



NO TIME FOR SILENCE:

Exploring policy approaches to investment in stroke prevention in Europe

Supported by:



Bristol Myers Squibb™



Contents

- 2** About the report
- 4** Executive summary
- 7** Introduction
- 12** Chapter 1: Prevention is Europe's greatest stroke priority
- 19** Chapter 2: Aligning prevention priorities with investment priorities
- 32** Chapter 3: Boosting stroke awareness campaigns for early action
- 40** Chapter 4: Who should play the biggest role?
- 45** Conclusion: Instilling better practices for prevention
- 47** Appendix: About the survey

About the report

No time for silence: exploring policy approaches to investment in stroke prevention in France, Germany, Italy, Spain and the UK is an independent report written by The Economist Intelligence Unit, sponsored by The Bristol Myers Squibb–Pfizer Alliance. The report considers policy and investment efforts around best practices for preventing stroke including resources for education, awareness and detection. To better understand variations in European policy, the research has been conducted across five major countries: France, Germany, Italy, Spain and the UK.

The report's findings are informed by a survey of more than 250 senior executives in patient advocacy groups, the healthcare workforce and healthcare policymakers and payers (public and private). All respondents' work involves prevention and management of stroke and/or the financing of services to prevent or manage stroke. Respondents are equally representative of the five target countries. (See Appendix: About the survey for more information.)

In addition, the following individuals (listed alphabetically) have generously contributed their views and insights to this report; The Economist Intelligence Unit extends its gratitude to:

- **Julio Agredano**, founder and president, Fundación Freno al ICTUS, **SPAIN**
- **Yannick Béjot**, head of general, vascular and degenerative neurology department, Dijon Stroke Registry (EA7460), University Hospital of Dijon Bourgogne, **FRANCE**
- **Valeria Caso**, past-president of the European Stroke Organisation, University of Perugia Stroke Unit, **ITALY**
- **Antonio Di Carlo**, first researcher, Institute of Neuroscience, Italian National Research Council, **ITALY**
- **Miquel Gallofré**, former director of stroke programme, Health Department, Autonomous Government of Catalonia, **SPAIN**
- **Maurice Giroud**, Department of Neurology, University Hospital of Dijon Burgundy, Dijon Stroke Registry (EA 7460), **FRANCE**
- **Trudie Lobban**, founder and CEO, Arrhythmia Alliance, **UK**
- **Massimo Piepoli**, chair, European Association for Cardiovascular Prevention and Rehabilitation, **ITALY**

- **Markus Wagner**, senior expert, German Stroke Foundation (Stiftung Deutsche Schlaganfall-Hilfe), **GERMANY**
- **Jamie Waterall**, deputy chief nurse and chair of England's Cardiovascular Disease Prevention System Leadership Forum, Public Health England, **UK**

The Economist Intelligence Unit bears sole responsibility for the content of this report. The findings and views expressed in the report do not necessarily reflect the views of the sponsor. The report was written by Becca Lipman and edited by Elizabeth Sukkar of The Economist Intelligence Unit.

March 2020

Executive Summary

The economic burden of stroke is increasingly taxing on European countries. Despite rapid reductions in stroke rates and improvements in preventative measures, demographic changes mean the absolute number of stroke incidence is on the rise. But most strokes can be prevented, and the current high healthcare costs can be significantly reduced with more effective policy responses and investment in prevention activities.¹

To assist policymakers, healthcare providers and payers in creating a better policy framework for stroke prevention, this report explores how five European countries currently perceive and act on their policy and investment. And to better understand policy impact and where further progress can be made, this research is combined with the perspective of on-the-ground experts active in stroke prevention and management strategies.

This report builds on a research paper produced by the Economist Intelligence Unit for the Bristol Myers Squibb–Pfizer Alliance in 2017, *Preventing Stroke, Uneven Progress*,^{2,3} and conducts deeper analysis of these five countries through a survey and in-depth interviews.

The key findings of the research are:

- **Stroke rates are declining across Europe.** This is due in part to healthy living advice and better clinical interventions to manage risk factors like high blood pressure, cholesterol, atrial fibrillation (AF), weight management and smoking. To go further, governments need to be more strategic in how they support other effective interventions proven to reduce the risk of stroke. A large majority of survey respondents (84%) agree that more investment in prevention now will help reduce healthcare system costs in the long term.
- **Even as Europe's average stroke rates and national stroke rates decline, these figures mask inequalities.** Based on our research, each European country in our study could make significant improvements to deal with regional inequalities. More negative stroke outcomes are found among poorer and deprived populations across the board. Experts argue that equitable distribution of care

1. "Stroke Action Plan Europe 2018-2030", *European Stroke Organisation*, May 23rd 2018. <https://eso-stroke.org/action-plan-stroke-europe-2018-2030-2/>

2. "Preventing Stroke: Uneven Progress", *The Economist Intelligence Unit*, 2017. <https://eiuerspectives.economist.com/healthcare/policy-approaches-stroke-prevention/white-paper/preventing-stroke-uneven-progress>

3. A Karnad, A Pannelay, A Boshnakova et al., "Stroke prevention in Europe: how are 11 European countries progressing toward the European Society of Cardiology (ESC) recommendations?", *Risk Management and Healthcare Policy*, Vol.11, 2018, pages 117-125. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6112781/#!po=75.0000>

and resources alongside better implementation of local, regional and national guidelines will be a critical focus in ongoing and future efforts to reduce stroke.

- **Most respondents believe the government has a greater role to play in funding stroke prevention.** Most (60%) of our survey respondents think government funding in stroke prevention is lacking to prevent admissions to emergency hospital departments in the long term, particularly in Germany (69%). Although Italy, which frequently emerges as an exception, notably feels otherwise (39%).
- **Education and awareness initiatives need greater funding and support from government.** Most strokes can be preventable, and prevention is far less expensive than acute care and long-term care following a stroke.⁴ Unfortunately, the majority (71%) of respondents do not think many people understand the impact of stroke and how it is a leading cause of disability. If European Stroke Organisation goals of 10% reduction in absolute strokes are to be met,⁵ the general population needs greater understanding of stroke as a medical emergency and how they can modify atherosclerotic risk factors.⁶ Many effective campaigns like “know your pulse” and “know your cholesterol” exist,^{7,8,9} and survey respondents agree they will only become more important in the future. But interviewees say such campaigns are largely funded privately and insufficiently. To make a wider impact, more government funding is necessary.
- **Clinical guideline implementation can be dramatically improved.** Only 39% of respondents believe the latest clinical guidelines for managing people at risk of stroke are being “mostly” or “entirely” implemented. At best, 48% of respondents in Italy feel guidelines are “mostly” or “entirely” implemented, while in Spain the figure is just 31%. Lack of funding from national authorities and a lack of understanding of key stroke risk factors are the largest barriers to implementation, according to respondents.
- **General practitioners, specialists, nurses and pharmacists have a bigger role to play.** Looking to the future, survey respondents say GPs, specialists and nurses will have a significantly greater role in detecting and managing stroke risk factors and generally increasing awareness among patients. However, pharmacists and patient groups

4. “Stroke: Healthy living”, *Centres for Disease Control and Prevention*, January 31st 2020. https://www.cdc.gov/stroke/healthy_living.htm

5. B Norrving, J Barrick, A Davalos et al., “Action Plan for Stroke in Europe 2018–2030”, *European Stroke Journal*, 2018. <https://actionplan.eso-stroke.org/images/2396987318808719.pdf>

6. “Stroke Action Plan Europe 2018-2030”, *European Stroke Organisation*, May 23rd 2018. <https://eso-stroke.org/action-plan-stroke-europe-2018-2030-2/>

7. “Know your pulse” campaign, *Arrhythmia Alliance*. <https://www.heartrhythmalliance.org/aa/uk/know-your-pulse>

8. “Mujeres por el corazón”, *Fundacion Mapfre*. <https://www.fundacionmapfre.org/fundacion/en/programs/health/mujeres-por-el-corazon/>

9. Heart UK’s National Cholesterol Month. <https://www.heartuk.org.uk/national-cholesterol-month/national-cholesterol-month>

are generally overlooked as potentially more active players, bringing into question if the most on-the-ground stakeholders that could be involved in prevention are being fully utilised.

- **More digital investment and support from government is important for future prevention.** The uptake of digital tools like apps and smart watches to detect and monitor stroke risk factors is on the rise, along with a proliferation of available devices. As adoption grows so does the demand for greater involvement and support from government. This includes data protection and adoption of unified standards so that records can be shared across the healthcare spectrum. Most experts feel governments have a growing role to play in digital health technology regulation and in encouraging their uptake for stroke prevention.

