

**S·A·F·E**

Stroke Alliance For Europe

THE STROKE PATIENT  
VOICE IN EUROPE



# THE BURDEN OF **STROKE** IN EUROPE

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Report

**King's College London**

for the

**Stroke Alliance for Europe (SAFE)**

**Overview of stroke  
burden and care**

in each EU and SAFE member country



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These tables summarise the information obtained for each country. Where information relates to one of the 12 indicators used in this report, the relevant indicator is noted.

## DEFINITIONS:

<b>Incidence:</b>	the number of new strokes.
<b>Mortality:</b>	the number of people who die as a result of their stroke, at any time following the stroke.
<b>Case fatality:</b>	the number of people who die as a result of their stroke within a month of having the stroke.
<b>Prevalence:</b>	the number of stroke survivors in the population.
<b>Age and sex adjusted:</b>	some of the stroke epidemiology rates in the following tables are 'age- and sex-adjusted'. The risk of stroke and likelihood of surviving stroke are significantly influenced by age and sex. When researchers want to compare rates of stroke, stroke deaths or the number of stroke survivors between two or more populations, they need to take into account the fact that different populations have different age and sex profiles. Researchers use a statistical method to adjust the recorded rates, producing age- and sex-adjusted rates that can be used to compare the burden of stroke in different populations.
<b>DALYs:</b>	<b>Disability Adjusted Life Years</b> The sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability.



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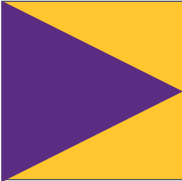
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 <h2 style="margin: 0;">AUSTRIA</h2>	
<b>HEALTH CARE SYSTEM</b>	National healthcare system, free at the point of use. Obligatory general medical insurance.
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 8,169,929</p> <p>Incidence estimate (GBD 2015 <sup>[1]</sup>): 8,243 strokes/year, 53.3 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015 <sup>[1]</sup>): 55,263 strokes, 390.1 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 6 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015 <sup>[1]</sup>): 6,094 deaths due to stroke/year, 32.9 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Austrian Stroke Unit Registry since 2004 (all hospitals with stroke units, captures ca. two thirds of stroke patients)</p> <p>Healthcare cost of stroke: total € 507.6 million, € 59 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> The Austrian Stroke Society performs multi-media campaigns around World Stroke Day to increase public awareness of stroke risk factors and primary prevention.</p> <p>Estimated prevalence of high blood pressure: 24.8 %, high cholesterol: 59.7%, raised glucose: 6% <sup>[4]</sup>.</p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 17.7% <sup>[5]</sup>. In a 2015 multi-centre survey, only 41% of diagnosed, treated, and adherent hypertensive patients had controlled blood pressure <sup>[6]</sup>.</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 87.4% in Austria, Germany, and Switzerland combined (PREFER-AF study, <sup>[7]</sup>)</p> <p>Use of oral anticoagulants in stroke patients: 16% of stroke patients diagnosed with AF prior to or at stroke were on oral anticoagulants pre-stroke in 1999/2000 <sup>[8]</sup>; 33% were on oral anticoagulants at discharge following their stroke <sup>[8]</sup>.</p> <p><b>Indicator 8:</b> TIA patients are usually admitted to a stroke unit for diagnostic work-up <sup>[9]</sup>.</p>

## AUSTRIA (continued)

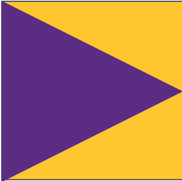
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> Austria has a public health campaign similar to the FAST campaign <sup>[9]</sup>.</p> <p><b>Indicator 4:</b> The Tyrol Stroke Pathway was launched in 2008-9, providing information campaigns for the public and standardised treatment pathways including a screening/fast-track system for suspected stroke <sup>[10]</sup>.</p> <p>Indicators 4 and 5: Austrian stroke care guidelines emphasise stroke as a medical emergency. Emergency services/ambulance staff is trained to screen for stroke/TIA and arrange immediate transfer to the appropriate hospital. Medical education emphasises the importance of stroke as a medical emergency <sup>[9]</sup>.</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 6:</b> Austria has a National Stroke Strategy, covering the stroke unit system in Austria and criteria for stroke units. National guidelines for acute care have been developed <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> Currently, there are 38 stroke units operating in Austria. Around two thirds of stroke patients are admitted to stroke units nationally <sup>[11]</sup>. The vast majority of stroke units can be reached in &lt;45min, but in some locations in Austria (western areas) travelling times can be &gt;90min <sup>[12]</sup>.</p> <p>A telemedicine system is in operation <sup>[13]</sup>.</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Data from the Austrian Stroke Unit Registry (since 2003) shows a thrombolysis rate of 5% of ischaemic stroke patients admitted to stroke units nationally in 2003, rising to &gt;10% in 2007 <sup>[12]</sup>. A more recent publication reported thrombolysis rates of 12.9% in 2010 and 16.8% in 2013 among ischaemic stroke patients admitted to hospitals in Tyrol <sup>[10]</sup>.</p> <p>11 Austrian centres perform endovascular treatment for stroke. 313 thrombectomies were undertaken nationally between October 2013 and September 2014 <sup>[11]</sup>.</p> <p>The Austrian Stroke Unit Registry serves as a national audit.</p>

## AUSTRIA

(continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Guidelines: German and Austrian Society of Neurology.</p> <p><b>Indicator 9:</b> Early assessment and rehabilitation is provided by a multidisciplinary team with neurologist, stroke physician, nursing staff and therapy staff including psychology and dietetics.</p> <p><b>Indicator 10:</b> Hospitals liaise with social services for transfer to a rehabilitation centre or home care (average stay on stroke unit 3-5 days; average stay in rehabilitation centre 4-6 weeks).</p> <p>Outpatient services (physiotherapy, speech therapy, occupational therapy) are geographically limited and only partially covered by the health care system <sup>[9]</sup>.</p> <p>The Tyrol Stroke pathway (regional) includes inpatient and outpatient rehabilitation phases <sup>[10]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> The Austrian Stroke Society recommend a 3-month medical follow up (function, quality of life) <sup>[14]</sup>.</p> <p><b>Indicator 12:</b> Sickness benefit and carer allowances are available <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+42	+35	+53	+43



 <h2 style="margin: 0;">BELGIUM</h2>	
<b>HEALTH CARE SYSTEM</b>	National health service, funded by taxation and co-payment. Payment is upfront, then re-imbusement of most/all of the cost of hospital care, prescriptions and rehabilitation [ <a href="https://www.socialsecurity.fgov.be/e">socialsecurity.fgov.be/e</a> ].
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 11,007,020</p> <p>Incidence estimate (GBD 2015 <sup>[1]</sup>): 10,397 strokes/year, 50.2 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015 <sup>[1]</sup>): 63,535 strokes, 348.5 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 9.2 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015 <sup>[1]</sup>): 9,501 deaths due to stroke/year, 38.7 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: none (not stroke-specific: mandatory hospitalisation data, Belgian Sentinel Network of General Practitioners, Institute of Health population surveys)</p> <p>Healthcare cost of stroke: total € 393.7 million, € 35 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are regular public health campaigns warning against the consequences of smoking, high blood pressure, diabetes <sup>[9]</sup>.</p> <p>There is a national stroke prevention strategy together with national guidelines for the prevention of stroke/treatment of stroke risk factors <sup>[9]</sup>.</p> <p>An AF awareness campaign was launched by the Belgium Stroke Council in 2016. The Belgium Heart Rhythm Week included a national screening of AF to increase awareness of AF and stroke <sup>[15]</sup>.</p> <p>Estimated prevalence of high blood pressure: 23.8%, high cholesterol: 62.4%, smoking: 23.9%, raised glucose: 6.4% <sup>[4]</sup>, atrial fibrillation: 1.4% (66% of cases previously unknown <sup>[15]</sup>).</p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 18.5% <sup>[5]</sup>.</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 72% in Belgium, Denmark, Netherlands, and Norway combined <sup>[16]</sup>.</p> <p><b>Indicator 8:</b> A dedicated system of care for TIA patients exists <sup>[9]</sup>.</p>

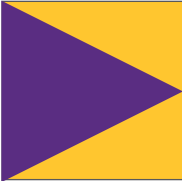
## BELGIUM

*(continued)*

<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> There are regular public campaigns about recognising acute stroke symptoms (FAST). A stroke awareness campaign was launched by the Belgium stroke council in 2016 <sup>[9]</sup>.</p> <p><b>Indicator 5:</b> No data found.</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The Belgian Stroke Council produced national guidelines for acute stroke treatment.</p> <p><b>Indicator 6:</b> Guidelines for the creation of stroke units have been developed by the Belgian Stroke Council. Most academic centres and large regional hospitals have introduced stroke units. But without a formal accreditation process to assess compliance with official standards it is difficult to assess the number of stroke units/ stroke unit beds [17, 18].</p> <p>Telemedicine is evaluated in a trial in the Brussels region <sup>[9]</sup>.</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Official number of hospitals providing thrombolysis and its percentage is lacking <sup>[17]</sup>. In 2003-2007, 743 thrombolysis procedures were reported from 42 SITS registered centres <sup>[19]</sup>.</p> <p>In 2007-2012, 80 thrombectomies were performed in 4 large stroke centres <sup>[20]</sup>. Thrombectomies are currently undertaken at the cost of the performing hospital <sup>[9]</sup>.</p> <p>There is currently no national stroke audit of acute care, but quality parameters for stroke care are defined and monitored <sup>[9]</sup>.</p>
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Rehabilitation is in general well organised in rehabilitation hospitals/units. Physiotherapy and speech therapy can be provided at home, whereas occupational therapy can only be offered in the hospitals <sup>[17]</sup>.</p> <p>Above two thirds of survivors return home within a month (an improvement since the CERISE studies in the preceding decade <sup>[21]</sup> so there is a need for well-organised home care <sup>[22]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not available – local attempts have been made <sup>[23]</sup>.</p>

<b>BELGIUM</b> <i>(continued)</i>				
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Follow-up practice is variable: neurologists may see patients in clinic 3-6 months after stroke <sup>[17]</sup>.</p> <p>There is a lack of multiprofessional stroke teams in primary care around the support offered by the GP <sup>[22]</sup> and a lack of pathways linking acute care with primary care, and rehabilitation with primary care <sup>[17]</sup>.</p> <p><b>Indicator 12:</b> sickness and disability benefits are available [<a href="http://socialsecurity.fgov.be/e">socialsecurity.fgov.be/e</a>].</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+39	+33	+45	+39



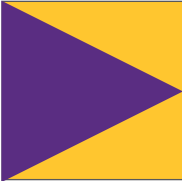
 <b>BULGARIA</b>	
<b>HEALTH CARE SYSTEM</b>	National health system funded by taxation (obligatory payments for public sector workers) <sup>[9]</sup> . Patients pay user fees to see a doctor and for hospital services and may pay some medication costs. Ambulances are free to use in an emergency <sup>[24]</sup> . GPs are responsible for stroke prevention: patients have a right to two appointments per year <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 7,621,337</p> <p>Incidence estimate (GBD 2015<sup>[1]</sup>): 24,584 strokes/year, 185.5 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015<sup>[1]</sup>): 101,055 strokes, 817.4 per 100,000 inhabitants age- and sex-adjusted</p> <p>Mortality (GBD 2015<sup>[1]</sup>): 22,061 deaths due to stroke/year, 153.7 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Local registry (Varna University Hospital)</p> <p>Healthcare cost of stroke: total € 47.6 million, € 7 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are public campaigns for primary prevention of stroke <sup>[9]</sup>. Stroke risk factor knowledge has been found to be very poor <sup>[25]</sup>.</p> <p>There is a national stroke prevention programme/strategy together with national guidelines covering stroke prevention and risk factor treatment <sup>[9]</sup>.</p> <p>Stroke prevention is covered by GPs. Every patient has two annual visits. The prevention programme is established in the national guideline 2013 by the Bulgarian Neurology Society. National guidelines cover monitoring and treatment of high blood pressure and cholesterol, and AF.</p> <p>Estimated prevalence of high blood pressure: 36.4%, high cholesterol: 49.9%, smoking: 36.9%, raised glucose: 10.3% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 21% <sup>[5]</sup></p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 73.2% <sup>[26]</sup></p> <p><b>Indicator 8:</b> No data found.</p>

<b>BULGARIA</b> (continued)	
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> There are public awareness campaigns which emphasise stroke as a medical emergency. Medical education emphasises stroke is a medical emergency.</p> <p><b>Indicator 5:</b> Ambulance service training exists, but no audits are undertaken to evaluate its impact or quality <sup>[9]</sup>. The Bulgarian Association of Neurosonology and Cerebral Haemodynamics undertakes training activities for physicians (conferences, workshops) since 2009 <sup>[27]</sup>.</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>National guidelines for acute stroke care have been introduced <sup>[27]</sup>.</p> <p><b>Indicator 6:</b> There are currently 20 stroke units in Bulgaria treating 10% of stroke patients <sup>[13]</sup>.</p> <p>Telemedicine is attempted at a local level, but not always successful due to lack of organisation and stable internet connections <sup>[9]</sup>.</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Thrombolysis was introduced in 2005. 34 hospitals performed thrombolysis in 2009, mostly in large cities <sup>[28]</sup>. National estimates of thrombolysis rates for ischaemic stroke patients were 0.04% in 2006 and 0.1% in 2009 <sup>[27]</sup>. Sofia University Hospital reported higher rates of 0.1-0.25% in 2009 <sup>[24]</sup>. St. Marina University Hospital in Varna achieved a thrombolysis rate of 5.8% in 2015 <sup>[9]</sup>. From 2008 to 2014, 1081 thrombolysis procedures were carried out nationally <sup>[13]</sup>.</p> <p>About 10 hospitals participate in the SITS register <sup>[9]</sup>.</p> <p>Since 2016 efforts are under way to implement thrombectomy. National thrombectomy guidelines were produced in 2016 <sup>[9]</sup>.</p> <p>There is a national audit of acute care undertaken by the National Health Insurance Fund <sup>[9]</sup>.</p>

## BULGARIA

(continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Guidelines: Bulgarian Neurology Society <sup>[9]</sup></p> <p><b>Indicator 9:</b> Early assessment and rehabilitation is provided by a multiprofessional team including neurologist, stroke doctor, physiotherapy, speech therapy, nursing staff and dietetics, although there is a shortage of occupational therapy and psychology for early rehabilitation <sup>[29]</sup>.</p> <p><b>Indicator 10:</b> Hospitals aim to discharge patients as soon as possible (3-10 days) with an outpatient neurologist appointment within a month and transfer to rehabilitation centre if needed <sup>[9]</sup>.</p> <p>There is a lack of community long-term and specialist rehabilitation services (for all conditions) – only a minority of stroke patients have rehabilitation in a specialist centre [24, 29].</p> <p>The national health insurance fund and regional health fund conduct performance audits, which include rehabilitation, but the data is not made public <sup>[9]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p>Survey data indicators that the loss of quality of life among stroke patients is high. Three-quarters of patients in a 2009 survey reported a poor state of general health. Three-quarters of patients face financial difficulties resulting from stroke <sup>[24]</sup>.</p> <p><b>Indicator 11:</b> Patients should be offered review with neurologist within a month of discharge <sup>[9]</sup>.</p> <p><b>Indicator 12:</b> In some hospitals, family members are educated to support with early physical and speech rehabilitation, as well as personal care <sup>[9]</sup>.</p> <p>There is little statutory / insurance support for independent living <sup>[30]</sup> and insurers rarely cover after hospital care <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+14	+3	+25	+13

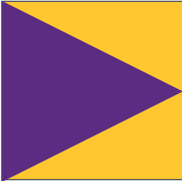
 <h2 style="margin: 0;">CROATIA</h2>	
<b>HEALTH CARE SYSTEM</b>	Universal and obligatory insurance funded by taxation covers acute and rehabilitation care; private rehabilitation centres are rare <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 4,490,751</p> <p>Incidence estimate (GBD 2015 <sup>[1]</sup>): 11,357 strokes/year, 152.4 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015 <sup>[1]</sup>): 54,481 strokes, 793.2 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality rate (30-days post-stroke): 23.5% <sup>[31]</sup></p> <p>Mortality (GBD 2015<sup>[1]</sup>): 8,033 deaths due to stroke/year, 94.6 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Healthcare cost of stroke: total € 36.9 million, € 9 per capita <sup>[3]</sup>.</p> <p>There is currently no national or regional stroke registry <sup>[9]</sup>.</p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Public campaigns on stroke prevention are being undertaken. There are national campaigns for healthy life style, salt reduction [9, 32]. Stroke risk factor knowledge was found to be moderate [33, 34].</p> <p>The Croatian Society for Neurovascular disorders was founded in 2001 for the prevention of stroke <sup>[28]</sup>.</p> <p>Estimated prevalence of high blood pressure: 35.8%, high cholesterol: 49.8%, smoking: 36.0%, raised glucose: 9.9% <sup>[4]</sup>.</p> <p><b>Indicator 2:</b> In 2006-8, 91% of hypertensive stroke patients were treated with antihypertensives, and 28.6% achieved adequate blood pressure control <sup>[35]</sup>.</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 84.3% <sup>[26]</sup>.</p> <p><b>Indicator 8:</b> There is only one TIA outpatient centre in Croatia providing diagnostics and therapy within 24 hours. Other hospitals either admit TIA patients, or discharge for later work-up <sup>[9]</sup>.</p>

<b>CROATIA</b> (continued)	
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> The Croatian Association for Stroke Prevention guidelines state that stroke is a medical emergency and that this should be an emphasis in public and professional education [9]. The Croatian Society for Neurovascular disorders offers annual summer stroke schools, teaching courses, symposia for physicians. The University Hospital Centre Zagreb offers series of two-days teaching courses [36].</p> <p><b>Indicator 4:</b> There was a TV campaign on acute stroke symptoms [9]. Public recognition of stroke symptoms and knowledge of the adequate response has been found to be poor [33].</p> <p><b>Indicator 5:</b> There is no specific training of ambulance staff to screen for stroke symptoms [9].</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The Croatian Society for Neurovascular disorders and the Croatian Stroke Society issued national guidelines for acute care, based on AHA/ASA guidelines [37].</p> <p><b>Indicator 6:</b> There are currently 5 stroke units in Croatia, one of them is at the standard of a comprehensive stroke unit providing endovascular stroke treatment [9].</p> <p>Telemedicine is available nationwide with a special emphasis on the islands, but it is not yet capable of telestroke interventions [9].</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Thrombolysis was introduced in 2003 and is now available in all university and most regional hospitals [38]. Overall 24 hospitals (5 of them have a dedicated stroke unit) are currently providing thrombolysis with large variations in thrombolysis rates between centres ranging from 2% to 15% [9]. A national average thrombolysis rate of 4-5% of all hospitalised stroke patients was reported in 2013 [28].</p> <p>Thrombectomy is currently performed in one hospital, but there are plans to open another site [9].</p> <p>There is currently no national or regional stroke audit [9].</p>



## CROATIA (continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Guidelines: European Croatian Stroke Society / Croatian Society for Neurovascular Disorders <sup>[37]</sup></p> <p><b>Indicator 9:</b> Early rehabilitation is available in stroke units. In larger urban hospitals, multiprofessional (physiotherapy, speech therapy, psychology, dietetics) assessment and rehabilitation is available (except occupational therapy), with social services support if patients need to be discharged to somewhere other than to home. In other hospitals, patients would likely not have access to specialist stroke physicians or psychology <sup>[9]</sup>. There are few stroke specialist inpatient rehabilitation centres <sup>[39]</sup>. Outpatient physiotherapy and speech therapy is available in larger urban areas. Data on rehabilitation provision is lacking; in 2005/6 it was estimated that 75% of patients had access to rehabilitation <sup>[40]</sup>. Rehabilitation bed provision increased 2000-08 <sup>[41]</sup>. The private care sector includes nursing homes, hospices, private physiotherapy and speech therapy <sup>[42]</sup>.</p> <p><b>Indicator 10:</b> Patients are typically discharged to a rehabilitation centre for 3 weeks or home with supported rehabilitation for 4 weeks. Early supported discharge is not available: supported rehabilitation at home takes a few weeks to initiate (due to paperwork and available resources) <sup>[9]</sup></p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Neurologists follow up patients in outpatient clinics <sup>[41]</sup>. Patients are not normally offered any rehabilitation needs follow up <sup>[9]</sup>.</p> <p><b>Indicator 12:</b> Patients pay part of the cost of home help/personal care and there is no specific help with other costs of living with stroke <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+23	+13	+36	+24

