estimate. In GBD, every estimate is calculated 1,000 times, each time sampling from distributions rather than point estimates for data inputs, data transformations and model choice. The 95th uncertainty interval is determined by the 25th and 975th value of the 1,000 values after ordering them from smallest to largest. Larger uncertainty intervals can result from limited data availability, small studies, and conflicting data, while smaller uncertainty intervals can result from extensive data availability, large studies, and data that are consistent across sources)

2. Incidence and Prevalence for all Ischemic Stroke

Ischemic Stroke (B 2.3.1)

Measure: Incidence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	9,556,444	0.02	129.28 (117.08-142.21)	142.34 (129.10-156.60)	There were over 9.5 million new cases of ischemic stroke in 2016.
1-69 years	5,524,967	-	-	-	Almost 60% of all new cases of ischemic stroke occur in people under 70 years.
1-44 years	698,335	-	-	-	7% of all new cases of ischemic stroke occur in people under 44 years.
Men (all ages)	5,012,911	0.02	134.54 (121.30-147.89)	161.74 (146.12-177.57)	52% of new cases of ischemic stroke occur in men.
Women (all ages)	4,543,533	0.02	123.92 (112.56-136.54)	125.49 (113.82-138.40)	48% of new cases of ischemic stroke occur in women.

Measure: Prevalence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	67,595,368	0.95	914.40 (822.65-1,008.78)	999.33 (899.23-1,105.91)	Over 67.5 million people had a new ischemic stroke in 2016 or have had one previously.
1-69 years	41,173,654	-	-	-	61% of the people currently living with the effects of ischemic stroke are under the age of 70
1-44 years	6,453,559	-	-	-	10% of the people currently living with the effects of ischemic of stroke are under the age of 44
Men (all ages)	32,837,417	0.92	881.33 (796.33-979.77)	1,043.96 (945.71-1,163.46)	49% of the people currently living with the effects of ischemic stroke are men.
Women (all ages)	34,757,951	0.97	948.02 (849.81-1,043.14)	961.79 (861.23-1,059.64)	51% of the people currently living with the effects of ischemic stroke are women. Globally, women account for just over half (51%) of all persons living with the effects of ischemic stroke.

2. Mortality and Disability-Adjusted Life Years (DALYs) for all Ischemic Stroke

Ischemic Stroke (B 2.3.1)

Measure: Deaths	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	2,690,171	4.92	36.39 (34.79-38.12)	43.40 (41.43-45.47)	Over 2.7 million people die from ischemic stroke each year.
1-69 years	708,472	-	-	-	25% of deaths due to ischemic stroke occur in people under the age of 70.
1-44 years	34,019	-	-	-	1% of deaths due to ischemic stroke occur in people under the age of 44.
Men (all ages)	1,343,464	4.48	36.06 (34.37-37.72)	50.22 (47.89-52.64)	49% of deaths due to ischemic stroke occur in men.
Women (all ages)	1,346,707	5.45	36.73 (34.45-39.45)	37.72 (35.34-40.48)	51% of deaths due to ischemic stroke occur in women. Each year, women account for more than half of the ischemic stroke-related deaths

Measure: DALYs	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	51,897,437	2.17	702.05 (647.93-751.70)	787.55 (728.37-843.24)	51.9 million years of healthy life is lost each year due to ischemic stroke-related death and disability..
1-69 years	26,161,786	-	-	-	50% of healthy life lost due to ischemic stroke-related death and disability affects people under the age of 70 years.
1-44 years	2,740,408	-	-	-	5% of healthy life lost due to ischemic stroke-related death and disability affects people under the age of 44 years.
Men (all ages)	27,528,703	2.12	738.85 (688.39-788.17)	908.40 (849.21-968.50)	Men account for 53% of healthy life lost due to ischemic stroke-related death and disability.
Women (all ages)	24,368,735	2.24	664.65 (601.14-721.29)	681.27 (616.67-739.22)	Globally, women account for just under half (47%) of healthy life lost due to ischemic stroke-related death and disability. Women account for 47% of healthy life lost due to ischemic stroke-related death and disability.