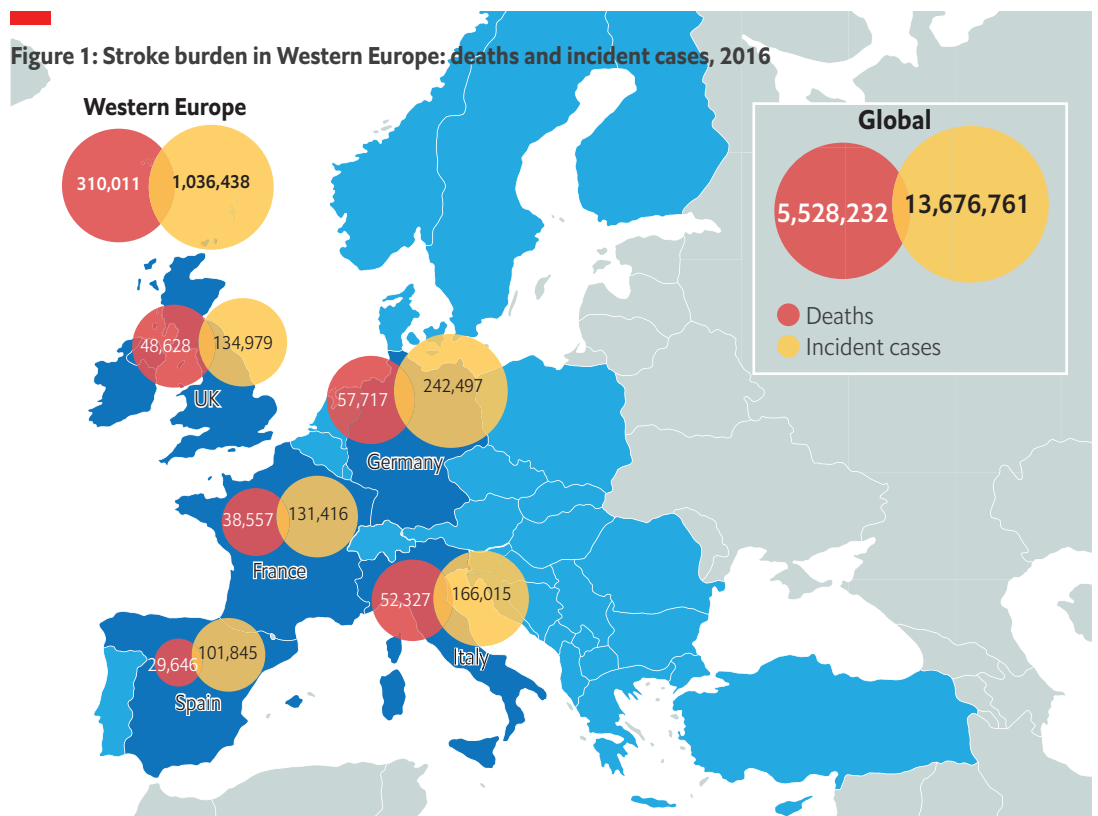
Introduction

Stroke accounts for more than one in ten European deaths each year and is the region's leading cause of adult disability.^{10,11} For policymakers in Western Europe, the stroke burden is stark with over 1m incident cases and around 310,000 deaths in 2016 (see Figures 1, 2 and 3).

Countries will need to act quickly to address this challenge as incidence of stroke is forecast to rise by more than 30% between 2015 and

2035 if current incidence trajectories are not improved.^{12,13}

Yet there is considerable evidence that stroke is highly preventable. A Lancet study of 188 countries found that 90% of the global burden of stroke in disability-adjusted life years (DALYs) was due to modifiable risk factors including behavioural (eg smoking, poor diet and low physical activity), metabolic (high blood pressure, obesity, high plasma glucose



Source: C Owens Johnson et al. Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet Neurology*, May 2019. <https://www.thelancet.com/action/showFullTableHTML?isHtml=true&tableId=tbl1&pii=S1474-4422%2819%2930034-1>

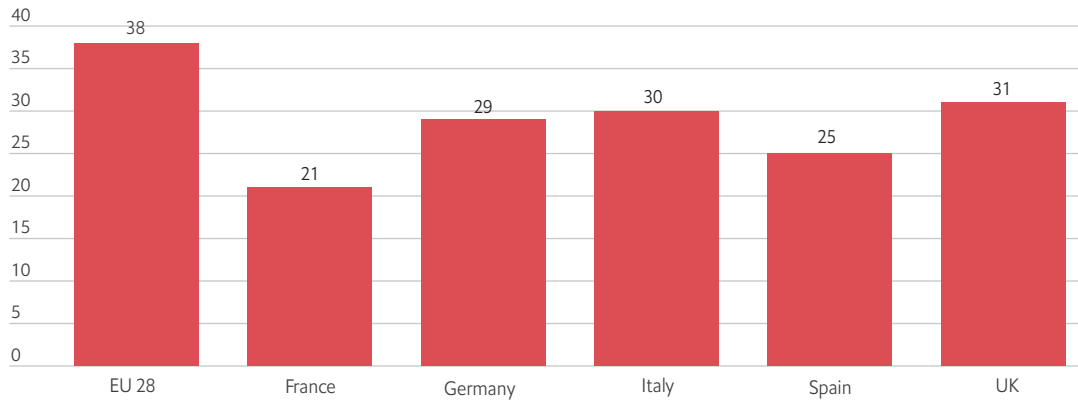
¹⁰ "Differences in stroke death rates across Europe", *Nuffield Department of Population Health*, 2018. <https://www.ndph.ox.ac.uk/news/differences-in-stroke-death-rates-across-europe>

¹¹ CJ Murray, T Vos, R Lozano et al., "Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010", *The Lancet*, 2012, pages 2197–2223. <https://www.ncbi.nlm.nih.gov/pubmed/23245608>

¹² "Adding stroke to the political agenda in Europe", *The Lancet Neurology*, Vol. 18, No.6, 2019, page 513. [https://www.thelancet.com/journals/laneur/article/PIIS1474-4422\(19\)30157-7/fulltext](https://www.thelancet.com/journals/laneur/article/PIIS1474-4422(19)30157-7/fulltext)

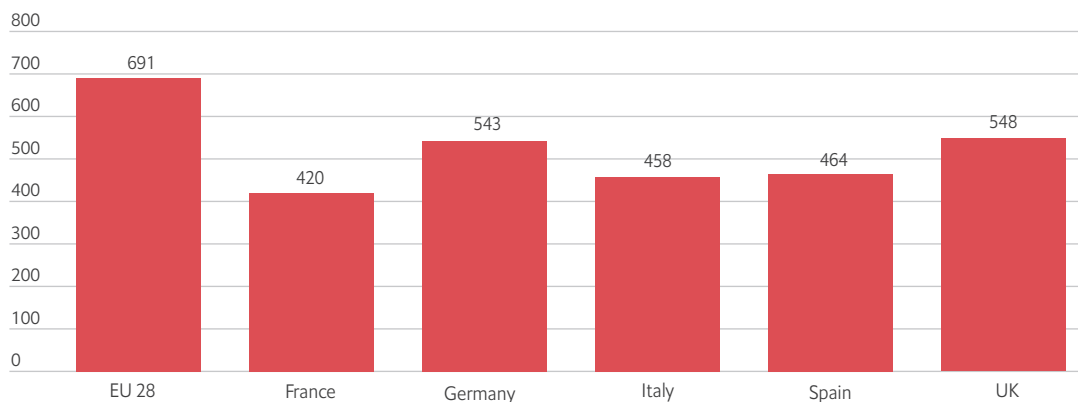
¹³ Table Deaths, Incident cases, and DALYs for stroke in 2016 and percentage change of age-standardised rates for 1990–2016, by location. [https://www.thelancet.com/journals/laneur/article/PIIS1474-4422\(19\)30157-7/fulltext](https://www.thelancet.com/journals/laneur/article/PIIS1474-4422(19)30157-7/fulltext)

Figure 2: Age-standardised rates of mortality (per 100,000 people) due to stroke for five countries in Europe, 2017



Source: VJ Santos et al. The state of health in the European Union (EU-28) in 2017: an analysis of the burden of diseases and injuries. *European Journal of Public Health*, <https://doi.org/10.1093/eurpub/ckz203>, 10 December 2019.