 <h2 style="margin: 0;">CYPRUS</h2>	
<b>HEALTH CARE SYSTEM</b>	Public and separate private system of similar size. The public system is funded by taxation/social insurance contributions and is highly centralised <sup>[43]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 803,147</p> <p>Incidence estimate (GBD 2015 <sup>[1]</sup>): 564 strokes/year, 45.9 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015 <sup>[1]</sup>): 3,710 strokes, 315.0 per 100,000 inhabitants age- and sex-adjusted</p> <p>Mortality (GBD 2015 <sup>[1]</sup>): 435 deaths due to stroke/year, 32.6 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Available registries: none</p> <p>Healthcare cost of stroke: total € 8.4 million, € 10 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p>Estimated prevalence of high blood pressure: 21.9%, high cholesterol: 57.1%, raised glucose: 7.8% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 17%<sup>[5]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<b>Indicator 6:</b> No data found
<b>TREATMENT RATES &amp; AUDITS</b>	<b>Indicator 7:</b> No data found

## CYPRUS (continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Patients are assessed by a physiotherapist and referred to rehabilitation. They initially access this for 4 weeks; if needed longer term this can be up to 6 months (average 3 months). The government pays 7000 Euros per patient a month towards rehabilitation <sup>[44]</sup>. There is a lack of neuro-specialist rehabilitation centres (i.e. one small rehabilitation centre treating neurological patients along with other conditions).</p> <p>Outpatient multiprofessional therapy services are limited and not well coordinated with inpatient care <sup>[43]</sup>; there is no funding for rehabilitation post-discharge from the initial rehabilitation phase <sup>[44]</sup>.</p> <p>In rehabilitation generally (not stroke specifically) there is a physiotherapy focus, rather than a multiprofessional approach <sup>[43]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not available <sup>[44]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> No data found</p> <p><b>Indicator 12:</b> Sickness and disability benefits are available (<a href="http://mlsi.gov.cy">mlsi.gov.cy</a>) but there is a “significant financial burden for patients not eligible for free care” <sup>[43]</sup>. Longer term support (for people with all conditions) is mostly provided by NGOs and the charitable sector <sup>[43]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+67	+48	+91	+62

 <b>CZECH REPUBLIC</b>	
<b>HEALTH CARE SYSTEM</b>	Mandatory insurance via taxation, publicly funded for the unemployed.
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 10,674,947</p> <p>Incidence estimate (GBD 2015) <sup>[1]</sup>: 18,445 strokes/year, 106.8 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015) <sup>[1]</sup>: 96,833 strokes, 597.9 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 9.5 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015) <sup>[1]</sup>: 13,148 deaths due to stroke/year, 70.0 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: National Registry of Hospitalised patients <sup>[45]</sup></p> <p>Healthcare cost of stroke: total € 365.8 million, € 35 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are current primary prevention campaigns. They are initiated by non-governmental organisations, hospitals, and the Stroke Society. They are funded by grants (EU, government), or sponsored by medical companies <sup>[9]</sup>.</p> <p>There are only secondary, but no primary stroke prevention guidelines <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 33.2%, high cholesterol 53.9%, smoking: 33.4%, raised glucose: 9.6% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 20.0%<sup>[5]</sup> In 2006-8, 89.6% of hypertensive stroke patients were treated with antihypertensives, and 27.1% achieved adequate blood pressure control <sup>[35]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> The majority of hospitals have no TIA outpatient clinic <sup>[9]</sup>.</p>

## CZECH REPUBLIC

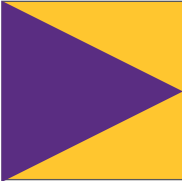
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<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> Since 2006, the Czech Stroke Society conducted educational campaigns throughout the Czech Republic to increase stroke awareness. However, a survey carried out before and after the campaign failed to show increased awareness <sup>[46]</sup>. HOBIT Programme: increase the awareness of stroke symptoms and appropriate response in school children. Time is Brain-campaign: led by the Czech Stroke Society and the Czech Society of Interventional Radiology and supported by pharma companies – started in 2016 <sup>[9]</sup>. Medical education emphasises that stroke is a medical emergency.</p> <p><b>Indicator 5:</b> Emergency services are trained to screen for stroke symptoms (triage by emergency services is one of the compulsory quality indicators). A pilot project in paramedics' education is conducted in one region in the Czech Republic, involving webinars, and the use of instruction cards to recognise stroke <sup>[9]</sup>.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>National stroke guidelines were issued by the Neurological Society of JEP and the Ministry of Health <sup>[47]</sup>.</p> <p><b>Indicator 6:</b> There are currently 10 Comprehensive and 32 Primary stroke centres in the Czech Republic <sup>[9]</sup>. 85% of stroke patients were estimated to be treated in stroke units <sup>[13]</sup>. Official accreditation of stroke units is in practice <sup>[9]</sup>.</p> <p>Telemedicine is currently not in operation <sup>[9, 13]</sup>.</p> <p>Since 2013 all stroke centres undertake a 6-monthly compulsory audit of 12 quality indicators <sup>[9]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> The first thrombolysis was undertaken in 1997 and official approval exists since 2004. National thrombolysis rate was reported as 2.5% of stroke patients in 2009 with 59 performing centres <sup>[28]</sup>. Data provided by 44 of the 50 centres registered with SITS in 2007 showed a thrombolysis rate of 4.3% (530 cases) in these centres (280 cases in 2005) <sup>[48]</sup>. A recent presentation reported a 10.9% thrombolysis rate in 2013 for ischaemic stroke patients admitted to stroke units nationally, as well as endovascular treatment rates of 6.5% <sup>[49]</sup>.</p> <p>Thrombectomy is currently undertaken in 15 stroke centres <sup>[9]</sup>.</p>

## CZECH REPUBLIC

(continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Guidelines: Czech Society for Rehabilitation and Physical Medicine.</p> <p><b>Indicator 9:</b> Acute rehabilitation begins as soon as possible following assessment and is by a multiprofessional team (including stroke doctor, physiotherapist, speech therapy, occupational therapy, dietetics and nursing staff) <sup>[9]</sup>. After acute rehabilitation, patients may then be transferred to the hospital rehabilitation unit or rehabilitation institution. Patients may stay for up to 3 months in government-funded rehabilitation institutions, as acute care lengths of stay have been reduced and hospital-based outpatient options are limited (early supported discharge is not available). The prescribed amount of inpatient rehabilitation is free of charge <sup>[9]</sup>. Data on rehabilitation provision is lacking; in 2005/6 it was estimated that 60% of patients had access to rehabilitation <sup>[40]</sup>.</p> <p>A team from Czech Republic is leading a project (RES-Q) to audit stroke care in hospitals including stroke units. Performance measures will include rehabilitation assessment and discharge destination <sup>[9]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not available.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Follow up care is supported by the GP but reviews are not routinely offered <sup>[9]</sup>.</p> <p><b>Indicator 12:</b> Rehabilitation is only partly covered by health insurance: patients meet the cost of 'extra' rehabilitation (in private centres or beyond the physician's prescription) <sup>[9]</sup>. Sickness and disability benefits are available <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+45	+22	+70	+45

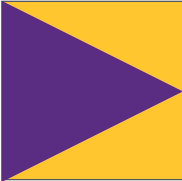
 <b>DENMARK</b>	
<b>HEALTH CARE SYSTEM</b>	<p>Decentralised system – local health authorities are responsible for planning hospital care. Municipalities are responsible for disease prevention, health promotion and rehabilitation.</p> <p>In May 2012, Central Denmark Region executed a stroke care reform that included specialisation and centralisation of acute stroke care.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 5,368,854</p> <p>Incidence estimate (GBD 2015) <sup>[1]</sup>: 5,297 strokes/year, 56.5 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015) <sup>[1]</sup>: 32,918 strokes, 367.9 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 3.5 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015) <sup>[1]</sup>: 4,556 deaths due to stroke/year, 44.9 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Danish Stroke Registry since 2003 (part of the Danish Clinical Registries, hospitalised stroke patients, captures ~90% of strokes) [50, 51], Frederiksberg Stroke Registry (population-based)</p> <p>Healthcare cost of stroke: total € 135.7 million, € 24 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p><b>Indicator 2:</b> No data found</p> <p>Knowledge of stroke risk factors was reported to be poor <sup>[52]</sup>.</p> <p>Estimated prevalence of high blood pressure: 26.3%, high cholesterol: 65.2%, smoking: 18.9%, raised glucose: 6.1% <sup>[4]</sup>, atrial fibrillation: 2% in adults &gt;25 years <sup>[53]</sup></p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 72% in Belgium, Denmark, Netherlands, and Norway combined <sup>[16]</sup>; 66.3% with 75.7% of AF patients treated according to guideline (2011 primary care data) <sup>[54]</sup></p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p> <p>Awareness of major stroke symptoms was found to be insufficient <sup>[52]</sup>.</p>

## DENMARK

(continued)

<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>Denmark first launched national clinical acute care guidelines in 2003 with regular updates since. Those guidelines are in line with guidelines from the American Heart Association and the European Stroke Organisation.</p> <p><b>Indicator 6:</b> Data from the Danish Stroke Registry showed that in 2011 51% of stroke patients were admitted to a stroke unit within 24h of admission <sup>[55]</sup>.</p> <p>In 2012, the Central Denmark Regions undertook a stroke care reform that included specialisation and centralisation of acute stroke care into two specialised hospitals <sup>[56]</sup>.</p> <p>The National Indicator Project (Det Nationale Indikatorprojekt) is a national audit of stroke care in Denmark.</p>			
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Thrombolysis became available in 2004, since 2008 available nation-wide 24/7 <sup>[57]</sup>. The Danish Stroke Registry is used as a national audit, assessing 18 process indicators against recommendations in the national clinical guidelines <sup>[51]</sup>.</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Guidelines: Danish Health and Medicines Authority 2014 <sup>[58]</sup>.</p> <p><b>Indicator 9:</b> No data found</p> <p>The treating hospital should provide the patient (and their GP) with a written plan for post-discharge rehabilitation, agreed with the patient and family. The municipal council should organise the appropriate rehabilitation provision free of charge <sup>[59]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is available regionally. There is increasing emphasis on community based rehabilitation and reduced length of stay. For example, during stroke care reform (from May 2012) one of the five regions centralised acute treatment and reduced length of stay from 2-3 weeks to 2-3 days using early supported discharge teams <sup>[56]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 12:</b> Social security allowances are available <sup>[60]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+47	+28	+68	+43



 <h2 style="margin: 0;">ESTONIA</h2>	
<b>HEALTH CARE SYSTEM</b>	Acute, rehabilitation and nursing care are funded by national health insurance. About 10% of the population have private healthcare <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 1,294,236</p> <p>Incidence estimate (GBD 2015)<sup>[1]</sup>: 2,735 strokes/year, 115.7 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015)<sup>[1]</sup>: 15,635 strokes, 729.9 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality (28-days post-stroke): 26% <sup>[61]</sup></p> <p>Mortality (GBD 2015) <sup>[1]</sup>: 1,708 deaths due to stroke/year, 63.3 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Local registry (Tartu)</p> <p>Healthcare cost of stroke: total € 42.5 million, € 32 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are public stroke prevention campaigns (healthy lifestyle, blood pressure, cholesterol) <sup>[9]</sup>. Stroke risk factor knowledge is suboptimal <sup>[62, 63]</sup></p> <p>There is no stroke prevention programme/strategy <sup>[9]</sup>.</p> <p>There are national guidelines for the management of high blood pressure, but only local guidelines regarding high cholesterol or AF.</p> <p>Estimated prevalence of high blood pressure: 39.2%, high cholesterol: 56.7%, smoking: 33.2%, raised glucose: 9.3% <sup>[4]</sup></p> <p><b>Indicator 2:</b> 42% of hypertensive stroke patients did not use any antihypertensives prior to stroke <sup>[61]</sup>.</p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> Acute TIA patients are usually admitted for diagnostic work-up <sup>[9]</sup>.</p>

## ESTONIA

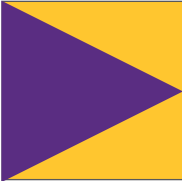
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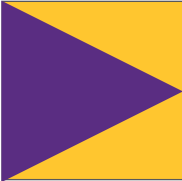
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> Public awareness campaigns have been conducted several times. In 2015/2016 lectures have been given for pupils (14-15 years) by neurologists and stroke nurses. There are stroke awareness movies, several media broadcasts and lectures. Medical education emphasises that stroke is a medical emergency (activities of the Estonian Stroke Initiative) <sup>[9]</sup>.</p> <p>The Estonian Stroke Initiative was founded in 2008 with the aim of increasing stroke knowledge among the general public and medical professionals <sup>[64]</sup>.</p> <p><b>Indicator 5:</b></p> <p><b>Indicator 5:</b> Emergency services/ambulance staff are trained to screen for stroke symptoms and arrange immediate transfer <sup>[9]</sup>.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>National stroke guidelines were produced by the National Health Insurance Fund together with the Estonian L. Puusepp Society of Neurologists and Neurosurgeons <sup>[64]</sup>.</p> <p><b>Indicator 6:</b> There are currently 6 stroke units in Estonia (2 in regional and 4 in central hospitals in the four big cities, <sup>[9]</sup> creating 61% of stroke patients <sup>[13]</sup>. The remainder of stroke patients is cared for in general hospitals (12 hospitals) <sup>[9]</sup>.</p> <p>There is a need for a national stroke strategy to link together hospitals of different capabilities to create a network <sup>[64]</sup>.</p> <p>There is no telemedicine system in operation <sup>[13]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> The number of thrombolysis procedures has increased continuously since 2003, but availability is still insufficient in some areas outside the bigger cities (especially in small islands). In 2005, 30 thrombolysis procedures were performed <sup>[40]</sup>.</p> <p>Thrombectomy is available since 2013 with increasing numbers <sup>[9]</sup>.</p> <p>National audits of acute stroke care have been initiated by the Estonian Health Insurance Fund in 2003, 2010, and 2013 <sup>[9]</sup>.</p>

## ESTONIA

(continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Patients are assessed for rehabilitation needs within a few days of admission to the hospital and before discharge from the acute stroke unit (typically within 7 days) <sup>[9]</sup>.</p> <p>Inpatient rehabilitation is provided by a multiprofessional team (including neurologist, nursing staff, physiotherapy, occupational therapy, speech therapy and psychology) in a rehabilitation unit or rehabilitation hospital. Post-discharge, outpatient multiprofessional therapies are available but variable across the country <sup>[64]</sup> and there are long wait times (&gt;1 month). Data on rehabilitation provision is lacking; in 2005/6 it was estimated that 40% of patients had access to rehabilitation <sup>[40]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not available <sup>[9]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Patients are not routinely followed up by a neurologist <sup>[9]</sup>. 36% of stroke patients had follow up visit from GP within 30 days; 48% within 90 days (2013 data) <sup>[65]</sup>.</p> <p><b>Indicator 12:</b> Social security allowances and vocational rehabilitation are available via the social insurance institution <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+21	+9	+32	+19

 <b>FAROE ISLANDS</b>	
<b>HEALTH CARE SYSTEM</b>	Acute care is funded by national health insurance <a href="#">[66]</a> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	No data found
<b>RISK FACTORS / PREVENTION</b>	No data found
<b>EMERGENCY RESPONSE</b>	No data found
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	No data found
<b>TREATMENT RATES &amp; AUDITS</b>	No data found
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	No data found
<b>LONGER TERM CARE &amp; SUPPORT)</b>	No data found

 <h2 style="margin: 0;">FINLAND</h2>	
<b>HEALTH CARE SYSTEM</b>	National Health insurance funds prevention, acute care and most of rehabilitation (this is funded by the social insurance institution, insurance companies, and local authorities). Out of pocket payments are very rare. The role of private care is increasing in primary and secondary prevention, as well as in rehabilitation, due to public sector waiting lists <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 5,410,233</p> <p>Incidence estimate (GBD 2015) <sup>[1]</sup>: 6,204 strokes/year, 61.7 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015) <sup>[1]</sup>: 36,500 strokes, 395.9 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 5.4 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015) <sup>[1]</sup>: 4,866 deaths due to stroke/year, 41.6 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Finnish Stroke Database (PERFECT Stroke) since 1999, hospitalised stroke patients, captures &gt;85% of strokes<sup>[67]</sup>, local registries: Turku, Finnstroke, Finmonca</p> <p>Healthcare cost of stroke: total € 721.1 million, € 132 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Public campaigns for primary prevention are undertaken, e.g. the World Stroke Day campaign: blood pressure measurements organised by the patient organisation Aivoliitto.</p> <p>There is a national stroke prevention strategy together with national guidelines <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 27.1%, high cholesterol: 59%, smoking: 21.8%, raised glucose: 7.7% <sup>[4]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients pre-stroke: 55.1% of those with CHADS-VASc score <math>\geq 2</math> <sup>[68]</sup></p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>

## FINLAND

(continued)

<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> There is no recent public campaign emphasising stroke as an emergency. Stroke as an emergency is emphasised in medical education <sup>[9]</sup>.</p> <p><b>Indicator 5:</b> Ambulance staff is trained to screen for stroke symptoms based on a FAST-like evaluation. A special stroke code is used nationally <sup>[9]</sup>.</p> <p>The Helsinki model, first introduced in Helsinki University Central Hospital, includes a fast-track system for suspected stroke and involves ambulance training and pre-notification of the receiving hospital. It successfully reduced treatment delays and was subsequently replicated elsewhere <sup>[70]</sup>.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>National clinical guidelines for acute treatment including thrombectomy have been published <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> Currently, all 5 University hospitals and 16 Central hospitals in Finland have dedicated stroke units. Also some district hospitals have stroke units. The proportion of stroke patients treated in stroke units was 62% in 2011. Large variations exist between regions. 73% of patients living within the catchment area of a SU were treated in a SU compared to 9% outside a catchment area <sup>[67]</sup>. Some hospitals, e.g. Turku University Hospital, have undertaken the European Stroke Initiative certification <sup>[9]</sup>.</p> <p>In 2006, there were only 16 stroke units in Finland (of those 5 comprehensive stroke centres) treating 54% of stroke patients <sup>[67]</sup></p> <p>A telestroke service is provided 24/7 by the Helsinki University Central Hospital to 11 hospitals, covering thrombolysis nationwide <sup>[9]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> Data from the national stroke registry PERFECT (1997-2007) show a rise in thrombolysis rates with a 1999-to-2007 average of 1% of admitted ischaemic stroke patients reaching 3.4% in 2007 <sup>[67]</sup>. In 2011 a Helsinki stroke centre achieved a thrombolysis rate of 31% <sup>[71]</sup>. The current national thrombolysis rate of ischaemic stroke patients is estimated to be 15% <sup>[9]</sup>.</p> <p>Thrombectomy is performed and centralised to 5 university hospitals <sup>[9]</sup>.</p> <p>A national audit (PERFECT) covers stroke unit admission and acute care <sup>[67]</sup>.</p>

## FINLAND (continued)

### REHABILITATION ORGANISATION & DELIVERY

**Indicator 9:** Early assessment is provided, and patients are on the acute ward for an average 5 days (range 3-8 days). Intensive rehabilitation (if needed) begins within a few days of admission and lasts on average for 29 days (range 17-54 days) <sup>[72]</sup>.