3. Incidence and Prevalence for all Hemorrhagic Stroke

Haemorrhagic stroke (intracerebral and subarachnoid haemorrhage combined) (B 2.3.2)

Measure: Incidence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	4,120,318	0.01	55.74 (50.92-60.99)	61.04 (55.79-66.73)	There were 4.1 million new hemorrhagic strokes in 2016.
1-69 years	2,469,197	-	-	-	60% of new hemorrhagic strokes occur in people under 70 years.
1-44 years	411,976	-	-	-	10% of new hemorrhagic strokes occur in people under 44 years.
Men (all ages)	2,179,769	0.01	58.50 (53.43-63.83)	69.28 (63.51-75.40)	53% of new hemorrhagic strokes occur in men.
Women (all ages)	1,940,550	0.01	52.93 (48.26-57.93)	53.64 (48.91-58.69)	47% of new hemorrhagic strokes occur in women.

Measure: Prevalence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	15,310,197	0.22	207.11 (187.45-229.34)	222.68 (201.54-246.33)	Over 15 million people globally live with the effect of hemorrhagic stroke.
1-69 years	10,319,487	-	-	-	67% of people living with the effect of hemorrhagic stroke are under 70 years.
1-44 years	2,237,325	-	-	-	15% of people living with the effect of hemorrhagic stroke are under 44 years.
Men (all ages)	7,565,942	0.21	203.06 (183.11-224.78)	233.29 (210.04-258.82)	49% of people living with the effect of hemorrhagic stroke are men.
Women (all ages)	7,744,255	0.22	211.22 (191.53-233.78)	213.27 (193.31-235.95)	51% of people living with the effect of hemorrhagic stroke are women.

3. Mortality and Disability-Adjusted Life Years (DALYs) for all Hemorrhagic Stroke

Haemorrhagic stroke (intracerebral and subarachnoid haemorrhage combined) (B 2.3.2)

Measure: Deaths	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	2,838,062	5.19	38.39 (37.18-39.69)	43.13 (41.71-44.67)	51% of all deaths from stroke are due to hemorrhagic stroke.
1-69 years	1,426,687	-	-	-	50% of deaths due to hemorrhagic stroke occur in people under the age of 70.
1-44 years	196,006	-	-	-	7% of deaths due to hemorrhagic stroke occur in people under the age of 44.
Men (all ages)	1,588,305	5.30	42.63 (41.02-44.23)	52.99 (50.95-55.10)	56% of deaths due to hemorrhagic stroke occur in men.
Women (all ages)	1,249,757	5.06	34.09 (32.51-35.79)	34.77 (33.15-36.53)	44% of deaths due to hemorrhagic stroke occur in women.

Measure: DALYs	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	64,547,700	2.71	873.18 (847.13-899.55)	923.62 (896.18-951.85)	Hemorrhagic strokes are responsible for over 64.5 million years of healthy life lost each year.
1-69 years	46,921,999	-	-	-	Almost three-quarters (73%) of healthy years of life lost due to hemorrhagic stroke occur in people under the age of 70 years. 73% of healthy years of life lost due to hemorrhagic stroke occur in people under the age of 70 years.
1-44 years	10,509,128	-	-	-	16% of healthy years of life lost due to hemorrhagic stroke occur in people under the age of 44 years.
Men (all ages)	38,111,410	2.93	1,022.88 (986.61-1,060.75)	1,137.11 (1,097.49-1,179.49)	Men account for 59% of all years of healthy life lost due to hemorrhagic stroke.
Women (all ages)	26,436,290	2.43	721.05 (689.95-754.35)	726.48 (695.29-760.07)	Women account for 41% of all years of healthy life lost due to hemorrhagic stroke.

4. Incidence and Prevalence for Major Stroke Risk Factor of Atrial Fibrillation

Haemorrhagic stroke (intracerebral and subarachnoid haemorrhage combined) (B 2.3.2)

Measure: Incidence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	3,841,072	0.01	51.96 (45.71-59.35)	57.92 (51.07-66.26)	There are almost 4 million new cases of atrial fibrillation diagnosed each year.
Men	1,925,572	0.01	51.68 (45.61-59.05)	62.18 (54.85-71.12)	Half of all new cases of atrial fibrillation each year occur in men.
Women	1,915,501	0.01	52.25 (45.93-59.67)	53.87 (47.32-61.70)	Half of all new cases of atrial fibrillation each year occur in women.