Figure 3: Age-standardised rates of DALYs (per 100,000 people) due to stroke for five countries in Europe, 2017



Source: VJ Santos et al. The state of health in the European Union (EU-28) in 2017: an analysis of the burden of diseases and injuries. *European Journal of Public Health*, <https://doi.org/10.1093/eurpub/ckz203>, 10 December 2019.

and cholesterol levels), or environmental factors (lead pollution or lead exposure). Other risk factors include atrial fibrillation (AF) and substance abuse, both of which can also be detected and managed appropriately.¹⁴

Encouragingly, the rates of stroke and other cardiovascular diseases like heart attacks

per 100,000 people are decreasing across Europe,¹⁵ particularly in Western Europe.¹⁶ This is largely due to successful prevention strategies around major risk factors such as smoking, cholesterol and hypertension control¹⁷ as well as access to medicines and better management of AF.

¹⁴ VL Feigin, G Roth, M Naghavi et al., "Global burden of stroke and risk factors in 188 countries, during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013", *The Lancet*, Vol. 15, No. 9, 2016, pages 913–924. [https://www.thelancet.com/journals/lanear/article/PIIS14744422\(16\)30073-4/fulltext](https://www.thelancet.com/journals/lanear/article/PIIS14744422(16)30073-4/fulltext)

¹⁵ E Stevens, E Emmett, Y Wang et al., "The Burden of Stroke in Europe: The Challenge for Policy Makers", *Stroke Alliance for Europe*, 2016. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

¹⁶ R Shah, E Wilkins M Nichols et al., "Epidemiology report: trends in sex-specific cerebrovascular disease mortality in Europe based on WHO mortality data", *European Heart Journal*, Vol. 40, No. 9, 2019, pages 755–764. <https://academic.oup.com/eurheartj/article/40/9/755/5069358>

¹⁷ 2016 European Guidelines on cardiovascular disease prevention in clinical practice. <http://eurheartj.oxfordjournals.org/>

However, the absolute number of strokes is increasing in most countries due to an expanding and rapidly ageing population. Projections made by the Stroke Alliance for Europe (SAFE), a coalition of patient organisations in 30 European countries, predict the annual number of strokes in the EU will increase from 613,148 in 2015 to 819,771 in 2035,¹⁸ due for the most part to these demographic changes.¹⁹

In countries like Italy, which has one of the greatest proportions of older people (23% of the total population is aged 65 years and over), the future burden of stroke will be particularly severe.

Clearly, there is much more work to be done to further reduce the incidence of stroke and its long-term health and socioeconomic consequences. In our previous report on stroke, *Preventing Stroke, Uneven Progress*,²⁰ it was made clear that the risk factors have largely been identified, but policymakers and healthcare professionals are not always enacting or following national policies and clinical guidelines to mitigate them.

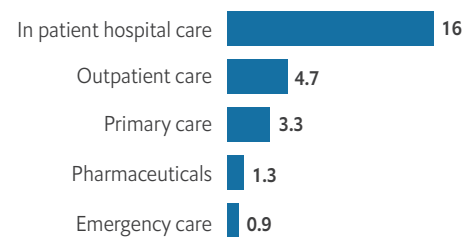
And change needs to happen fast. Public health officials know that even as rates of stroke-related deaths decline, the socioeconomic costs associated with the disease continue to rise, including direct costs (such as healthcare) and indirect costs (such as lost productivity and income of patients

and carers due to absenteeism from the workplace).

The economic burden of stroke is significant. According to 2019 research from SAFE, the full cost of stroke in 32 European countries was €60bn (US\$66bn) in 2017²¹ (see chapter 2). This is a dramatic increase from the 2015 estimate of €45bn (US\$50bn) per year,²² which did not include nursing or residential care home costs.

In fact the direct healthcare costs—largely from visits to general practitioners (GPs), accident and emergency admissions, outpatient and hospital inpatient care and medications—only make up €27bn (US\$30bn) or 45% of the total economic hit. Altogether, the direct costs represent 1.7% of health expenditure across the 32 countries.^{23,24}

Figure 4: Direct costs of stroke in 32 European countries (€ billion)



Source: R Luengo-Fernandez et al. Economic burden of stroke across Europe: A population-based cost analysis. 2019. <https://journals.sagepub.com/doi/full/10.1177/2396987319883160>

¹⁸ E Stevens, E Emmett, Y Wang et al., "The Burden of Stroke in Europe: The Challenge for Policy Makers", *Stroke Alliance for Europe*, 2016. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

¹⁹ "Stroke Action Plan for Europe: 2018-2030", *SAFE*, 2017. https://www.safestroke.eu/wp-content/uploads/2019/05/SAFE-SAPE-ebook-correct-version_compressed-FINAL-FINAL.pdf

²⁰ "Preventing Stroke: Uneven Progress", *The Economist Intelligence Unit*, 2017. <https://eiuperspectives.economist.com/healthcare/policy-approaches-stroke-prevention/white-paper/preventing-stroke-uneven-progress>

²¹ "Full costs of stroke in 32 European countries is €60 billion, says latest SAFE research", *SAFE*, November 27th 2019. <https://www.safestroke.eu/2019/11/27/costofstroke/>

²² S Halim, "Ever heard of the Stroke Action Plan?", *Health Europa*, 28th January 2019. <https://www.healtheuropa.eu/stroke-action-plan/89965/> and https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

²³ "Full costs of stroke in 32 European countries is €60 billion, says latest SAFE research", *SAFE*, November 27th 2019. <https://www.safestroke.eu/2019/11/27/costofstroke/>

²⁴ R Luengo-Fernandez, M Violato, P Candio et al., "Economic burden of stroke across Europe: A population-based cost analysis", *European Stroke Journal*, 2019. <https://journals.sagepub.com/doi/full/10.1177/2396987319883160>

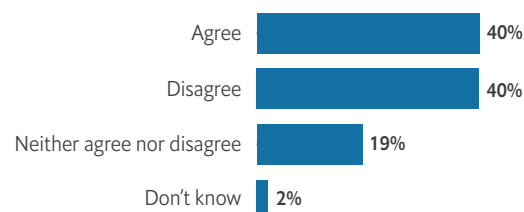
It is the indirect costs that are most onerous. In Europe, the majority of people (91% of men, 88% of women) survive their first stroke,²⁵ but about a third suffer a disability in relation to mobility, cognition, sight or communication.^{26,27} And although stroke is relatively rare in children,²⁸ about 60% of survivors will have permanent neurological deficits.²⁹

These handicaps impact quality of life and work, and individuals often need financial support and informal care for the rest of their lives. For example, the UK estimates annual strokes include £2.4bn (US\$3.07bn) in informal care costs, £1.3bn (US\$1.66bn) in lost income and £800m (US\$1.02bn) in benefit payments.³⁰ Additionally, people who have experienced stroke have a high risk of subsequent readmission to hospital. The risk of all-cause readmission within the first year following a stroke was about 33%—creating even more strain on public health resources.³¹ Across Europe, 43m days were spent in nursing/residential care homes due to stroke in 2017.³²

Generally, these current and future costs fall under the radar of public awareness. According to our survey of stroke prevention and management respondents across five European countries, only 40% felt the indirect and direct costs of stroke to economies is well understood by the public. This is an opinion held most strongly by healthcare policy makers/payers (49%) and patient advocacy

groups (43%) compared with healthcare professionals (29%).

Figure 5: The direct and indirect costs of stroke to economies is well understood by the public.
% of respondents



Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit

For public health officials and policymakers, the pressure is on to cut the number of new stroke cases and realise significant reductions in associated socioeconomic costs. And as explored in this paper, prevention is the most cost-effective action for reducing incidence in the long term and for relieving healthcare budgetary strains.

In each of the following chapters we explore how improved health policies and more public funding can be a powerful tool to increase stroke awareness and reduce its incidence and costs. To do this, we draw on our survey, interviews and desk research findings to shed light on how government and experts in five European countries (France, Germany, Italy, Spain and the UK) perceive and prioritise prevention policy and investment around stroke.