The rehabilitation plan is the responsibility of the treating doctor and is required by law. A written rehabilitation (acute phase) plan is made in only about half of rehabilitation centres <sup>[73]</sup>.

Patients have variable access to multiprofessional therapies in hospital and as outpatients depending on location. For example, at the time of a recent survey, two hospitals do not have occupational therapy, and two lacked speech therapy, for stroke care <sup>[72]</sup>.

Intensive rehabilitation is defined as physiotherapy five times a week, speech therapy two-three times a week and neuro-psychological rehabilitation 1-2 times per week <sup>[73]</sup>. Patients in all hospitals have physiotherapy therapy at least once each weekday and in 90% of hospitals patients get occupational therapy 3-5 times a week. An estimated 40-50% patients could benefit from intensive multiprofessional rehabilitation (two regions achieve this); typically 10-20% patients receive this. "In practice there are regions where the [stroke] patient receives very little or even no rehabilitation services" <sup>[72]</sup>.

Half of patients return home after their acute treatment; of those accessing intensive rehabilitation, 70% can return home after this <sup>[73]</sup>.

**Indicator 10:** Early supported discharge is not yet available but is supported in new guidelines (due autumn 2016), although decisions whether to adopt this will be made locally <sup>[9]</sup>. Currently length of stay is approximately 40 days (PERFECT audit data, 2011) <sup>[9]</sup>.

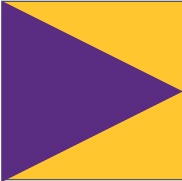
Rehabilitation is not part of the national audit <sup>[9]</sup>.

## FINLAND

(continued)

<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> Approximately 20% of patients are reviewed at 3 months by neurologist (i.e. medical review) and follow up home rehabilitation visits are arranged by 19/24 acute hospitals on an irregular basis (national survey by Aivoliitto, <sup>[9]</sup>)</p> <p><b>Indicator 12:</b> Social insurance institution offers vocationally oriented multiprofessional rehabilitation to those with mild symptoms who are employed <sup>[74]</sup>. The Finnish Brain Association (Aivoliitto) offers adaptation training and rehabilitation for stroke patients and their family members. There are around 40 courses per year for different groups funded by Kela (an independent social insurance institution supervised by Parliament) and RAY (Finland's Slot Machine Association) <sup>[42]</sup>.</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<p><b>Incidence</b></p>	<p><b>Prevalence</b></p>	<p><b>Deaths</b></p>	<p><b>DALYs lost</b></p>
	<p>+44</p>	<p>+26</p>	<p>+66</p>	<p>+41</p>



 <h2 style="margin: 0;">FRANCE</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>National health insurance (national insurance contributions) covers all medical expenditure. The National Stroke Plan gave additional funding for patients treated in a stroke unit <sup>[9]</sup>.</p> <p>Regional health agencies have a supervisory role with special responsibility for coordination between medical and social services <sup>[75]</sup>.</p> <p>Telemedicine is well developed in several French regions <sup>[9]</sup>.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 63,601,002</p> <p>Incidence estimate (GBD 2015) <sup>[1]</sup>: 57,174 strokes/year, 46.7 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015) <sup>[1]</sup>: 366,129 strokes, 349.0 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 8.5 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015)<sup>[1]</sup>: 47,671 deaths due to stroke/year, 31.5 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>There are several local registries (Dijon, Brest, and Lille).</p> <p>Healthcare cost of stroke: total € 1,973.2 million, € 30 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There is a national stroke prevention strategy/ programme and public campaigns for prevention are currently being undertaken <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 27.5%, high cholesterol: 62%, smoking: 28.1%, raised glucose: 8%<sup>[4]</sup>, atrial fibrillation: 600,000 to 1million. <sup>[76]</sup></p> <p><b>Indicator 2:</b> Data not found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 90.0% (PREFER-AF study) <sup>[7]</sup></p> <p>Use of oral anticoagulants in stroke patients: 91.1% post-stroke in AF patients in 2004-6 (Dijon, EROS) <sup>[77]</sup></p> <p><b>Indicator 8:</b> Several hospitals have introduced TIA outpatient clinics for urgent assessment<sup>[69, 78]</sup></p>

## FRANCE

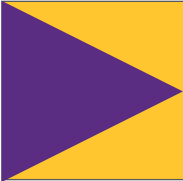
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<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> Every year there is a national, public campaign, performed by the Health Ministry, the association of patients (France-AVC), and the French Stroke Society regarding stroke symptoms and the need to call emergency services [17]. However inadequate public education about stroke was reported [75].</p> <p>The National Stroke Plan (2010) and the national stroke guidelines point out the need to improve education of the public and professionals with regards to stroke as an emergency [9].</p> <p><b>Indicator 4:</b> The HAS-Santé stroke guidelines (2010) [79] state that all health professionals involved in stroke management should be trained to recognise and respond to stroke symptoms, using the ASA/FAST symptom test [9].</p> <p><b>Indicator 5:</b> In the North of France region emergency services are trained to screen for stroke and direct patients to the closest stroke unit. There are also several population campaigns on TV/ bus/metro covering stroke symptoms and their urgency [80].</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>National clinical guidelines for acute stroke care have been developed.</p> <p><b>Indicator 6:</b> In each region of France, there is a university hospital with a stroke unit of reference, associated to general hospitals by stroke networks and telemedicine [9]. There are currently 120 stroke units (below the target of 170, National Stroke Plan 2010-14) or stroke unit bed/100,000 inhabitants [17]. 33% of stroke patients are treated in stroke units nationally, while the National Stroke Plan sets a target of 100% [81]. Local, population-based data from the Dijon Stroke Registry reported a proportion of 51% of stroke patients spending &gt;50% of their hospital stay in a stroke unit in 2004-6 [77].</p> <p>A telemedicine system was initiated in 2009 and is progressively being developed in several French regions [9].</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> Nationally, a thrombolysis rate below 3% of all ischaemic stroke patients was estimated for 2011 [17]. For ischaemic stroke patients admitted to stroke units thrombolysis rate was 16.7% according to data from the French Society of Radiology in 2015 [81]. A study relating to the North-of-France region reported a thrombolysis rate of 9.4% in 2009/10 and a rate of 16.5% in 2012 in stroke unit patients, an increase from 103 to 181/1,000,000 population or 76% [80].</p>

## FRANCE

(continued)

<p><b>TREATMENT RATES &amp; AUDITS</b> (continued)</p>	<p>Thrombectomy is available in major hospitals, with the network being gradually implemented under regional responsibility. The Health Authorities (Haute Autorite de Santé) are evaluating thrombectomy for future reimbursement <sup>[9]</sup>.</p>			
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>There are guidelines (additional to the main stroke care guidelines) on motor function rehabilitation <sup>[79]</sup>.</p> <p><b>Indicator 9:</b> Patients receive multiprofessional rehabilitation in stroke units (full team including neuropsychology), rehabilitation centres and in the community. In a recent study, 60% of discharges were to home, and 25% to rehabilitative care and then home <sup>[81]</sup>. Inpatient rehabilitation provision has recently been described as ‘sub-optimal’ <sup>[17]</sup>. Patients require health insurance to be admitted to rehabilitation centres <sup>[75]</sup></p> <p>There are barriers to effective implementation of stroke care pathways in France. The barrier most commonly cited by healthcare staff surveyed in France was lack of resources, especially staff shortages in rehabilitation centres and nursing homes. The acute-rehabilitation pathway is not always well implemented, e.g. physicians sometimes do not know which facilities accept stroke patients <sup>[75]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not well developed <sup>[9]</sup>; there are local examples such as using a mobile physical rehabilitation medicine team (physician, occupational therapy and social worker) <sup>[82]</sup>.</p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p>Indicator 11 Reviews are usually offered and involve a multiprofessional team between 3 and 6 months after stroke or during a therapeutic education program (depending on local organisation) <sup>[9]</sup>.</p> <p>There are pathways of care/protocols between acute phase care and GPs, and between rehabilitation services and GPs at national and regional levels <sup>[17]</sup>.</p> <p><b>Indicator 12:</b> There are disability/illness benefits <sup>[9]</sup>.</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<p><b>Incidence</b></p> <p>+40</p>	<p><b>Prevalence</b></p> <p>+30</p>	<p><b>Deaths</b></p> <p>+51</p>	<p><b>DALYs lost</b></p> <p>+37</p>

 <h2 style="margin: 0;">GERMANY</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>Decentralised healthcare system with universal coverage, funded by national insurance contributions (90% of population pay), and private schemes (11% use). There are some small out of pocket payments <sup>[9]</sup>.</p> <p>Germany has comprehensive stroke treatment services, organised into networks so that patients are directed to specialist centres <sup>[42]</sup>.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 81,799,600</p> <p>Incidence estimate (GBD 2015)<sup>[1]</sup>: 88,922 strokes/year, 51.7 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate (GBD 2015)<sup>[1]</sup>: 526,774 strokes, 338.5 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 6.7 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015)<sup>[1]</sup>: 75,861 deaths due to stroke/year, 37.9 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: The German Stroke Register Study Group ADSR includes several local registries, e.g. Erlangen, Ludwigshafen, Berlin</p> <p>Healthcare cost of stroke: total € 5,651.1 million, € 70 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are ongoing public health campaigns focussing on stroke, some of them covering prevention (healthy lifestyle, risk factor knowledge). Many of these are funded by industry rather than government <sup>[83]</sup>. Stroke risk factor knowledge is low <sup>[84]</sup>.</p> <p>There are national guidelines for the primary and secondary prevention of stroke although the latter have not been completely finalised or updated as recently as the guidelines for GPs <sup>[83]</sup>. Better preventive care including risk factor detection is needed <sup>[9]</sup></p> <p>Estimated prevalence of high blood pressure: 27.1%, high cholesterol: 65.6%, smoking: 30.7%, raised glucose: 7.4% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 25.5% <sup>[5]</sup>. Data from the German Health Examination Surveys, showed treatment rates in hypertensive patients increasing from 54% to 72% and control rates among treated patients increasing from 42% to 72% between 1998 and 2008/11 <sup>[85]</sup>. There are significant regional differences in treatment rates <sup>[86]</sup>.</p>

## GERMANY

(continued)

<p><b>RISK FACTORS / PREVENTION</b> (continued)</p>	<p>In 2006-8, 76% of hypertensive stroke patients were found to be treated with antihypertensives, with 29.9% achieving adequate blood pressure control <sup>[35]</sup></p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 87.4% in Germany, Austria, and Switzerland combined <sup>[7]</sup>; 71.4% of AF patients are treated according to guidelines <sup>[87]</sup></p> <p>Use of oral anticoagulants in stroke patients: 55.3% of AF patients at discharge following stroke in 2009 <sup>[88]</sup></p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> Since 1998 there are several public awareness campaigns, some ongoing. The impact of some of them was audited [84, 89, 90]. Knowledge of stroke symptoms is low <sup>[84]</sup>. Medical education emphasises stroke as an emergency <sup>[91]</sup>.</p> <p><b>Indicator 5:</b> Emergency services/ambulance staff is trained to screen patients for stroke using validated scales, triage to the appropriate hospital, and pre-notify the receiving hospital <sup>[91]</sup>. Education training programmes for emergency staff/paramedics have led to less in-hospital delay and increased thrombolysis rates <sup>[92]</sup>.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p><b>Indicator 6:</b> The certification system for stroke units is well established including comprehensive stroke units, telestroke networks and neurovascular networks (work in progress). In March 2017, there were 300 stroke units certified by German Stroke Society and German Stroke Foundation. Certification is currently on a voluntary basis. According to hospital administrative data, the proportion of hospitalised stroke patients being treated in stroke units rose steadily from 15% in 2005 to 56.9% in 2012 [93, 94]. This proportion is estimated to have now increased to 70-80% <sup>[9]</sup>. The German Stroke Register Study Group reported a stroke unit treatment rate of 77.2% in 2012 <sup>[95]</sup>. Stroke units are organised in a two tiers model with local and regional stroke units. Regional stroke units have capability for neurosurgery and interventional neuroradiology, while local stroke units should have a close collaboration with their regional stroke unit <sup>[17]</sup>.</p> <p>A telemedicine stroke network is in operation in some regions <sup>[96]</sup>. There are some regional initiatives for emergency mobile thrombolysis <sup>[97]</sup>, and early diagnostics in the ambulance <sup>[17]</sup>.</p>

## GERMANY

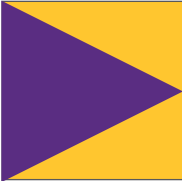
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<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> According to administrative hospital data, the thrombolysis rate of hospitalised ischaemic stroke patients was 2.4% in 2005, 5.6% in 2008, 8.9% in 2010, and 10.2% in 2012 [93, 94]. The German Stroke Register Study Group ADSR reported a thrombolysis rate of 6.0% of hospitalised ischaemic stroke patients in 2004, rising to 11.2% in 2009 [88], and 13.6% in 2012 (59.7% of “eligible” patients, [95]. Data from the state-wide, hospital-based Rhineland-Palatinate acute stroke care quality monitoring project show a thrombolysis rate of all hospitalised ischaemic stroke patients of 4.7% in 2006, compared to a rate of 14.1% of those admitted &lt;3h after onset (6.5% in 2001, [98]). The rate of thrombolysis varies according to service level, indicating potential to increase rates: 44% of patients admitted to interregional stroke units in Baden-Wuerttemberg received thrombolysis vs 13% in hospitals without a stroke unit [99].</p> <p>Thrombectomy rates rose from 0.14% in 2008 to 1.63% in 2012 according to hospital administrative data of ischaemic stroke patients [94]. The German Stroke Foundation is reviewing neurovascular networks where as an important criterion a trans-regional system for the coordinated provision of thrombectomy is implemented [100].</p> <p>Participation in one of the regional quality assurance projects of the ADSR is mandatory for all certified stroke units and for other hospitals treating stroke patients in some regions.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>Guidelines: early assessment &amp; multiprofessional neuro-rehabilitation [101]. The German Stroke Registries Group (ADSR) monitors discharge to rehabilitation and there are regional projects on the quality of rehabilitation, using evidence-based quality indicators [95, 102]. Quality indicators for follow-up in primary care and in outpatient care have not yet been developed [83].</p> <p><b>Indicator 9:</b> Germany uses a stepwise model of rehabilitation offering therapy targeted according to patient need. Multiprofessional rehabilitation (doctor, nursing staff, therapists and psychology) is provided to inpatients [9]. Patients have tended to get more therapy time than in e.g. the UK due to more formal management [103, 104].</p> <p><b>Indicator 10:</b> Early discharge to inpatient rehabilitation centres is supported.</p>

## GERMANY

(continued)

<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b> (continued)</p>	<p>Post-discharge, multiprofessional rehabilitation is available in neuro/geriatric rehabilitation centres and via outpatient provision (physiotherapy, speech therapy, occupational therapy). About a quarter of stroke patients are discharged to a rehabilitation facility <sup>[17]</sup>.</p> <p>Not all patients who would benefit from post-acute rehabilitation, access it. In the northwest Germany study (127 hospitals), of the primary target group for rehabilitation, 15% did not have rehabilitation after the acute stage. Older patients were less likely to access rehabilitation <sup>[105]</sup>.</p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> There is no specific disease management programme for stroke (unlike for diabetes and heart disease) (Wagner 2017, personal communication). There is a 3 month follow up of stroke patients in some regions [9, 102] , but stroke support services are not part of usual care <sup>[106]</sup>. There are local projects focusing on case management, where a trained case manager is responsible for coordinating post-acute care <sup>[83]</sup></p> <p>There is a lack of pathways of care/protocols between acute care and GPs or rehabilitation and GPs (so, for example, a lack of communication between hospitals and GPs about changes in medication) <sup>[17]</sup></p> <p><b>Indicator 12:</b> National health insurance covers rehabilitation, aids, disabled facilities grants and personal care <sup>[9]</sup>.</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+30	+19	+40	+27

 <h2 style="margin: 0;">GREECE</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>National insurance system plus out of pocket payments, Prevention is largely funded by national public or private insurance; there are limits on rehabilitation funding <sup>[9]</sup>.</p> <p>There is no established central stroke network, there are variations in organisation between regions <sup>[42]</sup>.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 11,606,813</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 16,095 strokes/year, 69.1 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 69,028 strokes, 352.6 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality (28-days post-stroke): 26.6% <sup>[107]</sup></p> <p>Mortality <sup>[1]</sup> (GBD 2015): 19,350 deaths due to stroke/year, 69.6 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>There are no current national or local stroke registries (several past registries: Athens, Arcadia, Xanthi, Patra) [9, 108]</p> <p>Healthcare cost of stroke: total € 356.2 million, € 33 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are public campaigns for stroke prevention. Additionally, during the last 5 years there is a current program (regional) for early detection of atrial fibrillation (NEDAFISP-GR) <sup>[9]</sup>. The Neurological Society and Hellenic Society of Cerebrovascular Diseases organise annual regional campaigns focused mainly on stroke prevention <sup>[9]</sup>. There is only moderate public knowledge of stroke risk factors <sup>[109]</sup></p> <p>There is no national stroke prevention strategy/programme. National guidelines only cover the monitoring and treatment of cholesterol <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 25%, high cholesterol: 48.2%, smoking: 43.4%, raised glucose: 9.1%<sup>[4]</sup>, atrial fibrillation: 3.9% <sup>[110]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 18.2%<sup>[5]</sup>. The Hypertension Study in General Practice in Hellas found that only 51.2% of hypertensive patients were treated and only 32.8% of treated patients had controlled blood pressure <sup>[111]</sup></p>

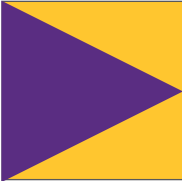


## GREECE (continued)

<p><b>RISK FACTORS / PREVENTION</b> (continued)</p>	<p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 76.2% in Greece and Italy combined (EORP-AF study, <sup>[16]</sup>); 40.6% of eligible AF patients were on oral anticoagulants, while 34.3% were on antiplatelets, and 25.1% had no therapy (screening study in rural Greece, <sup>[112]</sup>); &gt;55% of intermediate risk and 67% of high risk AF patient were not on oral anticoagulants <sup>[110]</sup></p> <p><b>Indicator 8:</b> No data found</p>
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> There are public awareness campaigns to emphasise stroke as an emergency. There is a moderate level of public awareness of stroke symptoms and the appropriate response <sup>[109]</sup>. A continued improvement in pre-hospital and in-hospital delays was attributed to public education and awareness campaigns <sup>[113]</sup>. Medical education emphasises stroke as an emergency.</p> <p><b>Indicator 5:</b> There is no central policy on emergency services/ ambulance staff training, but it depends on regional programmes <sup>[9]</sup>.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>There is no national guideline for acute stroke treatment, but most neurology departments treating stroke patients have local protocols based on the last edition of AHA/ASA guidelines. Recently, the Ministry of Health has asked the Hellenic Neurological Society together with the Hellenic Society of Cerebrovascular diseases to send proposals about a national stroke strategy.</p> <p><b>Indicator 6:</b> There is no centrally organised stroke network. The number of stroke units is very low, with great differences between different regions, e.g. between major cities, rural areas, islands. Some hospitals have introduced “stroke unit beds” within coronary/cardiovascular units. Greece has a very small number of comprehensive stroke centres <sup>[9]</sup>. A local study showed that 60.5% of stroke patients were treated in a stroke unit at Athens University hospital between 1993 and 2008 <sup>[113]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> The rate of ischaemic stroke patients receiving thrombolysis was reported as 4.2% between 2003 and 2008 in an academic stroke centre in Athens <sup>[113]</sup>.</p> <p>Endovascular treatment has only been carried out in a limited number of centres and is not available 24/7 <sup>[9]</sup>.</p> <p>There are no national audits or current local/regional registry to provide more current data <sup>[9]</sup>.</p>