Measure: Prevalence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	46,310,600	0.65	626.47 (560.60-703.62)	715.47 (637.51-806.78)	There are over 46 million people who have atrial fibrillation.
Men	23,197,500	0.65	622.60 (557.83-697.20)	796.41 (713.46-893.79)	Half of all people living with atrial fibrillation globally are men.
Women	23,113,101	0.65	630.41 (560.08-711.11)	648.24 (575.37-733.34)	Half of all people living with atrial fibrillation globally are women.

5. Incidence and Prevalence for Major Stroke Risk Factor of Diabetes

Diabetes (B 2.6)

Measure: Incidence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	20,827,783	0.05	281.75 (259.20-307.54)	280.05 (258.16-305.35)	There were 20.8 million new cases of diabetes diagnosed in 2016.
Men	10,744,013	0.05	288.36 (264.90-314.98)	289.99 (266.91-315.61)	52% of new cases of diabetes diagnosed in 2016 were men.
Women	10,083,771	0.04	275.03 (252.41-300.87)	269.79 (248.11-295.02)	48% of new cases of diabetes diagnosed in 2016 were women.

Measure: Prevalence	Number	Percent of total from all causes	Crude rate per 100,000 per year (UI)*	Age-adjusted rate per 100,000, per year (UI)	Approved Statement for use in WSO Materials
Ages (all), Sexes (both)	383,453,016	5.38	5,187.21 (4,769.67-5,608.23)	5,334.83 (4,908.60-5,759.71)	Over 383 million people have diabetes.
Men	198,739,364	5.60	5,333.99 (4,907.77-5,779.51)	5,672.49 (5,225.48-6,136.63)	Among people living with diabetes globally, 52% are men.
Women	184,713,652	5.17	5,038.04 (4,625.33-5,441.08)	5,009.53 (4,612.78-5,412.94)	Among people living with diabetes globally, 48% are women.

2016 Global Burden of Disease estimates for stroke burden (as measured by DALYs) attributable to risk factors*



Metabolic risks
(high systolic blood pressure (SBP), high body-mass index (BMI), high fasting plasma glucose (FPG), high total cholesterol, and low glomerular filtration rate) account for **72.1%** (66.4-77.3) of stroke burden.



Behavioural factors (smoking, poor diet, and low physical activity) account for **66.3%** (59.3 to 73.1) of stroke burden, and environmental risks (air pollution and lead exposure) **28.1%** (25.3 to 30.9).



Globally, high systolic blood pressure is the largest single risk for stroke **57.3%** (49.8-64.4)



All risk factors combined account for **88.8%** (86.5-90.9) of the global stroke burden

* From the GBD viz <http://ghdx.healthdata.org/gbd-results-tool>

Contributions of behavioural factors to stroke risk

- Dietary risk factors (51.1% [40.7-61.2])
- High BMI (23.6% [15.1-33.3])
- Smoking (23.4% [20.2-26.6])
- High fasting glucose (17.3% [11.6-24.7])
- Alcohol use (11.9% [9.4-14.6])
- High LDL cholesterol (10.0% [5.9-16.7])
- Impaired kidney function (8.6% [7.1-10.2])
- Low physical activity (4.5% [0.8-8.6])

WSO Resources



The WSO has developed a set of guidelines for stroke care leaders, offering current, evidence-based recommendations to guide stroke care planning and delivery across the continuum of care.

Based on these guidelines, WSO has also developed a road map to provide additional details on implementation strategies.

For more information, please visit the WSO website: www.world-stroke.org

WSO Roadmap Framework:

To be used by organizations and government in planning the range of services required across the continuum