²⁵ "Death rates from stroke are declining overall in Europe, but are levelling off or increasing in some countries", *European Society of Cardiology*, 2018. <https://www.escardio.org/The-ESC/Press-Office/Press-releases/death-rates-from-stroke-are-declining-overall-in-europe-but-are-levelling-off-or-increasing-in-some-countries>

²⁶ "State of the Nation", *Stroke Association*, 2016. https://www.stroke.org.uk/sites/default/files/stroke_statistics_2015.pdf

²⁷ *European Stroke Organisation FAQ*. <https://eso-stroke.org/faq/>

²⁸ DS Tsze and J Valente, "Pediatric Stroke: A Review", *Emergency Medical International*, 2011. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3255104/>

²⁹ HJ Fullerton, NK Hills, MS Elkind et al., "Infection, vaccination, and childhood arterial ischemic stroke Results of the VIPS study", *Neurology*, Vol. 85, No.17, 2015, pages1459-1466. <https://www.ncbi.nlm.nih.gov/pubmed/26423434>

³⁰ "State of the Nation: Stroke Statistics", *Stroke Association*, 2017. https://www.stroke.org.uk/sites/default/files/state_of_the_nation_2017_final_1.pdf

³¹ C Lainay, E Benzenine, J Durier et al., "Hospitalisation within the first year after stroke: the Dijon Stroke Registry", *Stroke*, Vol. 46, No.1, 2015, pages190-196. <https://www.ncbi.nlm.nih.gov/pubmed/25378425>

³² R Luengo-Fernandez, M Violato, P Candio et al., "Economic burden of stroke across Europe: A population-based cost analysis", *European Stroke Journal*, 2019. <https://journals.sagepub.com/doi/full/10.1177/2396987319883160>

Key facts about stroke

One in four people are at risk for having a stroke in their lifetime.³³ Stroke risk increases with age, but strokes can occur at any age. In fact, a quarter of strokes occur in people under the age of 65, and is one of the top ten causes of childhood death.³⁴

Men are at higher risk of stroke at a younger age than women. However, the number of stroke-related deaths is higher among women because women tend

to live longer and have strokes at a later age.³⁵

There are two main types of stroke. The first, ischaemic stroke, is caused by blood clots formed in or coming to the brain, cutting off its blood and oxygen supply. The second, haemorrhagic stroke, is caused by the bursting of a weakened blood vessel supplying the brain.³⁶ About 80% of strokes are ischaemic.³⁷

-
- ³³. V Feigin, G Nguyen, K Cercy et al., Global, Regional, and Country-Specific Lifetime Risks of Stroke, 1990 and 2016: The GBD 2016 Lifetime Risk of Stroke Collaborators", *New England Journal of Medicine*, 2018. <https://www.nejm.org/doi/full/10.1056/NEJMoa1804492>
- ³⁴. "Media Centre: Stroke Facts & Statistics", *Different Strokes*, <https://differentstrokes.co.uk/what-we-do/media-centre/>
- ³⁵. Stroke Association. 2017. State of the Nation, Stroke Statistics. https://www.stroke.org.uk/sites/default/files/state_of_the_nation_2017_final_1.pdf
- ³⁶. Royal College of Physicians. National clinical guidelines for stroke, 2016. [https://www.strokeaudit.org/SupportFiles/Documents/Guidelines/2016-National-Clinical-Guideline-for-Stroke-5t-\(1\).aspx](https://www.strokeaudit.org/SupportFiles/Documents/Guidelines/2016-National-Clinical-Guideline-for-Stroke-5t-(1).aspx)
- ³⁷. Y Béjot, H Bailly, J Durier et al., "Epidemiology of stroke in Europe and trends for the 21st century", *Presse Medicale*, 2016. <https://www.ncbi.nlm.nih.gov/pubmed/27816343>

Chapter 1: Prevention is Europe's greatest stroke priority

In 2018 the European Stroke Organisation (ESO) released a major policy document, the Action Plan for Stroke in Europe (also known as the European Stroke Action Plan (ESAP)), for the years 2018 to 2030.³⁸ The plan includes targets to reduce the absolute number of strokes in Europe by 10%.

If reached, each European nation stands to save hundreds of millions of euros each year in direct and indirect costs based on current estimates of stroke's economic burdens (see Figure 5). And any cost savings will enable allocation to other conditions and services that otherwise would be directed to stroke care.

Consider a 2016 report from the National Institute for Health and Care Excellence (NICE) which estimated that a UK national programme reducing population cardiovascular risk by

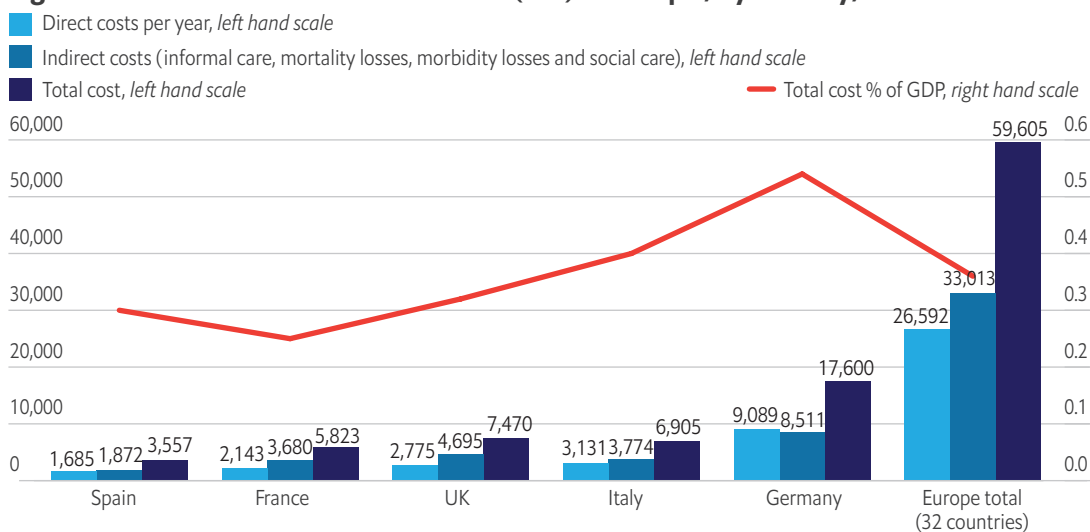
just 1% would prevent 25,000 cardiovascular disease (CVD) cases and generate savings of €40m (US\$44.2m) per year.³⁹

Cost-effectiveness of prevention

Experts interviewed explain that costs per stroke are rising in part because direct healthcare and medication costs have generally increased. People are also surviving stroke and living longer, so long-term costs of care are on the rise.

The particular cost savings of stroke prevention, compared with acute treatment and the direct and indirect costs of recovery, is still being studied. The Action Plan for Stroke in Europe 2018–2030 lists “the health-economic impact of strokes and the return of investment in stroke care” as a top research and development priority for 2030 alongside

Figure 6: Direct and indirect stroke costs (€m) in Europe, by country, 2017



Source: R Luengo-Fernandez et al. Economic burden of stroke across Europe: A population-based cost analysis. 2019. <https://journals.sagepub.com/doi/full/10.1177/2396987319883160>

³⁸ B Norrving, J Barrick, A Davalos et al., “Action Plan for Stroke in Europe 2018–2030”, *European Stroke Journal*, 2018. <https://actionplan.eso-stroke.org/images/2396987318808719.pdf>

³⁹ European Guidelines on cardiovascular disease prevention in clinical practice, 2016. <http://eurheartj.oxfordjournals.org/>

identifying the most relevant barriers, including economical, to the implementation of evidence-based stroke care.

Calculations are complex: for example it is known that the cost-effectiveness of CVD prevention strongly depends on parameters such as the target population's age, the overall population risk of CVD and the cost of interventions.⁴⁰

Some European countries are planning to shed more light on this. In the UK, Public Health England (PHE) is currently developing a CVD Prevention Return on Investment Tool which will demonstrate how different approaches to detecting and managing people with high risk conditions can free up national resources.⁴¹

"We're commissioning a new CVD prevention audit," explains Professor Jamie Waterall, chair of England's CVD Prevention System Leadership Forum. "For the first time in England, we'll have a new national prevention audit looking at some key risk factors and high-risk conditions, such as atrial fibrillation, blood pressure and high cholesterol. Once we have access to those data, we'll be publishing national ambitions to allow us to focus on addressing health inequalities in high risk groups and our most disadvantaged communities."

But even without the specifics on hand, there is no doubt that from a socioeconomic and public health standpoint the best approach to stroke is to prevent it.

Take for example the WHO's global action plan for the prevention and control of noncommunicable diseases (NCDs) 2013-2020, which emphasises that the cost of inaction far outweighs the cost of prevention and control activities.⁴² One of the key targets for countries in the WHO's NCD action plan is for "at least 50% of eligible people [to] receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes".⁴³

The UN also regards primary prevention as the most cost-effective strategy to reduce the socioeconomic burden of stroke and other major NCDs.⁴⁴ And a report by the US Centres for Disease Control and Prevention highlights research that shows reducing salt intake by 15% and implementing four key WHO elements of reduction in tobacco use—taxation, enforcement of smoke-free workplaces, packaging and labelling requirements and awareness campaigns—could prevent 13.8m deaths over ten years. This would reduce the cost of NCD care to less than 40 US cents per person per year in low-income and lower-middle-income countries, and just 50 US cents—\$1 per person per year in upper-middle-income countries.^{45,46}

Cost savings from stroke prevention are reflected in our survey: 84% believe that if we invest in stroke prevention now, we can contain larger costs to the healthcare system later on.