## GREECE (continued)

<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Early assessment is supported. There is limited occupational therapy access, and usually patients do not access speech therapy or psychology <sup>[9]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not formally supported <sup>[9]</sup>.</p> <p>Most patients pay for (costly) rehabilitation services after discharge, as there are time/session limits on national health provision of physiotherapy, occupational therapy and speech therapy in rehabilitation centres (which are mostly private) - national insurance does not cover all of the cost of rehabilitation centre stays. A stroke survivor can be hospitalised in a rehabilitation centre for the first six months after the stroke with insurance coverage of the main cost (estimated in practice 50-75% of the total cost in private centres). For an outpatient stroke survivor there is coverage for physiotherapy program for 10 times / per month for the first six months <sup>[9]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Patients are not usually followed up about their rehabilitation needs after discharge <sup>[9]</sup>.</p> <p><b>Indicator 12:</b> Social security allowances are available. There is a lack of vocational rehabilitation and specialised stroke services. Patients may have to travel long distances to stay in these centres. There are day therapeutic centres but these have been affected by funding cuts and in general, they do not house independent living facilities, vocational rehabilitation, counselling or specialised services for stroke survivors, Voluntary organisations operate locally to support patients and families with life after stroke <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+19	+13	+24	+18

 <b>HUNGARY</b>	
<b>HEALTH CARE SYSTEM</b>	National Health Service free at the point of use.
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 10,075,034</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 21,132 strokes/year, 127.1 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 117,559 strokes, 763.0 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 9.6 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 14,104 deaths due to stroke/year, 75.8 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Hungarian Stroke Database project 1997-8 (11 regional hospitals), Debrecen Stroke Database (population-based, regional)</p> <p>Healthcare cost of stroke: total € 276.5 million, € 28 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p>The National Stroke Strategy highlights the importance of stroke prevention with healthy lifestyle, good blood pressure control, and AF screening <sup>[9]</sup>. Estimated prevalence of high blood pressure: 35.2%, high cholesterol: 55.2%, smoking: 29.6%, raised glucose: 10% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 27.9%<sup>[5]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> The National Stroke Strategy emphasises stroke as a medical emergency and recommends public stroke awareness campaigns <sup>[9]</sup>. A national stroke campaign was launched by the Hungarian Stroke Society in 2009 <sup>[114]</sup>.</p> <p><b>Indicator 5:</b> A “lysis alarm” programme was introduced at a tertiary medical centre in Hungary involving hospital pre-notification by the ambulance team <sup>[114]</sup>.</p>

## HUNGARY

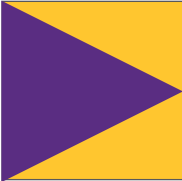
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<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>Hungary has a National Stroke Strategy <sup>[9]</sup>. Guidelines for the treatment of stroke were issued by the Ministry of National Resources 2010 <sup>[114]</sup>.</p> <p><b>Indicator 6:</b> Currently, Hungary has 39 stroke units <sup>[9]</sup> and is estimated to treat 30% of stroke patients in stroke units <sup>[13]</sup>. There are national guidelines for stroke services and acute treatment <sup>[9]</sup>.</p> <p>Telemedicine is used only in small localised trials <sup>[9]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> According to data from the National Health Insurance Fund of Hungary thrombolysis rate was 3.2% nationally in 2013, a doubling of the rate since 2008. There were 37 active thrombolysis centres performing 1,439 interventions <sup>[114]</sup>. The Markusovszky University Teaching Hospital reached a thrombolysis rate of 4% in 2013 following the launch of a “lysis alarm programme” <sup>[114]</sup>. In 2010 a national rate of &lt;1% (N=770) was estimated (~3% in large cities, [28, 115] compared to 0.7% in 2005 <sup>[40]</sup>.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p><b>Indicator 9:</b> Rehabilitation units admit patients as early as possible and discharge depends on achieving a level of independence appropriate to discharge destination (home, long term care or post-acute rehabilitation department) <sup>[116]</sup></p> <p>Around the time of the last Burden of Stroke report (2007) there was no rehabilitation-specific domiciliary or rehabilitation-focused long term care, and no unified structure for rehabilitation care for stroke patients. Rehabilitation units offer differing levels of care. Access to occupational therapy, speech therapy and neuropsychology has been more restricted than to physiotherapy <sup>[115]</sup></p> <p>Data on rehabilitation provision is lacking; in 2005/6 it was estimated that 25% of patients had access to rehabilitation <sup>[40]</sup>.</p> <p>There are mostly general homecare (non-rehabilitation) services in the community. Outpatient rehabilitation is available, but there is a shortage of specialised inpatient, outpatient and long term rehabilitation care <sup>[115, 116]</sup></p> <p><b>Indicator 10:</b> No data found</p>

## HUNGARY

*(continued)*

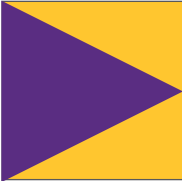
<b>LONGER TERM CARE &amp; SUPPORT</b>	<i>Indicator 11:</i> No data found			
	<i>Indicator 12:</i> Social security allowances are available <a href="#">[9]</a> .			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+28	+13	+44	+25

 <h2 style="margin: 0;">ICELAND</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>Iceland has a National Health Service which is free of charge (including rehabilitation therapies) but with certain co-payments in outpatient care. There is some funding for prevention though it is not earmarked especially for stroke but rather for heart and circulatory diseases in general <sup>[42]</sup>.</p> <p>Private health care is close to 20% of health services and is subsidised by the state.</p> <p>Telemedicine is not yet widespread <sup>[42]</sup>.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 320,060</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 190 strokes/year, 41.9 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 1,251 strokes, 298.2 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 7.4 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 152 deaths due to stroke/year, 30.0 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: National population-based epidemiological study <sup>[117]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p>Estimated prevalence of high blood pressure: 23.6%, high cholesterol: 69.8%, smoking: 17.5%, raised glucose: 7.1%<sup>[4]</sup>, atrial fibrillation: 1.9% in 2008, estimated to rise to 3.5% in 2050 <sup>[118]</sup></p> <p><b>Indicator 2:</b> Data from Icelandic GP database show that only 27% of patients diagnosed with hypertension had blood pressure levels below the guideline target of 140/90 <sup>[119]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p>

## ICELAND

(continued)

<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p><b>Indicator 6:</b> There is one hospital in Iceland that treats almost all stroke patients in the acute phase (National Hospital in Reykavik). It has no stroke unit, but a neurological department. There are no national guidelines for stroke treatment. The National Hospital uses certain guidelines based on best practices from other countries.</p> <p>The use of telemedicine is not yet widespread <sup>[9]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> No data found</p> <p>There is much interest in starting thrombectomy once the necessary expertise is available <sup>[9]</sup>.</p> <p>There is currently no national stroke audit.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p><b>Indicator 9:</b> Almost all patients have their early rehabilitation at the rehabilitation unit of the National Hospital in the capital city (otherwise in local hospitals outside the city). Post-acute rehabilitation is in rehabilitation centres and outpatient clinics (physiotherapy, speech therapy) <sup>[42]</sup>.</p> <p><b>Indicator 10:</b> No data found</p>
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> Research involving the national hospital has indicated that stroke patient follow up is inadequate, and the hospital is planning a follow up clinic to meet this need <sup>[42]</sup>.</p> <p><b>Indicator 12:</b> There are rehabilitation/incapacity pensions <sup>[120]</sup></p>

 <h2 style="margin: 0;">IRELAND</h2>	
<b>HEALTH CARE SYSTEM</b>	Comprehensive, government funded public system. Out of pocket payments for most inpatient and long-stay care. Residents on a limited income may qualify for a GP Visit Card or Medical Card entitling them to free health services.
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 4,581,269</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 2,771 strokes/year, 48.2 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 19,499 strokes, 346.0 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 9.9 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 2,123 deaths due to stroke/year, 35.2 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: National Stroke Register since 2011, North Dublin Population stroke study <sup>[121]</sup></p> <p>Healthcare cost of stroke: total € 143.8 million, € 31 per capita<sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> The Department of Health and Children has issued a new policy in 2010 “Changing Cardiovascular Health” <sup>[122]</sup> aiming to improve cardiovascular health, partly via public campaigns, covering healthy life-style, smoking, raised blood pressure and cholesterol, and atrial fibrillation. Public knowledge of stroke risk factors was found to be moderate, with less knowledge in older patients <sup>[123]</sup></p> <p>National clinical guidelines for the prevention of stroke and risk factor management have been developed.</p> <p>Estimated prevalence of high blood pressure: 20.9%, high cholesterol: 62.6%, smoking: 23.2%, raised glucose: 7.3% <sup>[4]</sup></p> <p><b>Indicator 2:</b> In the 2007 Survey of Lifestyle, Attitudes &amp; Nutrition in Ireland blood pressure screening was undertaken in adults aged 45 or over. 60% of men were found to have raised blood pressure. One third of those were on blood pressure treatment, the remainder had no treatment. In women the figures were 47% for raised blood pressure, with 17% on treatment and 27% on no treatment.</p>



## IRELAND

(continued)

<p><b>RISK FACTORS / PREVENTION</b> (continued)</p>	<p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients pre-stroke: 39% <sup>[124]</sup></p> <p>Six months after ischaemic stroke, 74.2% of patients were on anti-hypertensive therapy, but of those only 33.2% achieved blood pressure control (&lt;140/90). 83.5% of those with AF were on oral anticoagulants (2011 data) <sup>[125]</sup>.</p> <p><b>Indicator 8:</b> The National Stroke Programme encourages the development of local TIA services. Some dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> A national multi-media campaign, FAST, was launched in 2010-11. Its impact was audited in Ireland and showed some associations with changes in help-seeking behaviour for stroke <sup>[126, 127]</sup>. Awareness of stroke symptoms and the appropriate response has been poor <sup>[123]</sup></p> <p><b>Indicator 5:</b> There has been much recent progress with regards to service reconfiguration and education/training for emergency staff <sup>[122]</sup>.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>The Irish Heart Foundation has issued national clinical guidelines for stroke.</p> <p><b>Indicator 6:</b> According to the 2015 National Audit 54% of stroke patients are admitted to a stroke unit at some point during their admission, 47% spend &gt;50% of their hospital stay in a stroke unit, and 11% are admitted to intensive care or high dependency units.</p> <p>The North Dublin population study reported stroke unit admission rates of 17.8% of hospitalised stroke patients in 2005/6 <sup>[121]</sup></p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> The 2015 national stroke audit <sup>[124]</sup> shows a thrombolysis rate of 10.9% of hospitalised ischaemic stroke patients at 27 active sites. In the previous national audit INASC 2008, thrombolysis provision was virtually non-existent.</p> <p>Thrombectomy is undertaken in some centres. A regional stroke referral centre performed 93 thrombectomies between January 2010 and June 2013 <sup>[128]</sup></p> <p>Two national stroke audits have been undertaken (2008 and 2015) <sup>[124]</sup>.</p>

## IRELAND

(continued)

### REHABILITATION ORGANISATION & DELIVERY

There is a National Policy and Strategy for the Provision of Neuro-Rehabilitation Services in Ireland 2011-2015 and National Cardiovascular Health Policy 2010-19 [129, 130] [122]. The NCHP includes needs assessment prior to discharge; and the requirement for multiprofessional rehabilitation.

**Indicator 9:** In a 2006-07 national audit rehabilitation was described as “seriously inadequate” and “leaving many patients with potentially avoidable or unduly prolonged disability” [131]. Acute rehabilitation was only available to 1 in 4 patients or was delayed beyond the point at which it could be most effective. Less than half of stroke patients were seen by a physiotherapist within 72 hours of admission and only 1 in 4 had been assessed by an occupational therapist within 7 days of admission. There was little evidence of systematic management of secondary prevention targets before hospital discharge. Continuing care, long-term recovery programmes and community stroke services were haphazardly organised or did not exist. [131] quoted in [122]. In the latest rehabilitation audit, patients had access to physiotherapy, occupational therapy, and speech and language therapy at each of the 26 sites. Access five days a week to these therapies was available in 96%, 89%, and 54% of sites (physiotherapy, occupational therapy, and speech and language therapy respectively) [132]

Post-acute rehabilitation is mostly delivered through geriatric and rehabilitation medicine. There are restrictions on age, e.g. a particular lack of appropriate services (physical/vocational) for younger/less affected patients. There is limited access to intensive/specialist facilities including MDTs, inpatient beds and outpatient services [124, 132]

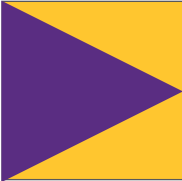
Care pathways and resourcing vary between localities, leading to wide variations in length of stay and provision of inpatient and community rehabilitation across the country. There are long waits for nursing home care and specialist inpatient [124, 132]

As an example of good practice, the National Rehabilitation Hospital – one of largest rehabilitation hospitals in Europe - covers inpatient, outpatient, home, community and vocational rehabilitation plus stroke specialty service. Staff fed into the cardiovascular strategy for stroke and National Policy and Strategy for the Provision of Neuro-Rehabilitation Services [122]

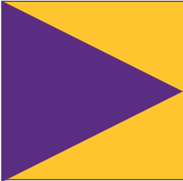
## IRELAND

(continued)

<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b> (continued)</p>	<p>A more recent, small self-report study in Dublin found that, while most patients referred for ongoing therapy were (eventually) seen, half reported a delay in receiving services - some were still waiting 6 months after referral <sup>[133]</sup></p> <p>About a third (36% of 196) of community dwelling stroke survivors paid privately for rehabilitation due to lack of access (2013) <sup>[134]</sup></p> <p><b>Indicator 10:</b> Early supported discharge is only accessible by 19% (5/26) of services. 14-35% of cases accessed these services. 39% (10/26) described access to a community rehabilitation team (CRT) <sup>[132]</sup>. Median length of stay reduced by more than one fifth between 2008 and 2015 <sup>[124]</sup></p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> 77% of services provide a follow up outpatient review; with a similar number offering readmission to patients if late or new rehabilitation needs are identified at follow up <sup>[132]</sup>. Many patients do not know who in hospital to contact post discharge <sup>[131]</sup></p> <p>There is a lack of appropriate psychological and counselling services <sup>[135]</sup></p> <p><b>Indicator 12:</b> Social welfare payments are available in the event of sickness and disability [<a href="http://www.citizensinformation.ie">http://www.citizensinformation.ie</a>]</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+59	+41	+84	+57

 <h2 style="margin: 0;">ISRAEL</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>Israel has a National Health Service which is free to use by everyone, and is funded by compulsory contributions. The state is responsible for providing health services to all residents of the country through 4 non-for-profit health maintenance organisations (HMO) <sup>[42]</sup>.</p> <p>Supplementary health insurance is available. All acute stroke care is provided as part of the public system.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 8,192,463</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 4,171 strokes/year, 45.6 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>[Incidence estimate (national registry data, <sup>[136]</sup>: 9000]</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 26,450 strokes, 309.2 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 6.3 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 3,368 deaths due to stroke/year, 33.9 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: National Acute Stroke Israeli Registry</p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Data not found</p> <p>Estimated prevalence of high blood pressure: 19.7%, high cholesterol: 53.5%, smoking: 30.4%, raised glucose: 7.2% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Data not found</p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> There was a nationwide FAST public health campaign including advertisement on TV <sup>[42]</sup>. A directive on acute stroke care by the Ministry of Health, as well as the clinical guidelines by the Israeli Neurological Association emphasise stroke as a medical emergency. The National Programme of Quality Indices includes some pre-hospital indices focusing on efficiency in acute management <sup>[136]</sup></p> <p><b>Indicator 5:</b> Data not found</p>

<b>ISRAEL</b> (continued)	
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The Ministry of Health published a directive about the organisation of acute stroke care.</p> <p>The Israeli Neurological Association has set national clinical guidelines.</p> <p><b>Indicator 6:</b> Patients with acute stroke are managed in stroke units, neurology or medical wards. There is a two tiers system of stroke care in place with comprehensive and primary stroke units <sup>[9]</sup>. In 2004, ~5% of stroke patients were treated in stroke units <sup>[137]</sup></p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Thrombolysis is currently provided at about 20 medical centres nationally <sup>[136]</sup>. Thrombolysis rates were 0.4% of hospitalised ischaemic stroke patients in 2004 and 7.4% in 2013 according to the triennial 2-month period of the National Acute Stroke Israeli Registry <sup>[136]</sup></p> <p>Thrombectomy is performed at 9 centres nationally <sup>[9]</sup>.</p> <p>The National Acute Stroke Israeli Registry serves as a national clinical audit.</p>
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Guidelines for provision of rehabilitation to the elderly exist <sup>[138]</sup>.</p> <p><b>Indicator 9:</b> Acute-stage, inpatient and outpatient rehabilitation (in specialist rehabilitation clinics) includes physiotherapy, speech therapy and occupational therapy. Vocational training and rehabilitation is paid by national insurance; patients are entitled to 12 sessions of physiotherapy a year <sup>[139]</sup></p> <p>There are no organised data on provision or distribution throughout Israel of rehabilitation services <sup>[138]</sup></p> <p><b>Indicator 10:</b> Data not found</p>
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Data not found</p> <p><b>Indicator 12:</b> Social security allowances are available including carer allowances, mobility allowance and vocational training <sup>[139]</sup>. The Ministry of Health partially funds rehabilitation, mobility aids and disabled facilities. The service is provided through the health bureaus (chronic disease and rehabilitation department) <sup>[140]</sup>. The Neeman Association rehabilitation clubs support patients to maintain rehabilitation gains <sup>[139]</sup>.</p>

 <h2 style="margin: 0;">ITALY</h2>	
<b>HEALTH CARE SYSTEM</b>	National health system, free at point of delivery, funded through general taxation. Controlled by regional governments which set strategy and policy implementation. Private sector exists with minority role in acute phase, more important in outpatient and rehabilitation [9, 17]
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 60,665,625</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 73,116 strokes/year, 53.1 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 351,820 strokes, 307.2 per 100,000 inhabitants age- and sex-adjusted</p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 6.5 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 75,252 deaths due to stroke/year, 44.7 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>No national, but several regional registries: L'Aquila (Abruzzo), Vibo Valentia (Calabria), Acquaviva delle Fonti and Casa Massima (Puglia), Sesto Fiorentino (Tuscany), Valle d'Aosta, Belluno (Veneto) <sup>[141]</sup>.</p> <p>Healthcare cost of stroke: total € 3,195.9 million, € 53 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> The stroke patients association ALICE initiates educational campaigns on stroke prevention, healthy lifestyles, and blood pressure control at national, regional, and local levels.</p> <p>Italy does not have a national stroke prevention programme/strategy <sup>[9]</sup>. There are national clinical guidelines for the management of high blood pressure, cholesterol, atrial fibrillation, and TIA.</p> <p>Estimated prevalence of high blood pressure: 27.6%, high cholesterol: 62.2%, smoking: 24.2%, raised glucose: 8.5%<sup>[4]</sup>, atrial fibrillation: 1.3% <sup>[142]</sup></p> <p><b>Indicator 2:</b> A large population survey found that 60.5% of hypertensive patients were under pharmacological treatment. Among treated patients 33.6% had controlled blood pressure <sup>[143]</sup>. Another study found a control rate of 47.1% in treated hypertensive patients <sup>[144]</sup></p>

