

THE ESSENTIALS OF STROKE CARE

The care and support every stroke survivor should get



The burden of stroke is rising across Europe as highlighted in two reports from SAFE: 'The Burden of Stroke in Europe' and 'At What Cost? - The Economic Impact of Stroke in Europe'. Unless concerted action is taken the number of people suffering a stroke and the number of people who will die from stroke are set to increase. In addition, there will be more stroke survivors living with the consequences of stroke such as lifelong disability. The costs to individuals and to economies are all set to increase.

While death rates from stroke has been falling over the last 20 years, your chance of dying from a stroke varies greatly according to where in Europe you live. Currently, the rate of death from stroke in different countries ranges from 30 per 100,000 (Iceland) of the population to 170 per 100,000 (Macedonia) of the population. Falling death rates due to better and quicker treatment means that there will be more people surviving their stroke and living with the consequences. So, the estimated total cost of stroke in Europe (healthcare and non-healthcare) from an estimated €60 billion in 2017 is set to rise by 44% by 2040.

There is also a huge disparity in the quality of stroke care available in different parts of Europe, with some areas struggling to provide the care that clinical guidelines recommend should be available for all. What happens to you if you have a stroke varies greatly depending on where you live - from stroke being recognised and treated as an emergency to receiving specialist stroke unit care and ongoing rehabilitation therapy after leaving the hospital.

For example, as the Burden of Stroke report shows, despite over 30 years of evidence showing the difference stroke units make, only about 30% of patients receive stroke unit care across Europe. The proportion of people who get treated in a stroke unit varies from less than 10% to over 80%, depending on where you live. Existing ESO or national guidelines are not consistently applied, and a continent-wide, evidence-based system of specialist stroke care is yet to be realised.

That's why the European Stroke Organisation and the Stroke Alliance for Europe launched the Stroke Action Plan for Europe, with a series of evidence-based steps to dramatically improve the standard of stroke care in Europe.

The plan is underpinned by the Essentials of Stroke Care, which, in medical terms, puts forward a minimum standard for the provision of stroke care in the pre-hospital setting, during acute hospital stay, during rehabilitation, and during life after stroke. Meeting these basic standards in full would transform the lives of stroke patients. Life-saving treatment in hospital must be followed by community rehabilitation and support enabling people to live the best life possible in the aftermath of stroke.

The Essentials of Stroke Care was created to be a guide for stroke health professionals and planners - this version is aimed at the general public. The 12 key performance indicators from the Stroke Action Plan are also included. Together, they arm stroke survivors (as well as their relatives, carers, and advocates) with a checklist to assess the quality of care they are receiving.



The Essentials of Stroke Care covers the whole stroke care pathway, including:

- ⊕ Stroke awareness and recognition of stroke symptoms

Emergency unit care including:

- ⊕ Arriving at the hospital - admission and assessment
- ⊕ Immediate treatment for those with ischemic stroke (stroke caused by a blood clot) to restore blood flow to the brain
- ⊕ General immediate treatment and supportive care of both ischemic and hemorrhagic stroke

Stroke unit care including:

- ⊕ Care in the stroke unit - admission and assessments
- ⊕ Stroke unit rehabilitation and care/early supported discharge
- ⊕ Prevention of complications - assessments expected in the stroke unit
- ⊕ Monitoring the stroke survivor in the stroke unit

Secondary prevention including:

- ⊕ Treatment options including starting pharmacological secondary prevention
- ⊕ Surgery for carotid artery disease (narrowing of the carotid arteries)
- ⊕ Life-style modifications

Discharge from hospital

- ⊕ Discharge from hospital should be planned and cover rehabilitation and ongoing care
- ⊕ Follow up

Life after stroke

- ⊕ Assessment
- ⊕ Rehabilitation
- ⊕ Annual checks
- ⊕ Care planning

These minimum essentials for stroke care are vital when planning and updating services including:



- ⊕ A region's emergency response to stroke
- ⊕ The training of medics and allied health professionals
- ⊕ The organisation, funding, and protocols for acute stroke care
- ⊕ The adequate provision of rehabilitation services.

This document should, therefore, be essential reading, not just for stroke specialist staff, but also for hospital and regional health planners and managers, and for the political institutions responsible for healthcare, locally and nationally.