"Once we know a person has a risk factor for stroke, we can begin to control for a much

40. European Guidelines on cardiovascular disease prevention in clinical practice, 2016. <http://eurheartj.oxfordjournals.org/>

41. Cardiovascular Disease Prevention Return on Investment Tool, *Public Health England*, 2018. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784208/Cardiovascular_disease_prevention_ROI_tool.pdf

42. "Global action plan for the prevention and control of noncommunicable diseases 2013-2020", *World Health Organisation*, 2013. https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf;jsessionid=17C9290E722C1A89DF4CAAC7CBEBBF8E?sequence=1

43. "Global action plan for the prevention and control of noncommunicable diseases 2013-2020", *World Health Organisation*, 2013. https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf;jsessionid=17C9290E722C1A89DF4CAAC7CBEBBF8E?sequence=1

44. N Probst-Hensch, M Tanner, C Kessler et al., "Prevention—a cost-effective way to fight the non-communicable disease epidemic: an academic perspective of the United Nations High-level NCD Meeting", *Swiss Medical Weekly*, 2011. <https://www.ncbi.nlm.nih.gov/pubmed/21901650>

45. VL Feigin, B Norrving, MG George et al., "Prevention of stroke: a strategic global imperative", *Centres for Disease Control and Prevention*, 2016. <https://www.cdc.gov/stroke/docs/prevention-of-stroke-strategic-global-imperative.pdf>

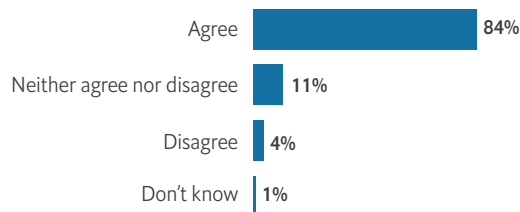
46. P Asaria, D Chisholm, C Mathers et al., "Chronic disease prevention: health effects and financial costs of strategies to reduce salt intake and control tobacco use", *The Lancet*, 2007, pages 2044–2053. <https://www.ncbi.nlm.nih.gov/pubmed/18063027>

lower cost than acute treatment,” says Valeria Caso, past-president of the European Stroke Organisation, and a stroke neurologist at the University of Perugia Stroke Unit, Italy.

“For example, hypertension is not expensive to control because you need some physical activity and non-expensive drugs. Regarding AF, I think we can invest more because the burden of cardioembolic disease is much higher than the cost of prevention with novel oral anticoagulants (NOACs) and other anticoagulation drugs. This will definitely be a

Figure 7: If we invest now in preventing stroke, we can contain larger costs to the healthcare system later on.

% of respondents

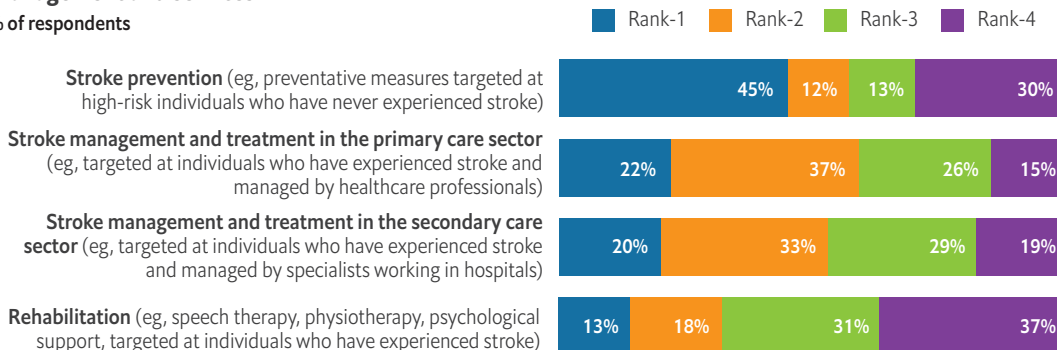


There is little variation to these findings between the three survey audiences: patient advocacy, healthcare professionals and healthcare policy makers/payers.

Source: The Economist Intelligence Unit.

Figure 8: How government prioritises its financial investment (funding) across stroke prevention, management and services

% of respondents



Rank of government priorities for financial investment in stroke (% of respondents): 45% of respondents say “stroke prevention” is the top priority in their government’s funding. This is highest in France (55%), and lowest in UK (38%). And felt most strongly by healthcare professionals (54%). Numbers may not add to 100 due to rounding.

Source: The Economist Intelligence Unit.

return on investment.”

Primary prevention as a priority

Survey respondents were asked to rank how they believe their government prioritises its financial investment (funding) across stroke primary prevention, secondary prevention, management and services.

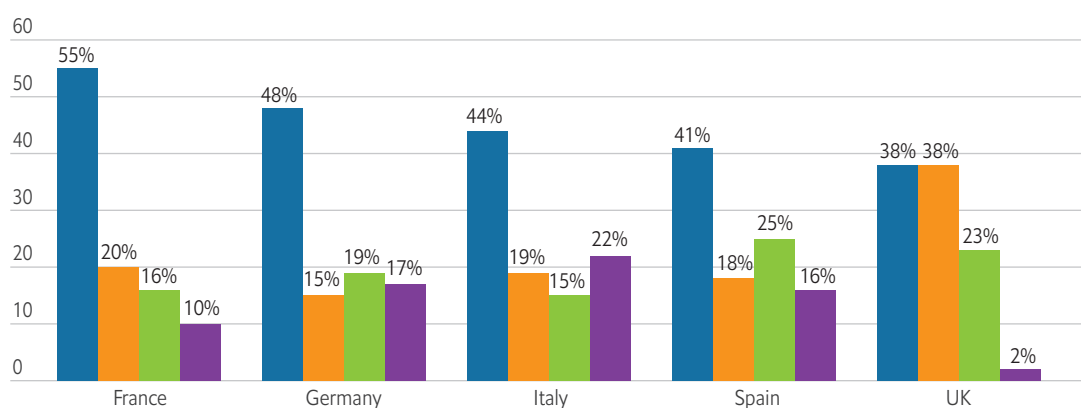
Overwhelmingly, they agreed that their government prioritises primary prevention (stroke prevention measures for high-risk individuals who have never experienced stroke) above all other areas of stroke care. In a distant second is stroke management and treatment in the primary care sector for

Experts interviewed also agree that the prevention of stroke and other CVDs are already among their country’s greatest health investment priorities, typically alongside cancer prevention.

Figure 9: Rank how you believe your government prioritises its financial investment (funding) across stroke prevention, management and services

% of respondents who rank a category #1 priority

- **Stroke prevention** (eg, preventative measures targeted at high-risk individuals who have never experienced stroke)
- **Stroke management and treatment in the primary care sector** (eg, targeted at individuals who have experienced stroke and managed by primary healthcare professionals)
- **Stroke management and treatment in the secondary care sector** (eg, targeted at individuals who have experienced stroke and managed by specialists working in hospitals)
- **Rehabilitation** (eg, speech therapy, physiotherapy, psychological support, targeted at individuals who have experienced stroke)

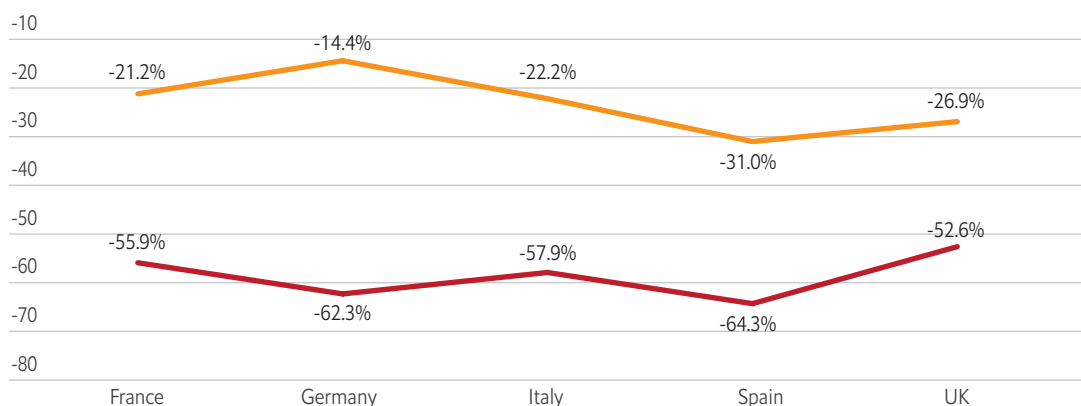


Top ranking of government priorities for financial investment in stroke (% of respondents by country): Altogether, 45% of respondents say "stroke prevention" is the top priority in their government's funding. This is highest in France (55%), and lowest in UK (38%), which equally ranks it alongside stroke management in the primary care sector. That prevention is a priority is felt most strongly by healthcare professionals (54%).