## ITALY (continued)

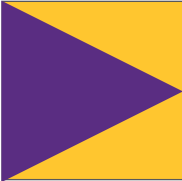
<p><b>RISK FACTORS / PREVENTION</b> (continued)</p>	<p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 71.5% (PREFER-AF study, [7], 76.2% in Greece and Italy combined (EORP-AF study, [16]; Based on GP data across Italy, only 46% of AF patients received oral anticoagulants in 2011 [145]. 84% are treated with oral anticoagulants at the time of diagnosis, but only 29.6% two years after diagnosis [142]</p> <p>Use of oral anticoagulants in stroke patients: 74.2% post-stroke in AF patients in 2004-6 [77]</p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist [69]</p>
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> There have been recent public campaigns on stroke as an emergency in Italy, covering stroke knowledge and reaction to symptoms [9]. Poor awareness of stroke symptoms was found among the public and medical personnel was found [146]. Medical education emphasises stroke as a medical emergency [9].</p> <p><b>Indicator 5:</b> Emergency services are trained to screen for stroke symptoms only in some regions [9]. In North Eastern Italy, several educational interventions towards health professionals and the development of pre-notification system by ambulance service (“Stroke Code”) were undertaken. Those interventions were audited and showed poor results: only 20% of stroke patients arriving by emergency services arrived with a “stroke code” [146]</p> <p>The Stroke Programme in Siena Province (Tuscany) includes direct transfer by ambulance or helicopter with medical assistance on board, stroke code notification, and a mean door-to-needle time of 48 minutes [9].</p> <p>The Emilia-Romagna Organisational Audit 2007 showed that almost all hospitals receiving stroke patients apply algorithms to fast-track stroke patients.</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>There is no national stroke strategy, but some regional plans exist. National clinical guidelines (SPREAD) have been published by the Italian Stroke Organisation [9].</p> <p><b>Indicator 6:</b> Stroke patients are admitted to general medicine wards, neurological wards, stroke units, and geriatric wards. Currently, there are 130 stroke units in Italy. Less than one third of stroke patients are admitted to a stroke unit.</p>

<b>ITALY</b> (continued)	
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b> (continued)	<p>There are wide differences between Northern and Southern Italy. While 34% of the Italian population live in Southern Italy, only 11% of stroke units are located there <sup>[17]</sup>. 27.6% were admitted to stroke units in the Emilia-Romagna Audit 2007 <sup>[147]</sup>, while only 15.9% spend &gt;50% of their hospital stay in stroke units in 2004-6 in Sesto Fiorentino <sup>[77]</sup></p> <p>There are some telemedicine experiences at regional level, e.g. Veneto, Emilia Romagna <sup>[9]</sup>.</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> In 2014, approximately 4200 thrombolysis procedures were performed <sup>[148]</sup> across the 170 authorised centres (only 129 active) nationally compared to 2400 in 2012 <sup>[17]</sup>. Access to thrombolysis is worse in Southern areas <sup>[17]</sup>. The Verona University Hospital achieved a thrombolysis rate of 10.7% of ischaemic stroke patients in 2009 <sup>[146]</sup>, while data from the population-based Sesto Fiorentino stroke registry calculated a rate of 2.1% across all stroke patients in 2004-6 <sup>[77]</sup></p> <p>Thrombectomy is currently being introduced in secondary level hub hospitals and stroke units <sup>[9]</sup>.</p> <p>Currently, there are only regional clinical audits of stroke care <sup>[9]</sup>.</p>
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Italian Stroke Organisation guidelines (as well as regional protocols and strategies) include rehabilitation <sup>[149]</sup></p> <p><b>Indicator 9:</b> Intensive acute phase rehabilitation is usually provided for 4 weeks. Patients have multiprofessional rehabilitation in hospital (except that occupational therapy access is unusual), and those who meet eligibility criteria (e.g. Barthel index) are transferred to rehabilitation hospitals, outpatient services and other community services (primarily physiotherapy and speech therapy) <sup>[17]</sup></p> <p>Assessment practices and pathways, and access to post-acute rehabilitation services is variable across the country due to lack of national strategy, e.g. in criteria for allocation patients to appropriate rehabilitation setting <sup>[150]</sup></p> <p><b>Indicator 10:</b> Early supported discharge services are available in a few regions <sup>[150]</sup></p> <p>There has not been a recent national audit of rehabilitation.</p>



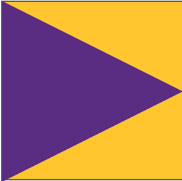
## ITALY (continued)

<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> GP follow up a few weeks after discharge is supported but there is a lack of protocols/pathways between acute/rehabilitation care and primary care at national level <sup>[17]</sup></p> <p><b>Indicator 12:</b> There is a lack of support from statutory services or health insurers with adjusting to life after stroke <sup>[42]</sup>. Local Health Authorities (ASL) pay for a number of hours of home care and basic aids and adaptations. There is a lot of variation in support available for people with disabilities to live independently, although in general such schemes have become more common <sup>[30]</sup>. Voluntary associations are very active, involved in service improvement, and offer practical support <sup>[30]</sup>. The Stroke Association ALICE is the major voluntary organisation that provides patient information and runs support groups <sup>[9]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+32	+26	+38	+32

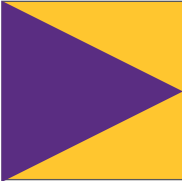
 <h2 style="margin: 0;">LATVIA</h2>	
<b>HEALTH CARE SYSTEM</b>	Public funding with some out of pocket payments depending on disability/income <sup>[151]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 1,973,127</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 6,976 strokes/year, 181.5 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 29,290 strokes, 827.6 per 100,000 inhabitants age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 5,204 deaths due to stroke/year, 121.4 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Available registries: A national stroke registry has been initiated, currently covering 5 hospitals <sup>[9]</sup>.</p> <p>Healthcare cost of stroke: total € 21.1 million, € 11 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are current public campaigns for stroke prevention. The patient organisation “ParSirdi.lv” organised an awareness campaign on World Stroke Day, covering prevention, particularly atrial fibrillation, and stroke as an emergency <sup>[9]</sup>.</p> <p>There are no national stroke prevention programme or strategy or national or local guidelines covering high blood pressure, cholesterol, or atrial fibrillation <sup>[9]</sup>. Some hospitals have stroke prevention centres (4 in Riga) <sup>[152]</sup></p> <p>Estimated prevalence of high blood pressure: 37.1%, high cholesterol 55.7%, smoking: 35.9%, raised glucose: 9.4% <sup>[4]</sup></p> <p>A national population-based survey of cardiovascular risk factors was carried out in 2012 and found increased cholesterol in 75.2% and high blood pressure in 44.8% of the participants <sup>[153]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 17.6%<sup>[5]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> Medical education emphasises stroke as emergency <sup>[9]</sup></p> <p><b>Indicator 5:</b> Emergency services/ambulance staff are trained to screen for stroke, but only a small number of hospitals have screening /fast-track algorithms in place <sup>[9]</sup>.</p>

## LATVIA (continued)

<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The Latvian Public Health Strategy 2011-2017 has a focus on cardiovascular diseases. National clinical guidelines covering acute care are published by the Latvian Association of Neurologists (2013).</p> <p><b>Indicator 6:</b> There are 25 acute hospitals admitting stroke patients. 7 of those hospitals have dedicated stroke units. Approximately 77% of stroke patients are treated in stroke units <sup>[9]</sup>. Telemedicine is not in operation <sup>[13]</sup>.</p>			
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> According to estimates by the CEES Working Group 54 thrombolysis procedures were performed nationally in 2005 <sup>[40]</sup>, while the national rate was reported as 9% in 2008-2014 <sup>[13]</sup>.</p> <p>Currently, no national or regional/local stroke audit are being undertaken <sup>[9]</sup>.</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Stroke rehabilitation started to become available in 1995. There is only one rehabilitation centre in Latvia that provides publicly funded inpatient rehabilitation in the post-acute phase of stroke (so not all patients can be treated in a specialised stroke rehabilitation unit). There is a lack of guidelines and selection criteria so referral post-acute stage is 'random'; options include rehabilitation centre, home based rehabilitation, day units, and outpatient clinics. Patients referred to a rehabilitation centre will (after a potentially long wait, median 13 weeks) receive multiprofessional therapies for about 2 weeks <sup>[154]</sup></p> <p><b>Indicator 10:</b> Early supported discharge is not available <sup>[154]</sup></p> <p>It is not known how many patients receive rehabilitation <sup>[154]</sup>. In 2005/6 it was estimated that 70% of patients had access to rehabilitation <sup>[40]</sup>.</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> It is not common practice for patients to have a follow up medical/therapeutic review <sup>[154]</sup></p> <p><b>Indicator 12:</b> People with (very) severe disability are entitled to social service support with adaptations, transport, and vocational rehabilitation to promote reintegration/inclusion <sup>[42]</sup>. Progress towards supporting people with disabilities to live independently in the community has been slow <sup>[30]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+5	-3	+15	+5

 <h2 style="margin: 0;">LITHUANIA</h2>	
HEALTH CARE SYSTEM	Compulsory state health insurance since 2014.
STROKE EPIDEMIOLOGY / STATISTICS	<p>Population: 2,881,020</p> <p>Incidence estimate <sup>[1]</sup> (GBD 2015): 8,817 strokes/year, 167.9 strokes per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Prevalence estimate <sup>[1]</sup> (GBD 2015): 44,386 strokes, 905.4 per 100,000 inhabitants age- and sex-adjusted</p> <p>Mortality <sup>[1]</sup> (GBD 2015): 5,036 deaths due to stroke/year, 85.6 deaths per 100,000 inhabitants annually age- and sex-adjusted</p> <p>Registries: Kaunas Stroke Registry</p> <p>Healthcare cost of stroke: total €41.6 million, €14 per capita <sup>[3]</sup></p>
RISK FACTORS / PREVENTION	<p><b>Indicator 1:</b> No data found</p> <p>Estimated prevalence of high blood pressure: 34.7%, high cholesterol 54.8%, smoking: 30.1%, raised glucose: 9.7% <sup>[4]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in stroke patients: 37.3% post-stroke in AF patients in 2004-6 <sup>[77]</sup></p> <p><b>Indicator 8:</b> No data found</p>
EMERGENCY RESPONSE	<p><b>Indicator 4:</b> Training of medical staff is inadequate and needs improvement <sup>[155]</sup></p> <p><b>Indicator 5:</b> No data found</p>
ACUTE CARE ORGANISATION & DELIVERY	<p>National stroke guidelines were updated in 2007 by the Lithuanian Stroke Association <sup>[155]</sup></p> <p><b>Indicator 6:</b> There are 24 acute hospitals admitting stroke patients, mainly to neurological wards or intensive care units. There is no formal requirement for organised stroke units or certification for organised stroke care <sup>[17]</sup>.</p> <p>Data from the CEES Working group reported in 2007 that 7 stroke units are in operation and 20% of stroke patients are treated in stroke units <sup>[40]</sup>. The population-based Kaunas stroke registry reported that 22.7% of stroke patients spend &gt;50% of their hospital stay in stroke units in 2004-6 <sup>[77]</sup>.</p>

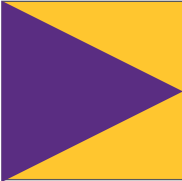
<b>LITHUANIA</b> (continued)				
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Thrombolysis was introduced in 2002. However, the population-based Kaunas Stroke Registry reported no thrombolysis procedures in 2004-6 [17]. Similarly hospital-based audits in two medical centres in 2006/7 reported no thrombolysis activity [156]. The CEES Working Group estimated 20 thrombolysis procedures nationally in 2005 [40], while in 2012 unofficial data led to a national estimate of 200 procedures [17]. Official data is lacking about the number of hospitals providing thrombolysis or their thrombolysis rate [17]</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Inpatient rehabilitation can last up to 48 days and includes individual and group physiotherapy, speech therapy, cognitive rehabilitation and occupational therapy. Physiotherapy and speech therapy can be provided at home, whereas occupational therapy can only be offered in the hospitals [17]</p> <p><b>Indicator 10:</b> Patients remain in hospital until ready for discharge to inpatient rehabilitation, home or to a nursing home. Early supported discharge is not available [17]</p> <p>Patients pay for rehabilitation and care after the acute stage; there is unlimited access to primary care. There have been reductions in funding of inpatient rehabilitation and longer term care services 2003-2009 [41].</p> <p>Data on rehabilitation provision is lacking; in 2005/6 it was estimated that 75% of patients had access to rehabilitation [40].</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Neurologists may see stroke patients in outpatient clinics after discharge from inpatient rehabilitation. There is a lack of pathways of care and protocols between acute care and primary care or rehabilitation and primary care [17]</p> <p><b>Indicator 12:</b> There is little statutory / insurance support for independent living [30] except personal care/home help and adaptations/aids subsidised by government [41].</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+2	-3	+10	+1

 <h2 style="margin: 0;">LUXEMBOURG</h2>	
<b>HEALTH CARE SYSTEM</b>	Public health system funded by national health insurance with free in-hospital care and 80-100% reimbursement of outpatient expenses. Prevention is funded for outpatients and in national information programmes <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 512,000</p> <p>Incidence estimate (GBD 2015): 403 strokes/year, 49.3 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 2,871 strokes, 378.3 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 326 deaths due to stroke/year, 35.2 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: local registries of the 3 stroke units</p> <p>Healthcare cost of stroke: total € 24.0 million, € 43 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p>National guidelines covering stroke prevention and stroke risk factor management exist <sup>[9]</sup>.</p> <p><b>Indicator 1:</b> The stroke patients' organisation "Blëtzasbl" undertakes public stroke prevention campaigns <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 25.5%, high cholesterol 66.9%, smoking: 24.4 %, raised glucose: 6.8% <sup>[4]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> There is no current public campaign to increase the awareness of stroke as a medical emergency. Medical education emphasises stroke as a medical emergency <sup>[9]</sup>.</p> <p><b>Indicator 5:</b> Emergency services are trained to screen for stroke symptoms and fast-track suspected stroke <sup>[9]</sup>.</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The National Neurological Society has established a national plan of stroke care. National guidelines covering acute care including thrombectomy, have been published <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> There are currently 3 stroke units in Luxembourg [9, 157]. The 3 stroke units adhere to the recommendations of the European stroke organisation and the national scientific council.</p>

## LUXEMBOURG

(continued)

<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> In 2010 the national thrombolysis rate was 6.4% (14 out of 220 ischaemic stroke patients) <sup>[157]</sup>.</p> <p>Thrombectomy is currently performed in one centre. Plans for implementing thrombectomy 24/7 is under way <sup>[9]</sup></p> <p>As national audit, the three stroke units participate in a benchmarking programme provided by the University of Münster in Germany.</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Multiprofessional rehabilitation (including therapists, psychology and dietetics) is provided to inpatients. Most are seen regularly for further therapies as outpatients, except occupational therapy which is only available on an inpatient basis <sup>[9]</sup>.</p> <p>Stroke units are in close contact with the rehabilitation centres. Social service is available in the hospitals to prepare the return home or into a protected environment <sup>[9]</sup>.</p> <p><b>Indicator 10:</b> No data found</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> No data found</p> <p><b>Indicator 12:</b> Social security allowances are available <sup>[9]</sup>. There is long-term care insurance for home care, and funding for adaptations/aids. However there has been a lack of support to prevent people with disabilities from becoming dependent <sup>[30]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+78	+72	+85	+78

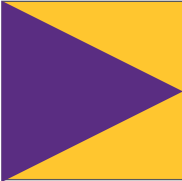
 <h2 style="margin: 0;">MACEDONIA</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>Most stroke patients are treated in government-funded hospitals. All phases of stroke prevention, acute treatment, and rehabilitation are in general funded by government. A small number of private hospitals treat stroke, and (expensive) private physical and speech therapy is available <sup>[42]</sup>.</p> <p>There are no specific policies or guidelines for how to provide a stroke service <sup>[9]</sup></p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 2,054,800</p> <p>Incidence estimate (GBD 2015): 5,302 strokes/year, 208.6 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 21,522 strokes, 815.7 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 4,399 deaths due to stroke/year, 180.3 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Available registries: none found</p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Several stroke patient organisations, including the “Macedonian organisation for fight against stroke”, take part in primary prevention by offering free risk factor screening, lectures, seminars or education using media <sup>[42]</sup>.</p> <p>There are no stroke prevention clinics in Macedonia, but primary prevention is undertaken by GPs. There is no national stroke prevention programme <sup>[13]</sup>.</p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> The Macedonian FAST campaign “BRZO” undertakes activities to raise stroke awareness <sup>[42]</sup>.</p> <p><b>Indicator 5:</b> No data found</p>



## MACEDONIA

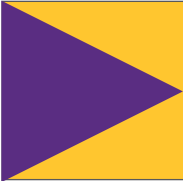
(continued)

<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The Ministry of Health has issued guidelines for the treatment of acute stroke, but there are no specific policies or guidelines for how to provide a stroke service <sup>[42]</sup>.</p> <p><b>Indicator 6:</b> There are four stroke units in Macedonia, three in the three University clinical centres and one in the city hospital of Skopje. Two of those stroke units are not working at full capacity due to staff and finance shortage <sup>[42]</sup>.</p> <p>Telemedicine is not in operation <sup>[13]</sup>.</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> According to estimates by the CEES Working Group 6 thrombolysis procedures were performed nationally in 2008-2014 <sup>[13]</sup>.</p> <p>Thrombectomy is currently not available <sup>[42]</sup>.</p> <p>There is no national or regional stroke audit to provide further data <sup>[9]</sup>.</p>
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Patients may have up to 21 days in specialist physical therapy and rehabilitation centres; complex patients may be permitted a further 21 days each year. Beyond this, doctors advise patients and carers about therapies, but there is no referral pathway for longer term services. Private, very expensive, physiotherapy and speech therapy are available <sup>[42]</sup>.</p> <p><b>Indicator 10:</b> No data found</p>
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> No data found</p> <p><b>Indicator 12:</b> No data found</p>

 <h2 style="margin: 0;">MALTA</h2>	
<b>HEALTH CARE SYSTEM</b>	National health service, funded by taxation <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 397,499</p> <p>Incidence estimate (GBD 2015): 325 strokes/year, 47.9 strokes per 100,000 inhabitants annually, age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 2,320 strokes, 341.2 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 272 deaths due to stroke/year, 38.4 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Hospital register/audit (Mater Dei) <sup>[158]</sup></p> <p>Healthcare cost of stroke: total € 8.8 million, € 20 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p>The “Strategy for the Prevention and Control of Non-communicable Disease in Malta” by the Department of Health Promotion and Disease Prevention (2010) suggests targets for lowering blood pressure and cholesterol, as well as activities to increase public awareness of risk factors and lifestyle changes.</p> <p>Only the management of atrial fibrillation, but not of high blood pressure or cholesterol is covered by national clinical guidelines <sup>[9]</sup>.</p> <p><b>Indicator 1:</b> No data found</p> <p>Estimated prevalence of high blood pressure: 25.4%, high cholesterol 59.0%, smoking: 25.9%, raised glucose: 10.1% <sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 25.4% <sup>[5]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> In Malta an “Act FAST” campaign for stroke awareness was launched in 2013 <sup>[158]</sup>. The Health Promotion Department has produced stroke awareness leaflets (2013). Medical education emphasises the significance of stroke as a medical emergency <sup>[9]</sup> and refresher courses for medical staff, including GPs, are offered <sup>[158]</sup></p> <p><b>Indicator 5:</b> No data found</p>