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The stroke care pathway is, briefly:



- SOS** Stroke is treated as an emergency by the public, paramedics, and hospitals
-  Arrival at hospital with access to stroke specialist staff, brain scanning, and immediate interventions
-  Acute care, essential assessments, and monitoring required
-  Stroke unit care to prevent complications, provide mobilisation, and rehabilitation
-  Reducing the risk of a subsequent stroke
-  Discharge from hospital
-  Life after stroke



SOS Stroke is a medical emergency

- ⊕ Stroke is a medical emergency. There should be Governmental support for awareness campaigns to make sure that everyone across Europe can recognise stroke symptoms and know to call an ambulance. ✓
- ⊕ All paramedics, hospital front-line staff, and emergency medical staff should be trained in a clinically proven stroke recognition system so that they can identify all potential stroke patients.
- ⊕ In every region there should be an established emergency stroke protocol so that the dispatch of paramedics is of the highest priority and stroke patients are rapidly taken to the nearest specialist stroke hospital which should be notified in advance.

- ⊕ Give patients oxygen unless their peripheral saturation level falls below 95%.
- ⊕ Induce hypothermia (cooling down the body).
- ⊕ Administer insulin.



Arriving at hospital

- ⊕ People suspected to have stroke should be taken to a hospital with multi-disciplinary stroke specialist staff and a rapid emergency pathway for the treatment of acute stroke.
- ⊕ Patients should have a thorough but swift assessment of their symptoms, their neurological condition, and any impairments caused by the stroke, using a recognised tool such as the National Institutes of Health Stroke Scale (NIHSS - <https://neurotoolkit.com/nihss/>).
- ⊕ Anyone with stroke symptoms should be given a computerised tomography (CT) or a magnetic resonance imaging (MRI) scan immediately to check the type of stroke and assess treatment options.
- ⊕ Angiography - a CT or MRI-scan - that can detect a clot in a large vessel should be performed in people arriving within 6 hours of the onset of symptoms to see if they are suitable for thrombectomy (mechanical removal of a blood clot).
- ⊕ For people with unknown time of onset of symptoms arriving within 6 to 24 hours and who are likely to be suitable for thrombolysis or thrombectomy, brain scanning should be done to assess viability of brain tissue and if a clot in a large vessel is present.
- ⊕ Blood tests to check the patient's general condition and electrocardiogram (ECG) to check the heart's rhythm should be done but should not delay immediate treatment to restore blood flow to the brain (reperfusion treatment).
- ⊕ For people whose symptoms have resolved (i.e., they have had a transient ischaemic attack or TIA), MRI on arrival should be considered.



Emergency treatment to restore blood flow to the brain

- ⊕ If the CT or MRI scan show that the blood flow to the brain is restricted because of a blood clot, treatment must be started to restore the blood flow. These treatments are called intravenous thrombolysis (which uses a drug to dissolve the clot) and mechanical thrombectomy, where the clot is removed.
- ⊕ Blood sugar levels must be measured before giving someone thrombolysis, as very high blood glucose may also present with symptoms mimicking a stroke.
- ⊕ Thrombolysis must be administered within 4.5 hours of the onset of the stroke and thrombectomy within 6 hours. The latest clinical guidelines help identify those select patients who can be treated after 4.5 and 6 hours.



- ⊕ Give aspirin to people eligible for thrombolysis or thrombectomy.



Acute stroke treatment

- ⊕ Blood thinning control: Following the initial brain scan, patients with ischaemic stroke or transient ischaemic attack should be given aspirin, normally 250-300 mg. (Aspirin should not be given to those receiving thrombolysis or thrombectomy).
- ⊕ Blood pressure control: People with acute intracerebral haemorrhage (a stroke caused by a bleed in the brain) should have their systolic blood pressure lowered to 140 mmHg or below as fast as possible and within 6 hours, which must be maintained for up to 7 days. After thrombolysis and mechanical thrombectomy blood pressure should be kept below 185/110 mmHg for the first 24 hours.
- ⊕ For people on oral anti-coagulants with acute intracerebral haemorrhage, consider reversing the anticoagulant medically in the acute setting to stop the bleeding.
- ⊕ Seizure control: If a patient has a seizure within 7 days of their stroke, they should be given anti-epileptic medication for three months. Long-term anti-epileptic treatment should start for those who have a seizure after day seven of their stroke.
- ⊕ The specialist team should consider stopping the use of oral anti-coagulants if the patient has an intracerebral haemorrhage.




- ⊕ Reduce high blood pressure in the acute phase of ischaemic stroke unless the blood pressure is extremely high (<220/120 mmHg) or the patient is receiving reperfusion therapy.
- ⊕ Reduce systolic blood pressure more than 90 mmHg in acute intracerebral haemorrhage to prevent kidney injury.
- ⊕ Use antiepileptic drugs for primary prevention of seizures.