Source: The Economist Intelligence Unit.

Figure 10: Change in death and incidence rates for stroke, 1990-2016

- **Deaths:** Percentage change in age-standardised rates, 1990-2016
- **Incidence:** Percentage change in age-standardised rates, 1990-2016



Source: The Lancet Neurology. Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. 2019.

individuals who have already experienced a stroke (secondary prevention).

Experts interviewed also agree that the prevention of stroke and other CVDs are already among their country's greatest health investment priorities, typically alongside cancer prevention. "Cardio-neurovascular diseases and cancer are top priorities," says Maurice Giroud of the Department of Neurology at University Hospital of Dijon Burgundy in France. "Financial investments have been dedicated to stroke prevention with, for example, free medicines for vascular risk factors."

Maintaining support for stroke prevention amid declining rates

Age-standardised data on stroke incidence and death show that death rates from stroke fell by 58% in Western Europe between 1990 and 2016. For our five study countries this was a decrease of 56% in France, 62% in Germany, 58% in Italy, 64% in Spain and 53% in the UK.⁴⁷

There are two main reasons why incidence rates of stroke and other types of cardiovascular diseases like heart attacks are declining. Firstly, there have been significant improvements in developed countries in preventative interventions that affect the many behavioural and environmental risk factors of stroke. For example, lifestyle factors

like smoking and high salt intake are on the decline, which helps reduce the population's average blood pressure, and the introduction of regulations to reduce air pollution.^{48,49}

Secondly, there have been significant improvements in the development of and access to clinical interventions. This includes pharmacological treatments like lipid-lowering agents such as statins and anticoagulation treatments for the management of risk factors. High blood pressure, for example, has been significantly reduced since the 1980s and 1990's with prescription of antihypertensives, according to experts.⁵⁰

Mortality rates from stroke are also declining because of better management and treatment, including how people are cared for on admission to emergency services. That is including the establishment of dedicated stroke unit teams and more widely available management options like thrombolysis and thrombectomy, interventions that lead to falling fatalities within the first 90 days.^{51,52}

Mr Waterall equally credits population preventative interventions and improved clinical treatments for the dramatic reduction in stroke mortality decline in the UK over the past two decades. "Combining primary and secondary preventative interventions, there's no doubt that that's the cause of this reduction that we've seen."

⁴⁷ CO Johnson, M Nguyen, GA Roth et al., "Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016", *The Lancet: Neurology*, Vol. 18, No. 5, 2019, pages 439–458. [https://www.thelancet.com/journals/lanneur/article/PIIS1474-4422\(19\)30034-1/fulltext](https://www.thelancet.com/journals/lanneur/article/PIIS1474-4422(19)30034-1/fulltext)

⁴⁸ KK Lee, MR Miller, A Shah, "Air Pollution and Stroke", *Journal of Stroke*, Vol. 20, No.1, 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5836577/>

⁴⁹ "Cleaner air for all", *European Commission*. https://ec.europa.eu/environment/air/cleaner_air/

⁵⁰ BM Psaty, T Manolio, N Smith et al., "Time Trends in High Blood Pressure Control and the Use of Antihypertensive Medications in Older Adults", *Archives of Internal Medicine*, 2002. <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/213968>

⁵¹ E Parr, P Ferdinand, C Roffe, "Management of Acute Stroke in the Older Person", *Geriatrics*, Vol. 2, No. 3, 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6371128/>

⁵² "Stroke and transient ischaemic attack in over 16s: diagnosis and initial management: [D] Evidence review for thrombectomy. NICE Guideline NG128. Intervention evidence review", *National Institute for Health and Care Excellence*, 2019. <https://www.nice.org.uk/guidance/ng128/evidence/d-thrombectomy-pdf-6777399569>

But success can be a double-edged sword. In light of the decreasing mortality rates from stroke, some reports and experts suspect political momentum is starting to lag for further prevention.⁵³

This is a mistake. Age-standardised statistics, while valuable, do not tell the full story. The number of older people in Europe—including the five countries in our study—is rising, with a projected increase of 35% between 2017 and 2050.⁵⁴ And because populations are ageing, the absolute incidence, prevalence and death rate of stroke are projected to increase significantly.

Mr Waterall is among those cautioning policymakers not to celebrate too soon. “There’s a risk that comes with the good-news story that we’ve halved death rates from CVDs, including strokes, over the last decade or two. There’s potentially a misconception that we’re done and things are finished when actually that’s far from reality. We can’t lose focus, there’s still work to do,” he says.

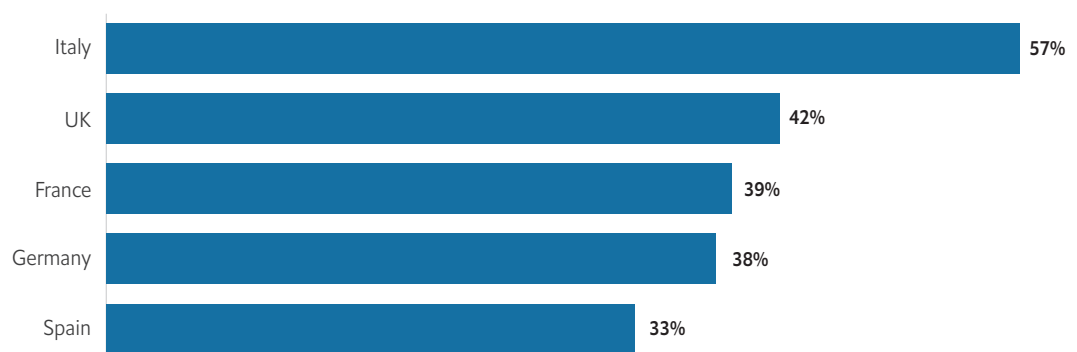
For instance, stroke reduction is far from equal.⁵⁵ Within countries, national figures showing decreases in stroke mask health inequalities by region.⁵⁶ “We know that people living in our most deprived populations are far more likely to die prematurely from strokes and CVDs,” says Mr Waterall.

“In fact, the data suggests that people living in England’s most-deprived areas are almost four times as likely to die prematurely, so under the age of 75, from CVD compared with those living in the least-deprived areas.” On average nearly 30% of our survey respondents were not satisfied with the financial investment of their regional or local authorities to support patients at risk of stroke.

“This isn’t exclusive to England,” Mr Waterall adds. “We know this is a global phenomenon that people in more deprived areas are more likely to die prematurely. This has to be our prime refocus to ensure that some of those significant benefits in reducing premature death and ill health are equitable across the population.”

Figure 11: I am satisfied with the financial investment and commitment of my regional and/or local authorities to support patients at risk of stroke.

% of respondents who agree



Source: The Economist Intelligence Unit.

⁵³ Stroke Association Strategy 2015 to 2018. https://www.stroke.org.uk/sites/default/files/stroke_association_strategy_2015-2018.pdf

⁵⁴ United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Ageing 2017– Highlights (ST/ESA/SER.A/397).

⁵⁵ R Shah, E Wilkins M Nichols et al., “Epidemiology report: trends in sex-specific cerebrovascular disease mortality in Europe based on WHO mortality data”, *European Heart Journal*, Vol. 40, No. 9, 2019, pages 755-764. <https://academic.oup.com/eurheartj/article/40/9/755/5069358>

⁵⁶ J Waterall, “Public Health Matters: How are we working together to tackle cardiovascular disease?”, *Public Health England*, 2017. <https://publichealthmatters.blog.gov.uk/2017/09/29/how-are-we-working-together-to-tackle-cardiovascular-disease/>

Julio Agredano, founder and president of Fundación Freno al ICTUS (stroke society) in Spain, reports similar issues. “There is inequity in the system and there are communities that are more disadvantaged. Some important provinces do not have hospitals prepared to properly treat stroke patients with the best means. Although there is a nationwide stroke plan, it is not implemented uniformly.”