## MALTA (continued)

<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 6:</b> In Malta, there is one acute general hospital, Mater Dei Hospital, with a neurology department providing acute care to stroke patients [9, 158]</p> <p>The Mater Dei Hospital has undertaken a local audit against the standards set in the UK guidelines in 2008, which led to the development of local stroke guidelines at Mater Dei [9]. A second audit was undertaken in 2012 [158]</p>			
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> In Mater Dei Hospital thrombolysis was introduced in 2010 and according to the hospital audit, 4 patients (=1.6%) were thrombolysed in 2012 [158]</p> <p>Thrombectomy is performed at Mater Dei hospital since 2015 [9].</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> There is a lack of current data about rehabilitation. Stroke care &amp; rehabilitation at Mater Dei Hospital was audited in 2008. In that audit, there was a multiprofessional team on the neurological ward caring for stroke patients. Three quarters of patients had been assessed by a physiotherapist within 72 hours, but only a minority of patients were assessed by speech therapy or occupational therapy (often, assessment was deemed not to have been required). None of the patients had a documented plan for rehabilitation goals agreed by a multi-disciplinary team. A quarter of surviving patients were discharged to a rehabilitation unit; 44% home. Patients who were discharged home stayed in hospital half as long as patients discharged to a rehabilitation unit, on average [158]</p> <p><b>Indicator 10:</b> There is no outpatient rehabilitation provision and early supported discharge is not available [9].</p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> Follow up reviews supported in guidelines but no data found on implementation.</p> <p><b>Indicator 12:</b> Social security allowances supporting independent living (e.g. for adaptations/aids) are available but there is a lack of access to independent living services [30].</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+66	+36	+101	+63

 <h2 style="margin: 0;">NETHERLANDS</h2>	
HEALTH CARE SYSTEM	National Health Service funded by compulsory contributions.
STROKE EPIDEMIOLOGY / STATISTICS	<p>Population: 17,100,300</p> <p>Incidence estimate (GBD 2015): 13,789 strokes/year, 49.6 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 89,462 strokes, 338.8 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 7.5 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015): 11,120 deaths due to stroke/year, 36.2 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Stroke Knowledge Network (“Kennisnetwerk CVA Nederland”), Tilburg Registry, Innherred, Rotterdam study</p> <p>Healthcare cost of stroke: total € 843.7 million, € 50 per capita <sup>[3]</sup></p>
RISK FACTORS / PREVENTION	<p><b>Indicator 1:</b> Stroke prevention campaigns are being undertaken via commercials and media. A non-smoking policy is widely in place <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 23.9%, high cholesterol 60.5%, smoking: 25.7%, raised glucose: 6.1%<sup>[4]</sup>, atrial fibrillation: 1.6% <sup>[159]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 72% in Belgium, Denmark, Netherlands, and Norway combined (EORP-AF study, <sup>[16]</sup>)</p> <p><b>Indicator 8:</b> No data found</p>
EMERGENCY RESPONSE	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p>
ACUTE CARE ORGANISATION & DELIVERY	<p>National guidelines issued by the Dutch Institute of Quality in Health Care cover stroke care based evidence-based recommendations and state that every stroke patient should be transferred to a specialised stroke unit.</p> <p><b>Indicator 6:</b> There are 70 hospitals in the Netherlands providing specialised services for stroke patients <sup>[160]</sup>. No figures found on the number of stroke units or proportions of patients treated on stroke units.</p>

## NETHERLANDS

(continued)

<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> According to the Stroke Knowledge Network Netherlands dataset the national thrombolysis rate of hospitalised patients was 6.4% in 2005 and 14.6% in 2012 <sup>[161]</sup>. A web-based survey of stroke neurologists in all 84 Dutch hospitals performing thrombolysis calculated a national rate of 11% of hospitalised ischaemic stroke patients in 2010, but rates varying widely between 4 and 26% between hospitals <sup>[162]</sup>. Similarly, a large university hospital achieved a thrombolysis rate of 22% of ischaemic stroke patients (5% in 2006, <sup>[163]</sup>).</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>Guideline: KNGF Clinical Practice Guideline for physical therapy in patients with stroke <sup>[164]</sup>.</p> <p><b>Indicator 9:</b> All stroke units (for which data is available) have a neurologist, nursing staff, physiotherapy and speech therapy; above 95% have occupational therapy and a stroke physician; 40% have neuropsychology <sup>[165]</sup>. The national guideline recommends mobilisation within 24 hours of stroke onset (65% compliance) and a minimum 40 minutes a day of physiotherapy every day. Patients receive on average 22 minutes of physiotherapy per weekday and weekend therapy is not standard (2011 data) <sup>[165]</sup>. Physiotherapists are notified that they need to assess a patient within 24 hours in 78% of cases.</p> <p>Patients stay on the acute ward for just over a week, on average. 40% are then discharged home <sup>[166]</sup>. Patients moved to rehabilitation wards typically spend less than two weeks there <sup>[167]</sup>.</p> <p>Post-acute multiprofessional rehabilitation is delivered in some specialist centres (a small number exist) and via community services. There is some domiciliary provision. All specialised rehabilitation centres refer on to community services after rehabilitation, but there is varied practice across these centres, including the existence and structure of care pathways, assessments and aftercare. For example, clinical pathways can range from 3-10 to 20-26 weeks, with assessments at very different times after admission (e.g. 1 week, 2 weeks, just before discharge) <sup>[168]</sup>.</p> <p>There are skilled nursing facilities available offering slow-stream multiprofessional programmes for elderly stroke patients <sup>[168]</sup>.</p>

## NETHERLANDS

(continued)

<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b> (continued)</p>	<p><b>Indicator 10:</b> Early supported discharge is available. In Maastricht region, if the patient is not able to go home within 5 days after admission, they are discharged to the stroke unit of a nursing home (with trained nursing home physicians) with multidisciplinary team assessment. After assessment, patients may access different intensities of rehabilitation at home, as an outpatient or as an inpatient according to their potential for rehabilitation and whether they have co-morbidities <sup>[160]</sup></p> <p>There is an ongoing multicentre cohort study aiming to describe the structure, process and outcomes of stroke rehabilitation in The Netherlands (SCORE: Stroke Cohort Outcomes of Rehabilitation) <sup>[168]</sup></p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> Follow-up reviews are supported but not all rehabilitation centres have a pathway in place for monitoring patients longer term <sup>[168]</sup></p> <p><b>Indicator 12:</b> More than half of all patients return home after discharge <sup>[168]</sup>. A small burden of stroke study (295 cases) suggest a high level of access (around 95%) to primary care (GP) services and specialist services after discharge <sup>[167]</sup> Statutory support includes disabled facilities grants and a personal budget which can include training/therapy <sup>[169]</sup></p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+53	+34	+74	+50

<b>NORWAY</b>	
<b>HEALTH CARE SYSTEM</b>	National health service, free at point of use. Stroke care is decentralised (rehabilitation is coordinated by municipalities), all provided in public hospitals.
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 5,033,675</p> <p>Incidence estimate (GBD 2015): 4,100 strokes/year, 51.0 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 25.044 strokes, 341.6 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 5.3 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015): 3,510 deaths due to stroke/year, 38.0 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: National Quality Registry for Stroke Care</p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p>Estimated prevalence of high blood pressure: 23.3%, high cholesterol 61.9%, smoking: 25.9%, raised glucose: 6.6%<sup>[4]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 72% in Belgium, Denmark, Netherlands, and Norway combined (EORP-AF study, <sup>[16]</sup>)</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> There are several regional awareness campaigns. In 2016 a large national awareness campaign was organised <sup>[9]</sup>. A mass media intervention to increase stroke awareness was evaluated and was associated with an increase in thrombolysis rates, tapering off after 6 months <sup>[170]</sup></p> <p><b>Indicator 5:</b> A new flow chart of the stroke care pathway and training of emergency services to screen for stroke and pre-notify the hospital were introduced in one centre in 2006 <sup>[171]</sup></p>

## NORWAY

(continued)

<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>A National Strategy for Stroke is in place. The Norwegian Directorate of Health has developed stroke guidelines for acute care, secondary prevention, and rehabilitation <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> Currently, Norway has 45 stroke units in 50 hospitals treating stroke patients. The proportion of patients treated in stroke units is &gt;90% <sup>[9]</sup>.</p> <p>Telemedicine is an important part of service due to scattered population <sup>[9]</sup>, but a recent descriptive study reported the integration of the service in practice as “challenging” due to problems with staff availability and motivation, and logistics <sup>[172]</sup></p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> Thrombolysis was licensed in 2003 <sup>[171]</sup>. The national thrombolysis rate was 7.8% in 2011 and 9.4% in 2012 according to the Quality Indicators for the Health Service by the Norwegian Directorate of Health 2013 <sup>[172]</sup> with rates ranging from 6.3% in Northern Norway to 14.9% in Western Norway. Local studies found a thrombolysis rate of admitted ischaemic stroke patients in 2007-9 of 15% (Bergen Stroke Registry) <sup>[173]</sup> and 7.6% of ischaemic stroke patients admitted to a University hospital in 2009 <sup>[174]</sup></p> <p>Currently, 5 centres perform thrombectomy. There are plans for 2 new centres in order to cover whole country <sup>[9]</sup>.</p> <p>By law, all hospitals have to report data (10 quality indicators) of all acute stroke patients to the national quality registry for stroke care (Norwegian stroke registry) <sup>[9]</sup>.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>Most rehabilitation is provided in public hospitals. The remainder is delivered by private organisations but publically funded.</p> <p><b>Indicator 9:</b> Patients have little contact time with a physiotherapist (3% of day), spend little time in higher physical activity (8% of day) and there is significant variation between hospitals (2011-2013 data, 11 stroke units) <sup>[175]</sup></p> <p>Patients typically spend 2 weeks in acute hospital <sup>[176]</sup></p> <p><b>Indicator 10:</b> Early supported discharge services with a multiprofessional team are available in about half of the hospitals that admit stroke patients. The aim is to develop such a service in most hospitals/stroke units – currently not all municipalities can provide access to all therapists for all patients e.g. speech therapy <sup>[42]</sup>.</p>

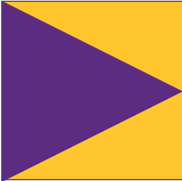


## NORWAY (continued)

**LONGER TERM CARE & SUPPORT**

**Indicator 11:** Most patients are offered an outpatient review at the hospital 2-3 months after the stroke. Further follow-up is organised in primary health care and by the GP <sup>[42]</sup>.

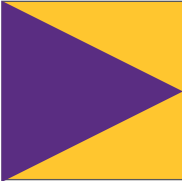
**Indicator 12:** People with disabilities are generally supported to live in the community, with rights-based access to equipment/adaptations and to occupational therapy/vocational therapy <sup>[30]</sup>. Voluntary associations provide some rehabilitation support; for example, the Blind Association runs courses for stroke patients and families to manage visual impairments <sup>[176]</sup>

 <h2 style="margin: 0;">POLAND</h2>	
<b>HEALTH CARE SYSTEM</b>	Decentralised system funded by mandatory health insurance and government. High out of pocket payments for e.g. medication <sup>[177]</sup>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 38,625,478</p> <p>Incidence estimate (GBD 2015): 65,087 strokes/year, 112.0 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 357,573 strokes, 652.3 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case-fatality (28-days post-stroke): 18.3% <sup>[178]</sup></p> <p>Mortality (GBD 2015): 44,276 deaths due to stroke/year, 69.3 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Polish Hospital Stroke Registry, 2000-2/2004-5/2007-8, 123 hospitals in 2008 <sup>[50]</sup>, Local registries: Warsaw, Zabrze, Krosno, Krakow</p> <p>Healthcare cost of stroke: total € 561.3 million, € 15 per capita<sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p>The National Cardiovascular Disease Prevention and Treatment Programme POLKARD (1998-2008) aimed to lower stroke incidence by implementing effective primary and secondary prevention <sup>[179]</sup>. National guidelines for the prevention of stroke and risk factor management, including TIA, have been published <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 33.5%, high cholesterol 57.1%, smoking: 29.4%, raised glucose: 9.5%<sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 21.1%<sup>[5]</sup></p> <p>In 2006-8, 88.9% of hypertensive stroke patients were treated with antihypertensives and 31.7% achieved adequate blood pressure control (EURASPIRE study, <sup>[35]</sup>)</p> <p>Pre-stroke use of antihypertensives in hypertensive patients rose from 77.8% to 90.5% between 1995/9 and 2010/13 in Warsaw <sup>[180]</sup></p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 74.7% in Poland and Romania combined (EORP-AF study, <sup>[16]</sup>); 95% of AF patients eligible for oral anticoagulants, but only prescribed in 39% <sup>[181]</sup></p>

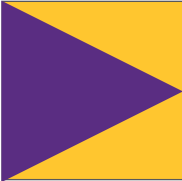
<b>POLAND</b> (continued)	
<b>RISK FACTORS / PREVENTION</b> (continued)	<p>Use of oral anticoagulants in stroke patients: 6.3% in 1995/9 rising to 39.8% of AF patients pre-stroke in 2010/3 <sup>[180]</sup>; 20.5% of AF patients at discharge post-stroke in 2008 (POLKARD, <sup>[88]</sup>), compared to 21.9% in 2004-6 (Warsaw, EROS <sup>[77]</sup>)</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>The National Cardiovascular Disease Prevention and Treatment Programme POLKARD aimed to improve acute and post-acute stroke management <sup>[179]</sup></p> <p>National clinical guidelines covering stroke unit care, thrombolysis, and thrombectomy have been developed.</p> <p><b>Indicator 6:</b> Over 200 acute hospitals admit stroke patients <sup>[17]</sup>. In 2010 there were 150 stroke units in Poland <sup>[182]</sup>. There are five comprehensive stroke centres with interventional neuroradiology, neurosurgery, and 24/7 MRI. 70% of stroke patients were treated in stroke units <sup>[13]</sup>. The population-based Warsaw stroke registry reported that 47.5% of stroke patients spend &gt;50% of their hospital stay in a stroke unit in 2004-6 <sup>[77]</sup></p> <p>Telemedicine is not in operation <sup>[13]</sup></p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Thrombolysis was registered in 2003 <sup>[183]</sup>. In 2009, based on information from the National Health Fund 1661 patients (~2% of all stroke patients) received thrombolysis. Thrombolysis was performed in 69 stroke units (compared to 150 stroke units with capacity of thrombolysis). Significant differences in thrombolysis rates exist between centres. While thrombolysis rate was ~20% in 5 stroke units, the rate in the other 64 units was &lt;3% of all hospitalised stroke patients <sup>[182]</sup>. According to the national stroke audit POLKARD thrombolysis rate of ischaemic stroke patients was 0.9% in 2004 rising to 1.8% in 2008 <sup>[88]</sup>. The CEES Working group estimate was 0.2% or 159 thrombolysis procedures in 2005 <sup>[40]</sup></p> <p>The Warsaw Stroke Registry reported a comparatively high thrombolysis rate in this population-based study of 6.8% in 2004-6 <sup>[77]</sup></p> <p>9 stroke centres have the capacity for endovascular treatment <sup>[182]</sup></p> <p>The Polish National Stroke Prevention and Treatment Registry serves as national audit [50, 184]</p>

## POLAND (continued)

<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>There are (relatively recently established) current guidelines/ recommended care pathways for rehabilitation from ESO and the Polish Neurological Society <sup>[185]</sup></p> <p><b>Indicator 9:</b> Data from a 2010 survey of neurological wards and rehabilitation departments indicated that facilities for early post stroke rehabilitation in Poland were insufficient: only 25% of all patients were moved from neurological wards to the rehabilitation department (vs an estimate that about half of all stroke survivors will require rehabilitation at one month after stroke), and of these only 54% were treated within 3 months of stroke <sup>[186]</sup></p> <p>Patients experience delays accessing treatment in rehabilitation centres and at home. There is little provision of community-level rehabilitation, although domiciliary physiotherapy provision has been promoted <sup>[41]</sup>.</p> <p>There have been improvements in the last decade or so (from 2003 to ~2010) in terms of increasing availability of rehabilitation at home (from a very low starting point) and more rehabilitation department beds. During that time, occupational therapy was only available in residential homes or other long term care settings, and there were some out of pocket payments for home care and speech therapy <sup>[41]</sup>. In 2005/6 it was estimated that 80% of patients had access to rehabilitation <sup>[40]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not available.</p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> No data found</p> <p><b>Indicator 12:</b> Patients pay for home help/personal care. There is a lack of pathways of care/protocols between acute care and primary care, and between rehabilitation and primary care <sup>[17]</sup></p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<p style="text-align: center;"><b>Incidence</b></p>	<p style="text-align: center;"><b>Prevalence</b></p>	<p style="text-align: center;"><b>Deaths</b></p>	<p style="text-align: center;"><b>DALYs lost</b></p>
	<p style="text-align: center;">+42</p>	<p style="text-align: center;">+27</p>	<p style="text-align: center;">+60</p>	<p style="text-align: center;">+37</p>

 <h2 style="margin: 0;">PORTUGAL</h2>	
<b>HEALTH CARE SYSTEM</b>	National health service, financed mainly through taxation. Public provision of most primary care and hospital care. Co-payments for e.g. medications. One-fifth to a quarter of the population has voluntary additional health insurance <sup>[187]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 10,617,999</p> <p>Incidence estimate (GBD 2015): 15,208 strokes/year, 75.4 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 76,309 strokes, 423.9 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case-fatality rate (28-days post-stroke): 14.6% (rural), 16.9% (urban, Correia 2004)</p> <p>Mortality (GBD 2015): 15,577 deaths due to stroke/year, 67.9 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Porto Stroke Registry</p> <p>Healthcare cost of stroke: total € 159.7 million, € 15 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p>There is a National Program for Prevention and Control of Cerebrovascular Disease <sup>[188]</sup></p> <p><b>Indicator 1:</b> No data found</p> <p>Estimated prevalence of high blood pressure: 29%, high cholesterol 55.9%, smoking: 22.6%, raised glucose: 9.2%<sup>[4]</sup>, atrial fibrillation: 2.5% in adults &gt;40 years <sup>[189]</sup></p> <p><b>Indicator 2:</b> In a large population survey, only 46.1% of hypertensive patients were aware of their high blood pressure, 39.0% were using blood pressure medication, and 11.2% had controlled blood pressure <sup>[190]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> A National Stroke Day was introduced in 2004.</p> <p><b>Indicator 5:</b> “Via verde do AVC” was implemented nationally in 2005, which is a coordinated screening and fast-track system for suspected stroke. Its impact was assessed and failed to show any impact on stroke mortality <sup>[188]</sup></p>

<b>PORTUGAL</b> (continued)				
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<i>Indicator 6:</i> In 2011, there were 30 stroke units in Portugal, some of them working under technical and human limitations <sup>[191]</sup>			
<b>TREATMENT RATES &amp; AUDITS</b>	<i>Indicator 7:</i> Using hospital administrative data a thrombolysis rate of 1% of ischaemic stroke patients nationally was calculated for 2005 rising to 7% in 2008 <sup>[188]</sup> . The Northern Portugal study reported thrombolysis rates of 34.1% of ischaemic stroke patients in 2010 <sup>[192]</sup>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><i>Indicator 9:</i> Rehabilitation is not audited and therefore there is a lack of information on its implementation and outcomes <sup>[193]</sup></p> <p>Many patients are discharged directly home from acute care, with variable access to further rehabilitation on an outpatient basis (public or private) <sup>[194]</sup>. There is a need to improve discharge processes in most hospitals (such as there being defined criteria for different rehabilitation streams and greater input of therapists) to promote continuing care <sup>[195]</sup>. The “Via Verde do AVC” (stroke greenway”) does not include post hospital care and rehabilitation <sup>[193]</sup></p> <p>Outpatient care has developed since the National Network of Long-Term Integrated Care was established in 2006 (this includes domiciliary therapies and units which vary in intensity of rehabilitation); before this, rehabilitation was typically as an inpatient in a rehabilitation centre for up to one month.</p> <p><i>Indicator 10:</i> Early supported discharge has been trialled locally (in Aveiro 2009-13) <sup>[194]</sup></p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><i>Indicator 11:</i> No data found</p> <p><i>Indicator 12:</i> Sickness and disability benefits are available [<a href="http://ec.europa.eu">ec.europa.eu</a>]</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+31	+20	+40	+29