Stroke unit care

- ⊕ All patients must be admitted to a stroke unit on arrival to hospital which should have a multidisciplinary team consisting of stroke specialists including physicians, nurses, occupational therapists, physiotherapists, speech-language therapists, social workers, and clinical dietitians.
- ⊕ A patient's swallowing ability must be assessed immediately on admission to the stroke unit and before they are given any oral food, fluid, or medication. If swallowing problems are present, the patient must be assessed by a specialist within 24 hours so that decisions can be made on dietary modification or tube feeding requirement, and swallowing therapy started.
- ⊕ People should be helped to sit out of bed, stand or walk, if able, within the first 24 hours. For those who need help to sit out of bed, stand or walk, offer only light mobilisation in the first 24 hours.





- ⊕ All patients should have their initial screening and assessment by rehabilitation professionals (physiotherapy, occupational therapy, speech, and language therapist) within 48 hours using a standardised protocol. Basic assessment components should include swallowing, mood and cognition, temperature, nutrition, bowel and bladder function, skin breakdown, mobility, functional assessment, discharge planning and deep vein thrombosis prevention. 
- ⊕ Stroke survivors needing rehabilitation should be treated in a stroke unit with stroke specialist staff who must follow best practices as laid out in clinical guidelines. Stroke survivors and relatives/carers must be involved in the rehabilitation process and be provided with education and information on stroke.
- ⊕ Early supported discharge (ESD) should be offered to the stroke survivor if available. ESD is beneficial for stroke survivors with mild to moderate stroke symptoms, who are medically stable, and have the resources for care and support at home. ESD is best provided by the team that provided the patient's inpatient rehabilitation and should be started within 3 days of discharge.

- ⊕ Give aspirin to people eligible for thrombolysis or thrombectomy. 



Preventing complications in the stroke unit

- ⊕ Reduce the risk of deep vein thrombosis. For stroke survivors who are unable to move about, the risk of a clot in a vein (deep-vein thrombosis, or DVT) or the lung (pulmonary embolism) is high. Therefore, a device covering the legs up to the thigh to provide a sequence of intermittent compression (intermittent pneumatic compression, or IPC) should be used. If these devices are not available, for people who have had an intracerebral haemorrhage, wait between 48 and 72 hours before administering the drug, low molecular weight heparin. 
- ⊕ Preventing bladder infection: the stroke survivor's bladder should be assessed using ultrasound, and, if needed, only intermittent catheterisation should be used to prevent bladder infection.
- ⊕ Stroke professionals should follow local practice to prevent falls.
- ⊕ Delirium: structured observation and, if suspected, interventions to prevent delirium should be carried out.

- ⊕ Use graduated compression stockings. 
- ⊕ Use heparin in stroke survivors with severe renal failure.
- ⊕ Use indwelling catheters due to risk of urinary tract infections and lower urinary tract syndrome.



Monitoring in the stroke unit





- ⊕ Blood sugar, fat levels, and the status of the liver should be checked.
- ⊕ Stroke survivors' blood pressure should be taken every 15 to 30 minutes until blood pressure is controlled.
- ⊕ The stroke team should monitor heart rhythm for at least 24 hours and depending on clinical need (blood pressure control, heart rhythm analyses, oxygen saturation).
- ⊕ The stroke unit team should make a clinical assessment for structural heart disease.
- ⊕ The carotid arteries should be scanned to check for stenosis (narrowing or blocking).
- ⊕ People who might be at increased risk of stroke due to atrial fibrillation should have their heart rhythm monitored.
- ⊕ Stroke professionals should also consider using echocardiography if medical history, ECG, or scans might indicate potential heart problems, and CT angiography for large vessel disease to detect narrowing of the arteries.