At a higher level, the EU has acknowledged that inequality is an issue across countries.⁵⁷ In 2016, it stated that the EU has a “clear mandate to ensure equitable access to high-quality health services for everyone living in their countries” including ensuring that

resources and health services are as closely matched regardless of geographies. Data collection, better monitoring, research and policy analysis, it says, will be needed to assess and address these gaps in care.

Experts interviewed also argue that without ongoing and indeed greater government support, it will be difficult—if not impossible—for stakeholders to tackle the inequality gaps across the entire stroke pathway from detection and treatments to stroke management. Nor will they be able to realise the 10% absolute reduction goals set by the ESO.

⁵⁷ “Report of the expert panel on effective ways of investing in health: Access to health services in the European Union”, *European Commission*. https://ec.europa.eu/health/expert_panel/sites/expertpanel/files/015_access_healthservices_en.pdf

Chapter 2: Aligning prevention priorities with investment priorities

Modifiable risk factors

Reducing the burden of stroke in any population requires active management of known risk factors.

While some risk factors of stroke such as age, gender and ethnicity are not modifiable, there are a number of modifiable risk factors, meaning they can be managed. These include:^{58,59}

- hypertension
- smoking
- dyslipidaemia
- unhealthy diet
- physical inactivity
- obesity
- diabetes mellitus
- cardiac disease
- excessive alcohol intake
- psychosocial factors
- atrial fibrillation

Generally, as borne out by survey results, research and expert commentary, modifiable risk factors can be managed at costs below that of acute emergency care and longer-term disability.⁶⁰

While all are important for combatting stroke, we asked survey respondents to identify the top three stroke prevention areas that they believe their government currently prioritises

its financial investment, and compared that with how they believe it should prioritise its investment.

Generally, there is alignment between current funding priorities and the priorities of respondents (although as we explore later, the level of funding itself is deemed to be insufficient).

The biggest disparity emerged around healthy lifestyle and living (eg weight management, exercise) as many more respondents say it should be a greater priority than it currently is. This was felt most strongly in the UK and least strongly by Germany and Italy. And by category, this was expressed more often by healthcare professionals than patient advocacy groups or healthcare policy makers/payers.

Collective rankings also reveal that more funding prioritisation of smoking cessation support and family history of stroke would be ideal, a view held particularly strongly by UK respondents. With regard to healthy diet, alcohol consumption and managing AF, respondents generally considered the current financial investment is adequately prioritised.

Notably, while many said managing diabetes, hypertension and hyperlipidaemia are a current priority, there seems to be an inclination from respondents that these could give way to other risk factors on the list.

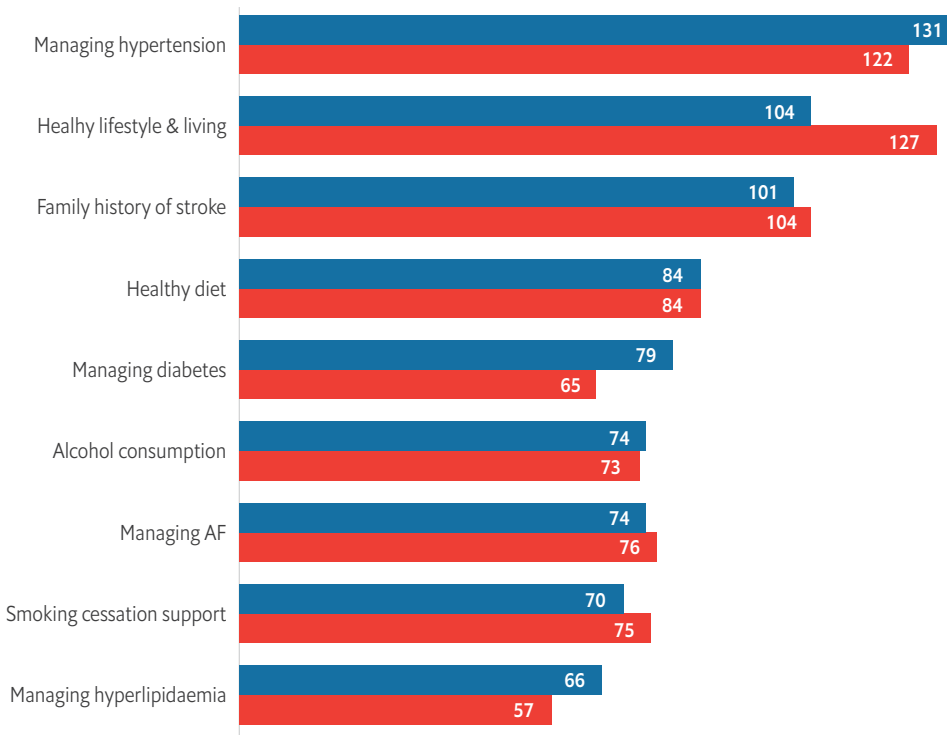
^{58.} B Norrving, J Barrick, A Davalos et al., "Action Plan for Stroke in Europe 2018–2030", *European Stroke Journal*, 2018. <https://actionplan.eso-stroke.org/images/2396987318808719.pdf>

^{59.} MJ O'Donnell, SL Chin, S Rangarajan et al., "Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): a case-control study", *The Lancet*, 2016, pages 761–775. <https://www.ncbi.nlm.nih.gov/pubmed/27431356>

^{60.} AK Boehme, C Esenwa, M Elkind, "Stroke Risk Factors, Genetics, and Prevention", *Stroke Compendium*, 2017. <https://www.ahajournals.org/doi/pdf/10.1161/CIRCRESAHA.116.308398>

Figure 12: Collective ranking of top 3 investment priorities for modifiable risk factors for stroke.

■ # of respondents who place it in the top 3 rankings for how government **currently** prioritise investment
 ■ # of respondents who place it in the top 3 rankings for how government **should** prioritise investment



Source: The Economist Intelligence Unit.

There are disparities between respondents from the five countries, likely reflective of their current public health concerns and existing funding strategies.

For example, on the question of which areas should be a top funding priority, Spanish respondents select smoking cessation and alcohol consumption less frequently than their peers in other countries (only 14% of Spain rank either smoking or alcohol, far below the average (28% and 27% respectively)). Instead, they tend to put more emphasis on healthy lifestyle (weight management/exercise) and hypertension management (57% of Spain ranks healthy lifestyle and 55% rank

hypertension, both more than the average (49% and 47% respectively)).

The French, in contrast, are more inclined to prioritise funding for alcohol (45% rank it) and smoking cessation (35% rank it).

Health technologies and interventions

The detection and treatment landscape for stroke has greatly improved in the past decade and continues to do so.^{61,62,63,64}

Widespread access to and use of preventative medicines, such as anti-hypertensives, anti-lipid drugs, smoking cessation products and

⁶¹ YC Lau, GY Lip, "Which drug should we use for stroke prevention in atrial fibrillation?", *Current Opinion in Cardiology*, 2014. <https://www.ncbi.nlm.nih.gov/pubmed/25029448>
⁶² "Stroke prevention drug combo shows promise, study says", *Science Daily*, 2018. <https://www.sciencedaily.com/releases/2018/05/180516085648.htm>
⁶³ A Matthews-King, "Blood pressure triple pill could help protect millions from heart attacks and strokes, trial finds", *The Independent*, August 14th 2018. <https://www.independent.co.uk/news/health/blood-pressure-triple-pill-heart-attack-stroke-disease-death-statins-lemisartan-amlodipine-a8491291.html>
⁶⁴ ME Gurol, JS Kim, "Advances in Stroke Prevention in 2018", *Journal of Stroke*, 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6007296/>

anticoagulants, should reduce rates even further.^{65,66}

However, more is expected from survey respondents. Just 30% of all respondents believe their government significantly prioritises financial investment in innovative medicines for use in stroke prevention over older medicines. Although, notably, 52% of Italians say medication is significantly prioritised or prioritised to a great extent while only 20% of French respondents share this view. However, there is no significant difference between stakeholder groups (patient advocacy groups: 31%, healthcare professionals: 23% and healthcare policy makers/payers: 35%).