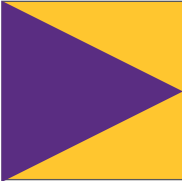
 <b>ROMANIA</b>	
<b>HEALTH CARE SYSTEM</b>	Highly centralised health system. Majority of population covered through contributions to social insurance system; free at point of use for all <sup>[196]</sup>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 19,043,767</p> <p>Incidence estimate (GBD 2015): 61,552 strokes/year, 190.9 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 252,774 strokes, 833.3 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 54,272 deaths due to stroke/year, 156.8 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Targu Mures Registry (local, only hospitalised patients) <sup>[197]</sup></p> <p>Healthcare cost of stroke: total € 163.1 million, € 8 per capita<sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> The National Program for Health Evaluation started 2007 and aims to improve the detection and treatment of stroke risk factors. A sustained mass media campaign for improvement of healthy lifestyle was undertaken <sup>[28]</sup></p> <p>Estimated prevalence of high blood pressure: 32.5%, high cholesterol 45.8%, smoking: 30.5%, raised glucose: 8.4%<sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 13.9%<sup>[5]</sup></p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 76.4% (BALKAN-AF survey, <sup>[26]</sup>), 74.7% in Greece and Italy combined (EORP-AF study,<sup>[16]</sup>)</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>National stroke guidelines have been issued by the Ministry of Health in 2009 <sup>[198]</sup></p> <p><b>Indicator 6:</b> According to data from the CEES Working group there are currently 7 stroke units and about 1% of stroke patients are treated in stroke units <sup>[13]</sup>.</p> <p>There is no telemedicine system in operation <sup>[13]</sup>.</p>

## ROMANIA

(continued)

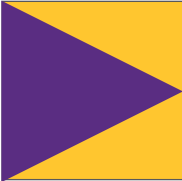
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> According to a 2013 publication, thrombolysis was only available in Bucharest, the capital covering 10% of the population <sup>[28]</sup>. 2 thrombolysis procedures were performed nationwide in 2005 <sup>[40]</sup> compared to 205 procedures between 2008 and 2014 <sup>[13]</sup>.</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p>Acute rehabilitation is included in the national stroke guidelines <sup>[198]</sup></p> <p><b>Indicator 9:</b> There is very limited information. It has been described as “insufficient, but efforts made” <sup>[28]</sup>. In 2005/6 it was estimated that 30% of patients had access to rehabilitation <sup>[40]</sup>.</p> <p><b>Indicator 10:</b> Early supported discharge is not available <sup>[186]</sup></p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> No data found</p> <p><b>Indicator 12:</b> There is a focus on institutional care for people with disabilities, e.g. investment in creating new neuro-rehabilitation centres. Some parts of the country have made more progress than others in developing community services <sup>[30]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+24	+13	+34	+22



 <h2 style="margin: 0;">SERBIA</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>National Health Service, free at point of use <sup>[42]</sup>.</p> <p>There is no national stroke strategy <sup>[42]</sup>.</p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 7,498,001</p> <p>Incidence estimate (GBD 2015): 24,101 strokes/year, 172.1 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 106,001 strokes, 792.7 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 21,861 deaths due to stroke/year, 149.2 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: National Stroke Thrombolysis Register, Nis Stroke Registry (hospital-based)</p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Public prevention campaigns cover risk factor knowledge and promotion of a healthy lifestyle <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 34.5%, high cholesterol 49.8%, smoking: 42.1%, raised glucose: 8.6 %<sup>[4]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 79.0% (BALKAN-AF survey, <sup>[26]</sup>)</p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> The Serbian Stroke Organization has launched a Serbian version of a FAST public health campaign on stroke awareness (“HITNO”) <sup>[42]</sup>.</p> <p><b>Indicator 5:</b> No data found</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>There is no national stroke strategy in Serbia, so pathways of stroke care differ between hospitals and regions. National clinical guidelines for acute care have been developed <sup>[42]</sup>.</p> <p><b>Indicator 6:</b> In Serbia, there are currently 20 stroke units and over 100 General Hospitals and Neurology Clinics providing acute stroke treatments. There are no hyperacute stroke units in Serbia <sup>[42]</sup>. 40% of stroke patients are currently being treated in stroke units <sup>[13]</sup>.</p> <p>There is no stroke telemedicine system in operation [13, 42]</p>

## SERBIA (continued)

<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> Thrombolysis was started in 2006 <sup>[199]</sup> and 10 thrombolysis procedures were performed between January and June 2006 <sup>[40]</sup>. The national thrombolysis rate was estimated to be 1.25% in a 2015 report <sup>[13]</sup>.</p> <p>Thrombectomy is currently available in 2 hospitals only <sup>[42]</sup>.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p><b>Indicator 9:</b> Early rehabilitation is stipulated in the national stroke guideline. All stroke units and departments of neurology in general hospitals offer early rehabilitation <sup>[200]</sup>. Patients are assessed as soon as possible after admission and a rehabilitation plan rehabilitation is confirmed by the following day. Patients spend typically 2-3 days in acute phase, then 3-4 weeks on rehabilitation ward. There is no speech therapy. The rehabilitation wards admit various conditions and are usually at capacity so there are delays for new patients <sup>[200]</sup></p> <p><b>Indicator 10:</b> No data found</p> <p>Long-term rehabilitation is not available and private care is expensive <sup>[42]</sup>.</p> <p>Rehabilitation data is not routinely collected.</p>
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> There is some primary healthcare involvement with rehabilitation once the patient is at home <sup>[200]</sup></p> <p><b>Indicator 12:</b> No data found</p>

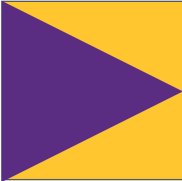
 <h2 style="margin: 0;">SLOVAKIA</h2>	
<b>HEALTH CARE SYSTEM</b>	National health service, free at point of use. Private care is a small part of health care <sup>[9]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 5,422,366</p> <p>Incidence estimate (GBD 2015): 9,491 strokes/year, 129.3 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 49,673 strokes, 684.1 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 5,401 deaths due to stroke/year, 71.3 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Slovak National Registry of Stroke (clinical-epidemiological register since 2006/7, aiming to cover whole country), some local registries (Kosice, Trnava, Nitra)</p> <p>Healthcare cost of stroke: total € 109.9 million, € 20 per capita<sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are public health campaigns on stroke prevention (healthy lifestyle, smoking, hypertension) <sup>[9]</sup></p> <p>The Public Health Authority and regional networks of health centres are responsible for programmes to control risk factors and promote healthy lifestyles. The National Programme of CVD prevention is supported by the Government and the Slovak Society of Cardiology. Management of stroke risk factors are covered by national guidelines <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 31.6%, high cholesterol 52.5%, smoking: 28.8%, raised glucose: 8.6%<sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 21.9% <sup>[5]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> There are no TIA outpatient clinics. TIA patients are usually admitted to hospital for diagnostic work-up <sup>[9]</sup>.</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> There are campaigns to improve public stroke awareness and the appropriate emergency response: “Time is brain”. Medical education emphasises stroke as a medical emergency <sup>[9]</sup>.</p> <p><b>Indicator 5:</b> Emergency services are trained generally about stroke <sup>[9]</sup>.</p>

## SLOVAKIA

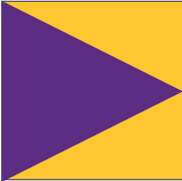
(continued)

<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>The Slovak Neurological Society is responsible for organising the process of stroke care. New National guidelines for acute stroke therapy were prepared by the Slovak Stroke Society in 2015 <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> There are 56 neurological departments in Slovakia which have intensive care units for acute stroke therapy, but there are no special stroke units <sup>[9]</sup>. However, the CEES Working group estimated that there are 10 stroke units, treating 20% of stroke patients <sup>[13]</sup>.</p> <p>Telemedicine is in operation in some regions <sup>[9]</sup>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> Thrombolysis was first undertaken in 1998 in University Hospital Nitra. It was officially approved in 2005. National thrombolysis rate of ischaemic stroke patients was reported as 0.5-1% compared to 15.8% at Nitra University Hospital in 2007 <sup>[20]</sup>. 60 thrombolysis procedures were reported to have been undertaken in 2005 <sup>[40]</sup>, compared to 3665 in 2008-2014 <sup>[13]</sup>.</p> <p>There are 6 hospitals performing endovascular stroke therapy and thrombectomy available for most patients <sup>[9, 13]</sup>.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p><b>Indicator 9:</b> Acute patients are assessed within a few days of admission and have access to physiotherapy and, depending on the hospital, speech therapy and psychology, but not occupational therapy. There are no neuro-specialist rehabilitation departments: there are physiotherapy departments but these have insufficient beds for the number of stroke patients.</p> <p>Severely affected patients transferred to nursing homes will typically have access to physiotherapy and speech therapy only; patients discharged home would not usually have physiotherapy provision.</p> <p><b>Indicator 10:</b> There is no direct referral from hospital to further stroke rehabilitation/rehabilitation departments, so that while there is pressure to discharge patients early (after 5-7 days), there are not the resources/organisation to provide rehabilitation.</p> <p>Post-acute rehabilitation is provided in physiotherapy departments.</p> <p>There is a lack of specialist rehabilitation provision and poor coordination between hospital and rehabilitation depts.</p> <p>Outpatient therapies are usually not available.<sup>[9]</sup></p>

SLOVAKIA (continued)				
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><i>Indicator 11:</i> Patients do not usually have a follow up post-discharge regarding rehabilitation needs <sup>[9]</sup>.</p> <p><i>Indicator 12:</i> Social security allowances, help with devices, adaptations from national health insurance agency. A social services act obliges providers to support community based rehabilitation <sup>[30]</sup>.</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<p><b>Incidence</b></p>	<p><b>Prevalence</b></p>	<p><b>Deaths</b></p>	<p><b>DALYs lost</b></p>
	<p>+53</p>	<p>+36</p>	<p>+77</p>	<p>+52</p>

 <b>SLOVENIA</b>	
<b>HEALTH CARE SYSTEM</b>	National Health System has public funding and universal coverage. System is decentralised, with management by regional health departments. Social care is separate from health care. Some regions have well-developed network of telestroke <sup>[42]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 2,048,847</p> <p>Incidence estimate (GBD 2015): 2,898 strokes/year, 79.5 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 19,029 strokes, 579.5 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 2,144 deaths due to stroke/year, 51.3 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Slovenian Stroke Registry since 2000 (not all hospitals provide data). A local registry is currently being developed at Ljubljana University Hospital</p> <p>Healthcare cost of stroke: total € 35.6 million, € 17 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There are public health campaigns regarding stroke prevention (healthy lifestyle, high blood pressure) <sup>[9]</sup>.</p> <p>National guidelines cover stroke prevention and risk factor monitoring and treatment <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 35.3%, high cholesterol 56.3%, smoking: 20.9%, raised glucose: 9.5%<sup>[4]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 19.9%<sup>[5]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> There are specialised TIA outpatient clinics <sup>[9]</sup>.</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> The “GROM” Campaign to increase public awareness of stroke and the appropriate emergency response is the Slovenian equivalent to FAST. A National Stroke Awareness day was established and is covered by press/TV <sup>[9]</sup>. There is still low public awareness around stroke despite campaigns <sup>[28]</sup>. Medical education emphasises stroke as an emergency <sup>[9]</sup>. Annual symposia for medical professionals are held <sup>[28]</sup>.</p> <p><b>Indicator 5:</b> Some emergency services (ambulance) staff is trained to screen patients for suspected stroke/TIA via lectures / practicums <sup>[9]</sup>.</p>

<h2 style="margin: 0;">SLOVENIA</h2> <p style="margin: 0;"><i>(continued)</i></p>				
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>A National Stroke Strategy was developed by the Department of Health. National guidelines have been issued by the Neurology Section of the Slovenian Medical Association, including stroke unit care, thrombolysis, and thrombectomy <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> There are 12 acute hospitals treating stroke patients. Three of these hospitals provide dedicated stroke unit care <sup>[9]</sup>. 35% of stroke patients are treated in those stroke units <sup>[13]</sup>.</p> <p>Telemedicine is in operation <sup>[9, 13]</sup>.</p>			
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> According to estimates from the CEES Working group 45 thrombolysis procedures were performed in 2005 <sup>[40]</sup> and 870 between 2008 and 2014 <sup>[13]</sup>. Thrombolysis is undertaken in 12 acute care hospitals. They form part of the national telemedicine project with two of the hospitals being University medical centres. The University Medical Centre Ljubljana offers 24/7 expert advice to local hospitals <sup>[9]</sup>.</p> <p>Thrombectomy is performed in 2 hospitals, one of them 24/7 <sup>[9]</sup>. The University Medical Centre Ljubljana performed 57 mechanical revascularizations over 24 months <sup>[202]</sup></p> <p>There is no national audit or registry of acute stroke care <sup>[9]</sup>.</p>			
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> Only some hospitals have full multiprofessional teams for rehabilitation. There is a national shortage of occupational therapy and speech therapy. Patients are entitled to two weeks' spa therapy. Early assessment is practised, primarily involving physiotherapy and occupational therapy.</p> <p>Community care is not well developed.</p> <p><b>Indicator 10:</b> Early supported discharge is not available. <sup>[203]</sup></p>			
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> No data found</p> <p><b>Indicator 12:</b> There is no life after stroke support from statutory services or health insurers <sup>[9]</sup>. The burden is on families to organise care <sup>[203]</sup>. Independent living for people with disabilities is not yet well supported, e.g. no right to funds for home adaptations <sup>[30]</sup>.</p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+44	+27	+60	+43

 <h2 style="margin: 0;">SPAIN</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>Decentralised public health system, free at the point of use. Each region has an allocated health budget.</p> <p>The health budget covers acute and post-acute (rehabilitation and convalescence) care.</p> <p>In Catalonia, social care is separate from health care (funding comes from municipalities). The Catalan government has run a Stroke Programme since 2004 <sup>[42]</sup></p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 46,777,373</p> <p>Incidence estimate (GBD 2015): 40,214 strokes/year, 46.2 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 273,971 strokes, 357.3 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 10.2 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015): 36,302 deaths due to stroke/year, 34.5 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Local registries (Catalonia, IBERICTUS, Barcelona, Menorca, Santa Coloma), Madrid prevalence study</p> <p>Healthcare cost of stroke: total € 1,244.8 million, € 27 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> There is a National Stroke Day (annually since 1999) with several mass media activities to raise stroke awareness <sup>[204]</sup></p> <p>Objectives for stroke prevention were established by the “Strategy for Stroke of the National Health System” and national clinical guidelines cover primary and secondary prevention <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 24.8%, high cholesterol 56.1%, smoking: 30.3%, raised glucose: 9.4%<sup>[4]</sup>, atrial fibrillation: 4.4% in adults &gt;40 years <sup>[205]</sup>, overall prevalence 1.5% <sup>[206]</sup></p> <p><b>Indicator 2:</b> Self-reported use of high blood pressure medication: 16.1%<sup>[5]</sup>. A large population-survey reported treatment rates of hypertensive patients of 59.2% and controlled blood pressure in 42.9% of treated patients <sup>[207, 208]</sup></p>

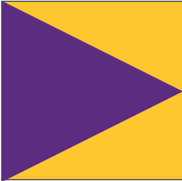


## SPAIN (continued)

<p><b>RISK FACTORS / PREVENTION</b> (continued)</p>	<p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 87.9% (PREFER-AF study, [7]); 23.5% of AF patients &gt;60 years with CHADS-VASc<math>\geq</math>2 were not on oral anticoagulants, female gender &amp; older age were related to lower rates, cognitive impairment was the main reason for non-treatment</p> <p>Use of oral anticoagulants in stroke patients: 59.4% of patients after embolic infarction in 2009 [209] 23.1% of AF patients post-stroke in 2004-6 (Menorca) [77]</p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist [69]</p>
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> Public campaigns on stroke awareness/ recognition (“RAPID”, equivalent to FAST) are being undertaken [9].</p> <p><b>Indicator 5:</b> A Stroke Code System is implemented nationwide, including throughout Catalonia since 2006 [210] with variations between regions. It involves ambulance/emergency staff screening for stroke and hospital pre-notification. Pre-hospital time delays are being audited [9].</p> <p>The Catalan Acute Stroke Network, coordinated by the Catalan Stroke Programme, includes different hospital types and emergency medical services systems [210]</p> <p>The Madrid Acute Stroke Care Program is under the central coordination of the Emergency Medical Service of Madrid [204]</p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>In 2006, the Spanish Society of Neurology published the Stroke health care plan aiming to make specialised stroke care available to all stroke patients. The “Strategy for Stroke of the National Health System”, adopted in 2008, established objectives of prevention, acute care, and rehabilitation [9]. National clinical guidelines have been developed.</p> <p><b>Indicator 6:</b> Currently, there are 59 stroke units and 27 comprehensive stroke centres in Spain. The Catalonia stroke audit reported that 22.6% of stroke patients were treated in stroke units in 2007 [210], while the Menorca stroke registry reported that stroke unit care was not available in their area in 2004-6</p> <p>Some regions have a well-developed network of telestroke [9]</p>

## SPAIN (continued)

<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> The long-running Catalonia Stroke Audit shows an increase in thrombolysis rate of admitted stroke patients from 2.8% in 2005 to 5.9% in 2007 [211]. In 2011 2672 thrombolysis procedures were performed nationally [17]. Two population-based studies reported thrombolysis rates of 0% in 2004-6 in Menorca [77] and 8.9% of incident ischaemic strokes in 2006-2014 in Tarragona [212]</p> <p>Endovascular therapy is performed in 27 centres [213]</p> <p>In Catalonia, all patients treated with reperfusion therapies are included in the ‘CICAT’ register, running since 2011, where inclusion is audited [213]</p>			
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>Rehabilitation and social reintegration guidelines are part of the national health system strategy for stroke (2008); their implementation is not routinely audited but there are examples (e.g. Catalonia audit of 47 acute hospitals [204, 211])</p> <p><b>Indicator 9:</b> Catalonia’s guidelines recommend early assessment (within 48 hours); early mobilisation &amp; rehabilitation; and a multiprofessional team in the stroke unit. In a 2007 audit, hospitals achieved 46.5% compliance in assessment of rehabilitation needs (an improvement since 2005). Nearly all patients had early physiotherapy involvement (98%) and social worker involvement (96%); three quarters saw a rehabilitation physician; half had occupational therapy involvement; and 58% saw a neuropsychologist [211]</p> <p>Post-acute rehabilitation in Spain is provided in rehabilitation hospitals or units. Domiciliary physiotherapy and speech therapy is available in some regions, but occupational therapy is only offered in hospitals (except in Catalonia where it is also available at home) [17, 213]</p> <p><b>Indicator 10:</b> Early supported discharge is not available [17]</p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> Many neurologists hold outpatient clinics for patients, usually up to 6 months after stroke. There are regional protocols/care pathways linking acute care to primary care but not rehabilitation to primary care [17]</p> <p><b>Indicator 12:</b> There is insufficient support for emotional consequences of stroke [214]</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<p><b>Incidence</b></p>	<p><b>Prevalence</b></p>	<p><b>Deaths</b></p>	<p><b>DALYs lost</b></p>
	<p>+35</p>	<p>+31</p>	<p>+39</p>	<p>+35</p>