Secondary prevention

- ⊕ Secondary prevention measures to reduce the risk of another stroke should be started as soon as possible and preferably within 1 week. 
 - ⊕ Each stroke survivor should have a personalised plan for lifestyle and pharmacological approaches to reduce their risk of having another stroke. These plans should consider the stroke survivor's physical and cognitive disabilities, and their ability to understand and take medication.
 - ⊕ All stroke survivors should be advised about the things they can do to reduce their risk of having another stroke. Lifestyle changes include: giving up smoking; limiting alcohol intake to a maximum of 14 units per week for men and 7 units per week for women; aiming to eat at least 5 portions of fruit and vegetables per day, reducing the consumption of saturated fats and salt; increasing the amount of exercise and physical activity.
 - ⊕ Blood pressure control is essential – in most people it should be below 130 mmHg. The choice of treatment can vary from place to place but should take into account maximising compliance (to encourage the stroke survivor to take their medication as prescribed); possible side effects; number of daily doses and pricing.
 - ⊕ Statins should be prescribed long term for ischaemic stroke survivors, but not normally for those who had an intracerebral haemorrhage.
 - ⊕ To reduce the risk of blood clots, Anti-platelets (for example, Aspirin) should be offered to people who have had an ischaemic stroke or TIA.
 - ⊕ For people with atrial fibrillation, long-term anticoagulants should be given – while local practice varies, new oral anti-coagulants are safer than vitamin K antagonists such as warfarin.
 - ⊕ If anti-coagulation is not suitable, surgery could be considered in atrial fibrillation using a device to prevent blood clots from the heart.
 - ⊕ In ischaemic stroke, consider closing a patent foramen oval (small hole in the heart) for patients under 60 and with no alternative cause of their stroke. If a patient has an intracerebral haemorrhage related to taking anti-coagulants, consider entering them into a trial, and taking all other individual risk factors into account, and restarting them on anti-coagulation.
 - ⊕ Carotid artery disease, where a build-up of fatty deposits in the carotid artery in the neck can be a cause of stroke and TIA, should be diagnosed preferably within 48 hours of the stroke using ultrasound and/or CT or MRI scanning. If the narrowing of the artery is severe, referral to vascular surgeon should be considered. The stroke survivor may benefit from either carotid endarterectomy (where the fatty deposits, or plaque, are surgically removed from the artery) or from the insertion of a stent to widen the artery (known as carotid artery stenting). Stenting is less effective than carotid endarterectomy in people over the age of 70. These interventions are most effective if carried out within 14 days of the stroke or TIA.
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- ⊕ People with an abnormal heart rhythm (atrial fibrillation) should not be given anti-platelets. 
 - ⊕ Heparin is not recommended as a stopgap before starting on anti-coagulation.



Leaving hospital

- ⊕ Discharge planning is essential. It must involve the stroke survivor and their relatives or carers. It should make sure, through liaison with local service providers, that the required care will be provided, and that the stroke survivor knows what to expect.
- ⊕ Blood pressure must be monitored regularly after leaving the hospital.
- ⊕ Stroke survivors should leave hospital with a secondary prevention plan covering both drugs and lifestyle changes.
- ⊕ A post-stroke check list should be used at follow-ups to ensure comprehensive screening of all patients for frequent stroke complications.



Life after stroke

- ⊕ Stroke survivors and relatives should be involved in making care plans and other decisions for life after stroke and receive appropriate support and education.
- ⊕ Stroke survivors' needs and abilities should be assessed, and care plans should be completed quickly and regularly updated. Counselling and education about relationships and sex after stroke should be available. Assessment of a stroke survivor's ability to drive should be made according to local legislation. Timely referral to rehabilitation and support services should be provided when needed.
- ⊕ Stroke survivors should be followed up at least once a year to check on whether their functional abilities have declined; whether new symptoms may have developed; to review and, where needed, enhance support services; and adherence to secondary prevention measures should be reviewed. Patients should be referred for treatment/support if relevant.
- ⊕ For those leaving hospital to go into long-term care, the discharge summary and care plan should be available on admission; and ongoing, longer term rehabilitation support to meet needs and achieve goals should be part of the long-term care package.



Stroke Action Plan for Europe: Key performance indicators

These KPIs can be used to measure progress towards achieving the aims of the Stroke Action Plan for Europe. The issues, campaigning points, and links to the Essentials of Stroke Care for each KPI are covered below.



KPI 1: A national stroke plan defining pathways, care, and support after stroke including pre-hospital phase, hospital stay, discharge and transition, and follow-up.

This is the first step to improving stroke care. While some progress can be made by individual medics or hospitals, an overarching, national stroke plan that is supported and funded nationally is an essential first step. And, crucially, this plan must cover the whole stroke pathway – too often stroke rehabilitation and life after stroke get forgotten. The section of the Essentials of Stroke Care on stroke as a medical emergency require a national stroke plan that includes public education on stroke symptom recognition; organisation of emergency services and their co-ordination with hospitals; staff training and national/regional protocols between different parts of the health system.