Evidence to Practice



WSO Roadmap: Stroke Services Delivery



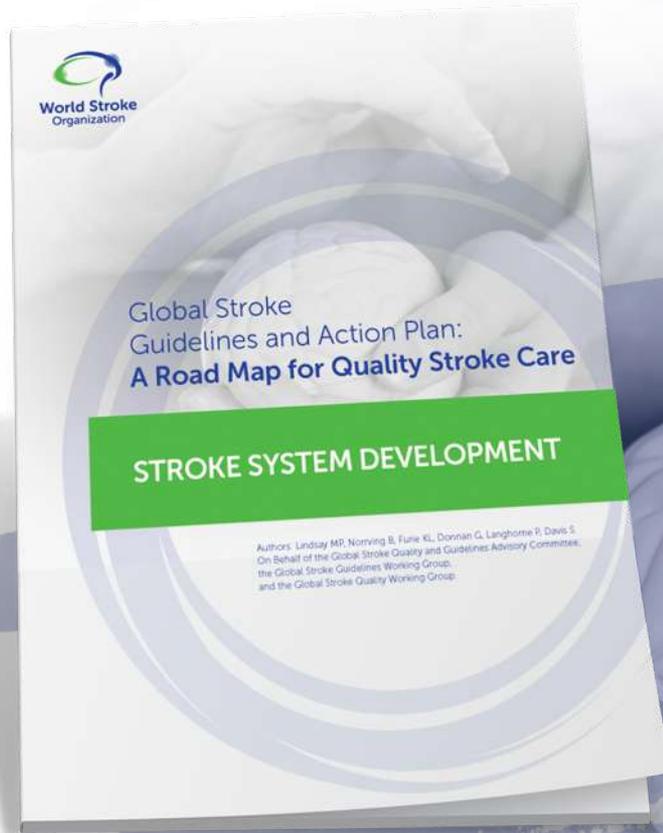
Levels of health service capacity for stroke care.

Roadmap Rationale

Mortality and morbidity from stroke could be significantly reduced through organized stroke care, including the implementation of evidence-based clinical practice guidelines and adoption of a continuous quality improvement philosophy and programs.



Components



Capacity

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 minimum stroke services)	Advanced Stroke Services (In addition to services listed under essential stroke services)
<ul style="list-style-type: none"> Care provided in local communities without coordination across defined geographic regions No access to diagnostic services or hospital care for hyperacute 	<ul style="list-style-type: none"> Access to basic diagnostic services <ul style="list-style-type: none"> Laboratory blood test (CBC, electrolytes, urea, glucose, HbA1c, PT) Electrocardiogram (12 lead) Computed Tomography (CT) and vasculature (is CT/CTA) apply 	<ul style="list-style-type: none"> 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 Access to physicians with stroke expertise in acute stroke care, stroke prevention and/or stroke rehabilitation

Quality

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 Service Capacity for Stroke Care			Supporting Evidence	Self Assessment
	Minimum	Essential	Advanced		
Acute Inpatient Care (First days after stroke)					
1.1 Patients with an <u>acute stroke</u> should be admitted to hospital.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/> in place <input type="checkbox"/> in development
1.2 Patients with <u>minor stroke, or transient ischemic attack</u> should be urgently assessed and prevention management commenced, (within 48 hours of stroke symptom onset) either in hospital or treated in a specialized outpatient clinic.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Practice

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 (as defined 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 overweight, acid) 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

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World Stroke Organization Global Stroke Services Guidelines and Action Plan

Patrice Lindsay ^{1,2,*†}, Karen L. Furie ^{3,4,†}, Stephen M. Davis ^{5,6,†}, Geoffrey A. Donnan ^{6,7,†}, and Bo Norrving ^{8,†}

Global Stroke Guidelines and Quality Action Plan Core stroke care recommendations and key quality indicators

Key evidence-based recommendations	applicable level of health services capacity for stroke care			Key performance measures
	Minimal	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).	✓	✓	✓	System Indicators: I. Availability of basic health services within a region II. Availability of diagnostic labs and imaging within region III. Availability of inpatient hospital facilities within region IV. Availability and level of training for healthcare workers and healthcare professionals within region V. Availability of relevant stroke pharmacotherapies in a region
2. All healthcare personnel should be trained to recognize the signs and symptoms of stroke.	✓	✓	✓	
3. All geographic regions should have a local emergency call number or system in place, such as 9-1-1.		✓	✓	
4. Protocols should be in place in emergency call centers to mobilize EMS personnel to respond to a stroke call with high urgency.		✓	✓	



IJS 2014; Available free online at IJS



WSO Administrative Office

c/o Kenes International

7, rue François-Versonnex C.P. 6053, 1211 Geneva 6, Switzerland

Tel: + 41 22 906 9166

E-mail: admin@world-stroke.org

www.world-stroke.org