 <h2 style="margin: 0;">SWEDEN</h2>	
<b>HEALTH CARE SYSTEM</b>	Highly decentralised healthcare system <sup>[215]</sup> . Publicly financed health service funded by regional taxes. In-hospital services are free of charge, small charges for rehabilitation depending on region <sup>[154]</sup> .
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 9,515,744</p> <p>Incidence estimate (GBD 2015): 10,687 strokes/year, 60.1 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 57,999 strokes, 368.6 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case fatality of ischaemic stroke <sup>[2]</sup>: 6.4 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015): 8,729 deaths due to stroke/year, 41.9 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: National register Riks-Stroke for TIA and acute stroke since 1994 (hospitalised stroke patients, &gt;90% of strokes, <sup>[50]</sup>), Local registries: Orebro, Lund, Gothenburg, Soederhamn</p> <p>Healthcare cost of stroke: total € 336.3 million, € 35 per capita<sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Public campaigns for stroke prevention are currently being undertaken <sup>[9]</sup>. There was poor knowledge of stroke risk factors <sup>[216]</sup></p> <p>Government policies on stroke risk factors and healthy lifestyle have been developed. There are national clinical guidelines for the treatment of high blood pressure, cholesterol, and atrial fibrillation <sup>[9]</sup>.</p> <p>Estimated prevalence of high blood pressure: 25.9%, high cholesterol 51.8%, smoking: 21.9%, raised glucose: 6.9%<sup>[4]</sup>, atrial fibrillation: 2.9% <sup>[217]</sup>, 28.3% AF in stroke patients <sup>[88]</sup></p> <p><b>Indicator 2:</b> No data found</p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 42%, while 80% of AF patients had a CHADS-VASc score warranting oral anticoagulants <sup>[217]</sup></p> <p>Use of oral anticoagulants in stroke patients (national stroke register data): 16.2% of those with known AF prior to ischaemic stroke in 2005-10 <sup>[218]</sup>; 63% of 18-64 year olds after stroke, compared to 9.1% of &gt;85a (2005 data <sup>[219]</sup>), 35% within the first 3 months of stroke (2005-10 data, <sup>[218]</sup>)</p>

<b>SWEDEN</b> (continued)	
<b>RISK FACTORS / PREVENTION</b> (continued)	<p><b>Indicator 8:</b> Many hospitals work to improve TIA management. The vast majority of TIA patients is admitted to hospital for diagnostic work-up <sup>[9]</sup></p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> In 2014, the Swedish national stroke awareness campaign AKUT was rewarded “Best Stroke Campaign” by World Stroke Organisation <sup>[9]</sup>. There is low public awareness of stroke symptoms and the appropriate emergency response <sup>[216]</sup>. Medical education emphasises the importance of stroke as a medical emergency <sup>[9]</sup>.</p> <p><b>Indicator 5:</b> Emergency services are trained to screen for stroke symptoms, but training is of varying quality <sup>[9]</sup>.</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p>Stroke care guidelines were produced by the National board of Health and Welfare in 2009 with later updates <sup>[9]</sup>.</p> <p><b>Indicator 6:</b> 72 hospitals treat acute stroke patients and all have dedicated stroke units, mainly comprehensive. Three of those stroke units do not provide thrombolytic therapy. Overall there are 1400 stroke unit beds in Sweden, a ratio of 15 stroke unit bed per 100,000 inhabitants <sup>[17]</sup>. 87.5% of stroke patients were admitted to stroke units at some point of their hospital stay, while 68.2% were at a stroke unit from the first day (Riksstroke data, <sup>[220]</sup>). There is no official accreditation system of stroke units in place, but quality indicator measurements serve as a driver of care quality.</p> <p>Telemedicine is in operation, the Swedish Acute Stroke Telemedicine Programme.</p>
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> Data from the national Swedish Stroke Register Riks-Stroke showed a steady increase of the thrombolysis rate of hospitalised ischaemic stroke patients from 0.4% in 2001, 0.9% in 2003, 6.6% in 2008, and 8.6% in 2010. In 2012, 13.3%/10.4% of male/female stroke patients had thrombolysis or thrombectomy [95, 221]. However, regional variations exist and range from 4.1% to 12.8%</p> <p>Thrombectomy was introduced in 2005 in the Karolinska University Hospital Stockholm. According to unpublished Riks-Stroke data the proportion of acute ischaemic stroke patients undergoing mechanical thrombectomy was 1.4% during 2010 <sup>[221]</sup>.</p>

## SWEDEN

(continued)

### REHABILITATION ORGANISATION & DELIVERY

Rehabilitation is included in national guidelines <sup>[222]</sup> and there are local guidelines for stroke care in most counties <sup>[223]</sup>.

**Indicator 9:** The national Riksstroke register collects data on planned rehabilitation. The majority of patients (78%) are assessed within 48 hrs of admission and have access to early multiprofessional rehabilitation (including therapists, nursing staff, psychology and dietetics) - almost all community and specialised hospitals offer this but it is less common in university hospitals. In most hospitals there are dedicated staff to coordinate stroke patients' care <sup>[224]</sup>

On average patients spend 24 minutes a day in moderate-high activity (based on 4 rehabilitation wards, data 2007-08) <sup>[225]</sup>. Patients are sedentary for 74% of the day (based on 4 stroke rehabilitation clinics in South-West, data 2009-2010) <sup>[226]</sup>

The average hospital stay after stroke is 12 days and 55% are thereafter discharged directly to their homes <sup>[227]</sup>

Further rehabilitation pathways vary between hospitals, e.g. transfer to geriatric ward or discharge to nursing homes with rehabilitation facilities. Home based rehabilitation is increasingly widely available (but not in all parts of the country): for instance, in 1995 no patients who needed rehabilitation were transferred home, and by 2010 one in 10 patients went home with rehabilitation provided <sup>[223]</sup>. Post-acute rehabilitation begins after 2 weeks typically <sup>[154]</sup>

Fewer patients were discharged to geriatric or rehabilitation departments in 2010 than in 2001. However, the recent reduction in in-hospital and nursing home beds may disadvantage those with more severe strokes <sup>[223]</sup>

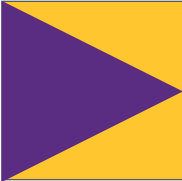
A fifth (21.5%) of stroke survivors have perceived unmet rehabilitation needs (41.8% no needs) <sup>[228]</sup>

**Indicator 10:** Early supported discharge is supported in national stroke guidelines <sup>[222]</sup>. There have been trials of early supported discharge with multidisciplinary therapies <sup>[229, 230]</sup> and there are at least two ongoing trials (Gothenburg and Umea). These typically focus on early input from the therapists, rehabilitation goal setting, and onwards referral to primary/municipal care. Despite such schemes and improvements in acute stroke care, the average hospital stay after stroke has persisted at 12 days <sup>[227]</sup>

## SWEDEN

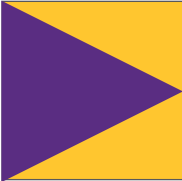
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<b>LONGER TERM CARE &amp; SUPPORT</b>	<p><b>Indicator 11:</b> The national stroke guidelines recommend ‘early’ doctor’s follow-up. Three in four patients have a follow up review with a stroke doctor, stroke nurse or GP within 3 months <sup>[231]</sup></p> <p><b>Indicator 12:</b> Health insurance may cover rehabilitation in private centres. The need for home help increased from 18.2% in 1995 to 22.1% in 2010 <sup>[223]</sup>. Sickness and disability benefits are available <sup>[9]</sup>.</p> <p>A National Performance Assessment was conducted on stroke care in Sweden including a 2009-10 survey, sent to patients 3 and 12 months after discharge. 61% of respondents stated that they were dependent on support from family three months after stroke, and the report concluded that there was lack of clarity over which organisations (municipalities, county councils) were responsible for providing rehabilitation and assistive devices to stroke survivors <sup>[232]</sup></p>			
<b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b>	<b>Incidence</b>	<b>Prevalence</b>	<b>Deaths</b>	<b>DALYs lost</b>
	+44	+28	+59	+43

 <h2 style="margin: 0;">UKRAINE</h2>	
<b>HEALTH CARE SYSTEM</b>	Decentralised health care system, part funded by public sector sources (taxation). Nominally basic healthcare is free, but a high proportion of health expenditure is out of pocket payments and there is very little use of voluntary health insurance. There is a small private sector (pharmacies, diagnostics, physicians) <sup>[233]</sup>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 45,396,470</p> <p>Incidence estimate (GBD 2015): 145,999 strokes/year, 194.6 strokes per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate(GBD 2015): 650,429 strokes, 907.3 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Mortality (GBD 2015): 100,896 deaths due to stroke/year, 126.5 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: Local registry Uzghorod (1999/2000, population-based) <sup>[234]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> No data found</p> <p>A national stroke prevention programme has been developed <sup>[13]</sup>.</p> <p>Estimated prevalence of high blood pressure: 34.6%, high cholesterol 44.4%, smoking: 30.1%, raised glucose: 9.1%<sup>[4]</sup></p> <p><b>Indicator 2:</b> Data from the Ukraine Demographic and Health Survey 2007 show that among hypertensive patients aged 35 to 49 years 61.9% had a previous diagnosis, 54.0% were on treatment, and 19.7% had controlled blood pressure <sup>[235]</sup></p> <p><b>Indicator 3:</b> No data found</p> <p><b>Indicator 8:</b> No data found</p>
<b>EMERGENCY RESPONSE</b>	<p><b>Indicator 4:</b> No data found</p> <p><b>Indicator 5:</b> No data found</p>
<b>ACUTE CARE ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 6:</b> There are currently 15 stroke units in Ukraine <sup>[13]</sup>.</p> <p>Telemedicine is in operation <sup>[13]</sup>.</p>

<b>UKRAINE</b> <i>(continued)</i>	
<b>TREATMENT RATES &amp; AUDITS</b>	<p><b>Indicator 7:</b> 215 thrombolysis procedures were performed in 2015 and only very few thrombectomies (reported at SAFE conference, Amsterdam, Dec 2016)</p> <p>According to CEES data 149 thrombolysis procedures were performed between 2008 and 2014 <sup>[13]</sup>.</p>
<b>REHABILITATION ORGANISATION &amp; DELIVERY</b>	<p><b>Indicator 9:</b> No data found</p> <p><b>Indicator 10:</b> No data found</p> <p>There is a government-defined list of rehabilitation services and medical devices that should be provided free, regardless of type of disability etc. Rehabilitation services are limited <sup>[233]</sup></p>
<b>LONGER TERM CARE &amp; SUPPORT</b>	<p>Indicator 11. No data found</p> <p>Indicator 12. No data found</p>



 <h2 style="margin: 0;">UNITED KINGDOM</h2>	
<b>HEALTH CARE SYSTEM</b>	<p>Devolved national health services in the four nations (separate budgets and policies), financed through taxation and national insurance contributions. Universal access to comprehensive health services (mostly) free at the point of delivery (co-payments include outpatient prescriptions in England). A very small proportion of the population has private healthcare insurance (c. 3%). The private sector dominates nursing care for older people, and private providers deliver some NHS services. With the exception of Northern Ireland, social care is separate and funded through local government <sup>[236]</sup></p>
<b>STROKE EPIDEMIOLOGY / STATISTICS</b>	<p>Population: 65,542,579</p> <p>Incidence estimate (GBD 2015): 43,700 strokes/year, 39.3 strokes per 100,000 inhabitants annually, age- and sex-adjusted <sup>[1]</sup></p> <p>Prevalence estimate (GBD 2015): 602,149 strokes, 619.5 per 100,000 inhabitants age- and sex-adjusted <sup>[1]</sup></p> <p>Case fatality of ischaemic stroke <sup>[2]</sup> : 10.4 per 100 discharges, adults aged 45 or older, age- and sex-adjusted</p> <p>Mortality (GBD 2015): 53,004 deaths due to stroke/year, 41.5 deaths per 100,000 inhabitants annually age- and sex-adjusted <sup>[1]</sup></p> <p>Registries: The Scottish Stroke Care Audit since 2002, Sentinel Stroke National Audit Programme in England, Wales, and Northern Ireland since 2013, Several local population-based registries (South London Stroke Register, OXVASC)</p> <p>Healthcare cost of stroke: total € 2,652.4 million, € 41 per capita <sup>[3]</sup></p>
<b>RISK FACTORS / PREVENTION</b>	<p><b>Indicator 1:</b> Public education campaigns on reducing risk centre on an annual ‘stroke month’. Charity campaigns also link stroke in with, for example, salt reduction awareness events [<a href="http://bloodpressureuk.org">bloodpressureuk.org</a>]. The NHS promotes to adults aged 40-74 a free Health Check each 5 years, including blood pressure check and advice on reducing risk [<a href="http://nhs.co.uk">nhs.co.uk</a>].</p> <p>The National Stroke Strategy highlights the importance of stroke prevention (healthy lifestyle, blood pressure, AF, warning signs/ TIA). National guidelines for the prevention of stroke and risk factor management are in use.</p> <p>Estimated prevalence of high blood pressure: 20.3%, high cholesterol 63.4%, smoking: 20.3%, raised glucose: 7.7%<sup>[4]</sup>, atrial fibrillation: 2.4% (Public Health England), 20.0% AF in stroke patients <sup>[88]</sup></p>

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(continued)

<p><b>RISK FACTORS / PREVENTION</b> (continued)</p>	<p><b>Indicator 2:</b> Data from the Health Survey for England show that among hypertensive patients 64.2% were previously diagnosed, 56.2% were on treatment, and 32.0% had controlled blood pressure in 2009 <sup>[235]</sup></p> <p>In a stroke population, only 62% of patients with diagnosed hypertension were prescribed antihypertensives prior to stroke and 75% of those with hypercholesterolaemia lipid lowering drugs <sup>[237]</sup></p> <p><b>Indicator 3:</b> Use of oral anticoagulants in AF-patients: 78.0% (PREFER-AF study, <sup>[7]</sup>; 53%, 7.2% of very high risk patients had no treatment, while 38.2% of low risk patients were on oral anticoagulants, lower treatment rates in elderly (primary care data, <sup>[238]</sup></p> <p>Use of oral anticoagulants in stroke patients: 23% of stroke patients diagnosed with AF prior to or at stroke were on oral anticoagulants pre-stroke in 2011, increased from 12% in 1995 <sup>[237]</sup>; 34.3% of AF patients at discharge post-stroke in 2008 (<sup>[88]</sup>, compared to 39.6% post-stroke in 2007-12 (South London Stroke Register data) and 18.4% in 2004-6 <sup>[77]</sup></p> <p><b>Indicator 8:</b> Dedicated TIA clinics with immediate or same day evaluation of patients by a stroke specialist exist <sup>[69]</sup></p>
<p><b>EMERGENCY RESPONSE</b></p>	<p><b>Indicator 4:</b> In 2009, the Department of Health launched the national mass-media “Act FAST” campaign, aiming at increasing public awareness around stroke (stroke symptoms and the appropriate emergency response). FAST is also aimed at medical professionals in order to improve pre-hospital screening and fast-track potential thrombolysis patients. A subsequent evaluation showed a statistically significant impact on information seeking behaviour and emergency admissions <sup>[239]</sup></p> <p><b>Indicator 5:</b> 1 in 3 hospitals in the UK have a direct transfer policy from ambulance to stroke units bypassing emergency rooms <sup>[240]</sup></p>
<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b></p>	<p>The UK has a National Stroke Strategy. Clinical guidelines were produced by the National Institute of Care Excellence.</p> <p><b>Indicator 6:</b> In the UK, there are currently 183 stroke units, and some hyperacute stroke units (8 in London). According to the 2015 national stroke audit SSNAP 59.3% of stroke patients were admitted to a stroke unit within 4h of hospital admission and 82.9% spend over 90% of their hospital stay on a stroke unit. Stroke unit admission rates vary by region.</p>

## UNITED KINGDOM

*(continued)*

<p><b>ACUTE CARE ORGANISATION &amp; DELIVERY</b> <i>(continued)</i></p>	<p>In London about 90% of stroke patients are admitted to stroke units, compared to ~50% in Oxford. In 2004-6, the population-based South London Stroke Registry showed that in this area 65.4% of patients spend &gt;50% of their hospital stay in stroke units <a href="#">[77]</a>.</p> <p>Telemedicine is only used in small, localised trials <a href="#">[9]</a>.</p>
<p><b>TREATMENT RATES &amp; AUDITS</b></p>	<p><b>Indicator 7:</b> The national stroke audit SSNAP covers England, Wales, and Northern Ireland and reported an increase in thrombolysis rates of admitted patients from &lt;0.2% in 2006, 1.8% in 2008, to 12.2% in 2014 <a href="#">[241]</a>. Scotland is covered by the Scottish Stroke Care Audit and reported rates of 3% in 2008 to 9% in 2013 <a href="#">[242]</a></p> <p>Thrombectomy is encouraged, but not yet widely available. 68% of hospitals treating stroke patients in the first 72 hours offer thrombectomy either on-site (18%) or through referral (50%) <a href="#">[243]</a>. A national survey of all British Association of Stroke Physicians in 2010 showed that that numbers of intra-arterial thrombolysis and/or mechanical thrombectomy performed in UK hospitals is low <a href="#">[244]</a></p> <p>The Royal College of Physicians carries out an ongoing national stroke audit of acute care (SSNAP). Results are published so that teams can compare their performance with one another and against national averages.</p>
<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b></p>	<p>Stroke rehabilitation is included in the National Stroke Strategy (2007)<a href="#">[245]</a> and NICE Clinical Guidelines 162, which support early supported discharge <a href="#">[246]</a>. The Sentinel Stroke National Audit Programme (SSNAP) collects data from all stroke teams treating at least 10 stroke patients a year (in England, Wales and Northern Ireland), across the whole care pathway including early supported discharge and community rehabilitation up to a six month follow up appointment. <a href="#">[241]</a></p> <p><b>Indicator 9:</b> Most patients should be assessed by a nurse and at least one therapist within 24 hours of admission, and then by all relevant therapists (physiotherapy, occupational therapy, speech therapy) within 72 hours (90.7% of applicable patients were assessed by occupational therapy, 94.2% by physiotherapy, and 86.4% by speech therapy). They should agree rehabilitation goals within 5 days. Recent SSNAP data (Jan-March 2016) shows that all of these targets were met for a slight majority (58%) of patients <a href="#">[243]</a></p>

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<p><b>REHABILITATION ORGANISATION &amp; DELIVERY</b> (continued)</p>	<p>Guidelines recommend 45 minutes of each appropriate therapy per day while the patient is in hospital, if tolerated. On average stroke inpatients received physiotherapy for 34 mins a day; speech therapy for 32 mins a day and occupational therapy for 40 mins a day <sup>[243]</sup></p> <p><b>Indicator 10:</b> SSNAP data indicates that a third of patients were discharged with home rehabilitation (early supported discharge) <sup>[247]</sup>. These multidisciplinary teams typically see the patient within one-two days of referral/assessment and work with them for 2-6 weeks, sometimes continuing with the patient on a community services basis or discharging them to separate community teams. Rehabilitation in the community is much more variable than acute rehabilitation in terms of availability of multiprofessional (particularly physiotherapy), intensity and duration and there is sometimes poor communication between health and social care <sup>[248]</sup>. There can be long delays in accessing post-acute services, particularly in psychological support, and a low availability of vocational rehabilitation <sup>[240]</sup></p>			
<p><b>LONGER TERM CARE &amp; SUPPORT</b></p>	<p><b>Indicator 11:</b> GPs should be informed of the patient's post-discharge / follow up review rehabilitation plan via a letter from the discharging hospital. National guidelines recommend reviews at 6 months after stroke but these are not available to patients in all areas, the deliverer (e.g. community stroke team, stroke nurse or stroke care coordinator) varies and they are not always completed <sup>[240]</sup></p> <p><b>Indicator 12:</b> In addition to the services provided by statutory health and social care organisations, there are a range of non-governmental organisations (charities, social enterprises, and private providers) offering support to stroke survivors and their families, including with aids and adaptations, employment, emotional and psychological difficulties, and deficits such as aphasia.</p>			
<p><b>ESTIMATED PERCENTAGE CHANGE 2015-2035</b></p>	<p><b>Incidence</b></p> <p>+44</p>	<p><b>Prevalence</b></p> <p>+32</p>	<p><b>Deaths</b></p> <p>+56</p>	<p><b>DALYs lost</b></p> <p>+41</p>

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