KPI 2: At least one individual from the respective Stroke Support Organisation SSO (if existent) will be involved and supported, in an equal way, during the development of each country's national stroke plan or stroke related guideline.

It is essential that stroke survivors and their support organisations play an active part, not just because of their first-hand experience of care, but also because combining their expertise with that of stroke professionals and researchers helps to produce better and more comprehensive stroke plans and guidance.

KPI 3: A national strategy for multi-sectorial public health interventions promoting and facilitating a healthy lifestyle and risk factor control has been implemented.

Stroke is a preventable disease and much more needs to be done to promote better control of modifiable risk factors throughout life such as smoking, unhealthy diets, and lack of exercise.

KPI 4: Establishment of national and regional level systems for assessing and accrediting stroke clinical services, providing peer support for quality improvement, and making audit data available to public.

KPI 5: All stroke units and other stroke services independent of sector undergo quality auditing continuously or with regular time intervals (% audited/certified).

Without measuring stroke care, it is not possible to assess the quality of care or if improvements in stroke care are happening. On a European level, the Stroke Service Tracker will allow for comparison between countries. Audit of stroke care helps professionals and stroke support organisations to highlight deficiencies and to campaign for better stroke care. Without audit it will not be possible to know whether the Essentials of Stroke Care minimum standards are being followed. Accreditation and peer support for quality improvement, together with audits, have been shown to drive improvements in service delivery and outcomes.

KPI 6: Access to stroke unit care for patients with acute stroke (% admitted to stroke unit care <24 hours).

KPI 7: Recanalisation treatment rate provided for patients with ischaemic stroke (% receiving intravenous thrombolysis or mechanical thrombectomy calculated out of all ischaemic stroke admissions).

KPI 8: Access to: CT/MRI, vascular imaging, ECG, long-term ECG-monitoring, cardiac echo (TTE, TOE), dysphagia screening, and blood tests during stroke unit admission (% of stroke units with access).

These three vital KPIs cover the key elements required to ensure that the immediate and acute stroke care elements of the Essentials Stroke Care are carried out. Making sure that brain scanning is immediately available; that all who could benefit from thrombolysis or a thrombectomy receive these treatments; and that everyone gets admitted to a specialised stroke unit are key to reducing mortality and disability caused by stroke. Stroke units are especially important so that life-saving screening for swallowing problems, for example, can be carried out within 24 hours.

KPI 9: Access to early stroke unit rehabilitation including early supported discharge (% access)

KPI 10: Access to basic secondary prevention including antithrombotics, antihypertensives and statins as well as lifestyle advice (% according to WHO data)

KPI 11: A binding personalised, documented rehabilitation and sector transition plan provided at the time of discharge (% patients provided with plan).

These three KPIs are about care in the stroke unit after the acute phase and refer to the parts of the Essentials of Stroke Care under the heading of Stroke Unit Care and Secondary Prevention. The vital work of monitoring patients, reducing their existing stroke risk, and providing early rehabilitation support are all key to stroke unit care.

Rehabilitation can make a huge difference to someone's speed and extent of recovery, and the evidence shows that the sooner a stroke survivor gets therapy the better. That's why allied health professionals are an essential component of the stroke specialist team. Where the stroke survivor can be part of an Early Supported Discharge system, it is vital that they are able to receive the same level of rehabilitation support as they had in hospital.

Whatever the circumstance of discharge, the care plan covered in the Leaving Hospital and Life After Stroke sections of the Essential of Stroke Care is all about making sure that stroke survivors can expect their stroke care to continue once they are back in a community setting. Too often stroke care stops at the stroke unit door.

KPI 12: Follow-up at 3-6 months after the stroke incident including a Post Stroke Check list and a functional assessment and referral for relevant interventions (% patients with follow-up).

Along with ongoing rehabilitation needs, stroke survivors may also have a wide variety of other needs. Some of these may be about employment, driving, sexual and mental health, and some may be medical. That's why follow up meetings within 6 months of leaving hospital and at least annually thereafter are vital. It is through these meetings that new or existing after-effects of the stroke can be picked up, that medication and secondary prevention measures can be reviewed, and where referral back into rehabilitation services or to a stroke specialist can take place.

Campaigning priorities

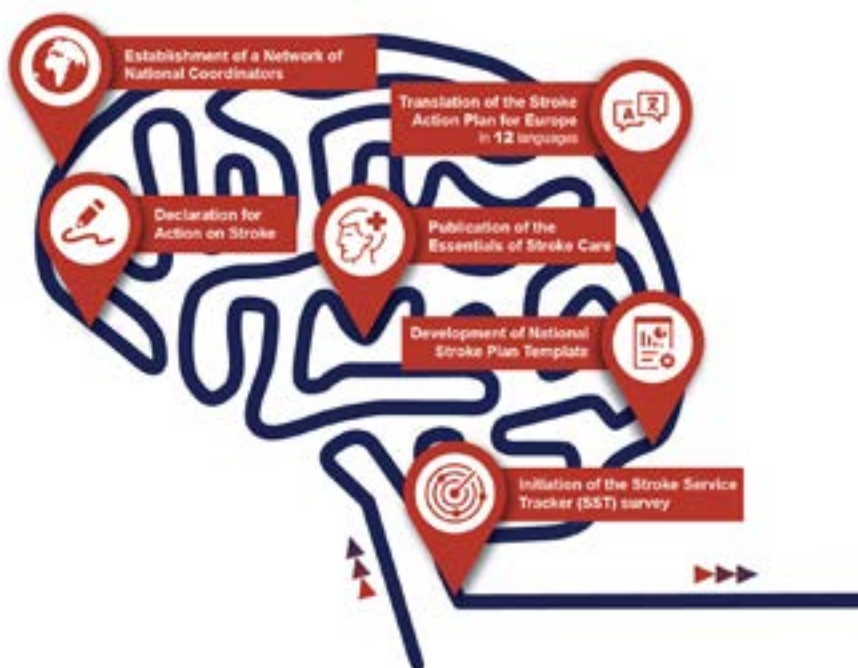
The Stroke Action Plan for Europe and the Essentials of Stroke Care provide a blueprint to tackle the burden of stroke across Europe. In each country across the continent the aspiration is that a member of ESO and stroke support organisation will work together, in collaboration with other key advocates to implement the plan in their area. Check the Stroke Action Plan for Europe website (<https://actionplan.eso-stroke.org/nationalcoordinators/>) to find out who is involved from your country.

Getting your government to commit to a national stroke plan (the European Union's Healthier Together Plan already makes this commitment) and to funding the auditing of stroke services is the top priority – a subject for political lobbying and community campaigning. When national stroke plans and audit are in place, it will be easier to highlight stroke services that are not

meeting minimum standards and to work with local stroke professionals to identify what needs to be done to bring about improvements in services, and / or highlight regional differences, or differences between urban and rural stroke provision. It will enable stroke support organisations to work with local health systems to promote public awareness campaigns on recognising stroke symptoms and on reducing people's risk of having a stroke. It will enable health system decision-makers and planners to plan for the recruitment and training of the stroke specialist workforce if needed.

And, perhaps most important of all, national stroke plans and audit will lead to better outcomes – fewer people will die from their stroke, and more people will make a quicker and better recovery from the impact of their stroke, reduced disability and better quality of life.

**TAKE THE LEAD
ACT ON STROKE**
WWW.ACTIONPLAN.ESO-STROKE.ORG



Essentials of Stroke Care was developed and written by Professor Thorsten Steiner, Professor Katharina Sunnerhagen, Professor Jesse Dawson, Professor Guillaume Turc, and Professor Hanne Christensen and approved by the Steering Committee of the Stroke Action Plan for Europe and endorsed by the Executive Committee of the European Stroke Organisation

This report was edited by Joe Korner

STROKE ACTION PLAN FOR EUROPE

SAP-E

One of the largest stroke initiatives that was ever undertaken.

Two previous pan-European consensus meetings, the 1995 and 2006 Helsingborg meetings, reviewed the scientific evidence and the state of current services, to identify priorities for research and development, and to set targets for the development of stroke care for the decade to follow. The meetings resulted in the publication of the Helsingborg Declaration 2006 on European stroke strategies.

In 2017, the European Stroke Organisation (ESO) and the Stroke Alliance for Europe (SAFE) brought together over 70 experts from across Europe to turn this Declaration into action, which resulted in the publication of the Stroke Action Plan for Europe 2018 - 2030 (SAP-E).

In 2020, 52 European countries participated in the official SAP-E implementation kick-off meeting and those involved committed themselves to drive the implementation of the SAP-E forward on a national level.



Contact

Stroke Action Plan for Europe (SAP-E)
Reinacherstrasse 131
4053 Basel / Switzerland

StrokeActionPlan@eso-stroke.org
+41 61 686 77 76