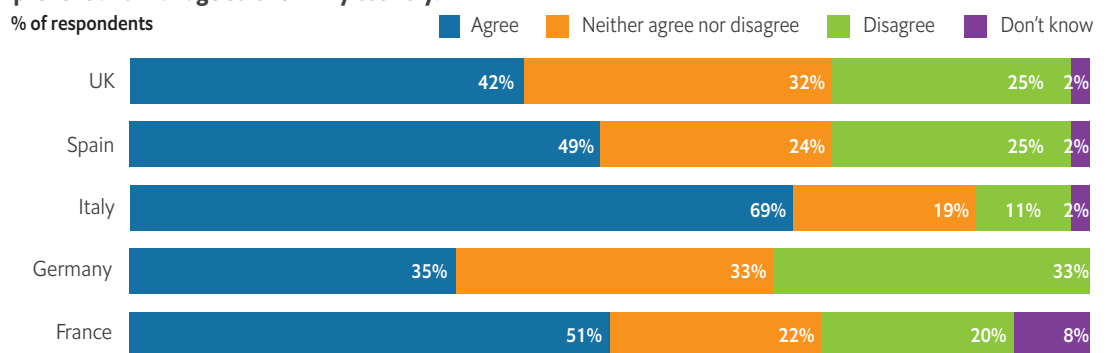
In addition to innovative medications, the use of any new health technologies is an important consideration in stroke prevention. Overall, only 49% of respondents were satisfied with

the level of investment in innovation in new health technologies to help prevent and manage stroke in their country. But responses varied between the five surveyed countries.

Some countries are making positive moves. Take the UK: in 2018 the National Health Service (NHS) introduced new stroke-reducing heart implants for patients with AF who could not take blood-thinning medicines.⁶⁷

But for other interventions, the news is not so positive. For example, embedding a thrombectomy service to remove blood clots responsible for stroke within Europe has proved challenging for some countries. According to a Lancet report covering 44 European countries, Germany, France and Spain led the way in provision of endovascular treatment. The UK, in contrast, provisioned so few that the service has even been shut down completely in Scotland.⁶⁸

Figure 13: I am satisfied with the level of investment in innovation in new health technologies to help prevent and manage stroke in my country.



Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit.

^{65.} "Stroke Prevention", *Medscape*, 2019. <https://emedicine.medscape.com/article/323662-overview>
^{66.} CO Johnson, M Nguyen, GA Roth et al., "Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016", *The Lancet: Neurology*, Vol. 18, No. 5, 2019, pages 439–458. [https://www.thelancet.com/journals/laneur/article/PIIS1474-4422\(19\)30034-1/fulltext](https://www.thelancet.com/journals/laneur/article/PIIS1474-4422(19)30034-1/fulltext)
^{67.} NHS. Thousands of patients to benefit from innovative new treatments on the NHS. 2018. <https://www.england.nhs.uk/2018/07/thousands-of-patients-to-benefit-from-innovative-new-treatments-on-the-nhs/>
^{68.} "21st century management and prevention of stroke", *The Lancet*, Vol. 392, No.10154, 2018. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)32358-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)32358-4/fulltext)

Despite the troubles with embedding a thrombectomy service, the UK, along with Germany, has the greatest net-positive response for its government's investment in innovative medicine: 77% say the state funds it "entirely", "to a great extent" or "somewhat". Mr Waterall explains: "The country has a historical commitment to reducing cardiovascular risk. We have fantastic primary care infrastructure where people can access these medicines.

"But we can still do better," he adds. "We know from our own modelling that by improving access to some of those pharmacological interventions, we can prevent another 100,000 heart attacks and strokes over the next ten years. That's why it's such a commitment in the NHS long-term plan now to really focus on those areas."

Digital health tools

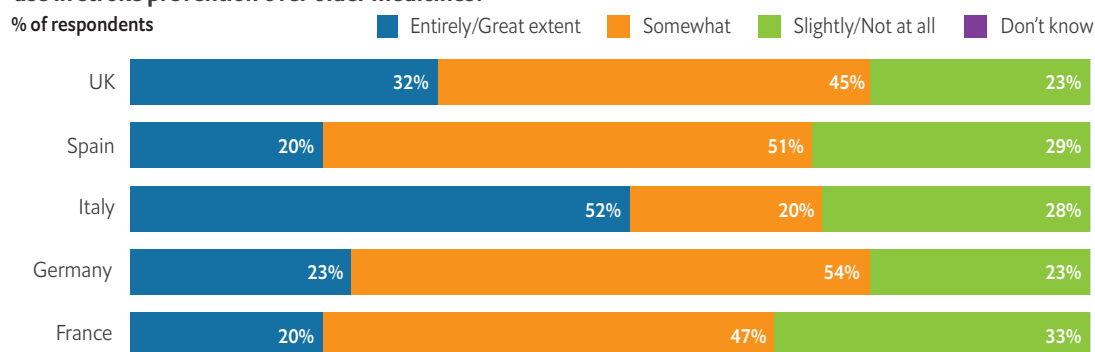
Digital health tools are an increasingly important part of stroke prevention. Personal

monitoring devices such as smartphones, smart watches, apps and handheld electrocardiograms (ECGs) are being used to support patients and enable them to play a part in their own self-care rather than having to rely solely on health services.⁶⁹

For example, 2018 announcements indicate that the UK's NHS would be distributing 6,000 various devices to GP practices and NHS community clinics in England to prevent stroke, such as detection of irregular heart beats, which are projected to save the NHS £81m per year.⁷⁰

Uptake of digital health technologies among healthcare professionals is also on the rise, although not evenly among European countries and regions.^{71,72} According to our survey, only 20% of healthcare professionals (HCPs) say they have not recommended mobile and/or digital technology applications (defined here as apps, watches, smartphones) to patients for the purpose of managing stroke risk factors.

Figure 14: To what extent does your government prioritise financial investment in innovative medicines for use in stroke prevention over older medicines?



Source: The Economist Intelligence Unit.

⁶⁹ Welsh Government's 2017-2020 Stroke Delivery Plan, 2017. <https://gov.wales/sites/default/files/publications/2018-12/stroke-delivery-plan-2017-to-2020.pdf>

⁷⁰ "NHS could save £81m a year through new tech designed to prevent strokes", *Digital Health*, 2018. <https://www.digitalhealth.net/2018/02/nhs-stroke-innovation-tech-81m/>

⁷¹ E Baltaxe, M Kraus, M Reiss et al., "Digital Health Transformation of Integrated Care in Europe: Overarching Analysis of 17 Integrated Care Programmes", *Journal of Medical Internet Research*, 2019. <https://www.jmir.org/2019/9/e14956/>

⁷² "Connected health: How digital technology is transforming health and social care", *Deloitte Centre for Health Solutions*, 2015. <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/life-sciences-health-care/deloitte-uk-connected-health.pdf>

Furthermore, 51% of respondents surveyed have recommended a mobile and/or digital technology application to patients for healthy diets and 49% for healthy lifestyle and living. Another 45% recommended such technologies for blood pressure monitoring, 43% for smoking cessation support, 32% for heart rhythm monitoring and 19% for lipid management.

Experts seem to agree that digital technology has a large role to play in stroke prevention.

Yannick Béjot, head of the general, vascular and degenerative neurology department at the Dijon Stroke Registry, says: “France must better communicate with the public on how they can use new technologies such as validated smartphone apps to support stroke prevention. To prevent further costs down the road, we need to prevent de novo and recurrent strokes. This is the best method.”

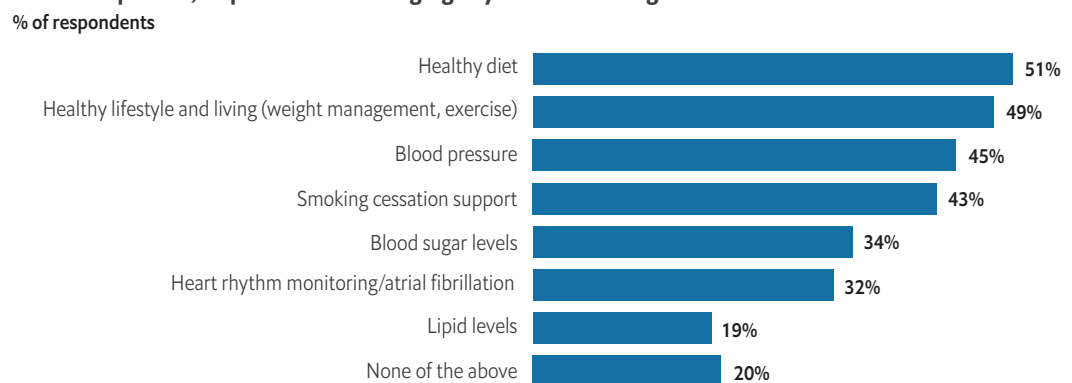
He adds: “France should develop the use of new technologies for communication including validated smartphone apps to control hypertension, diabetes, cholesterol, physical activity and AF.”

Most respondents (71%) say mobile and/or digital health applications provide them with useful data to help them support people in prevention of stroke. Although 48% say they do not always have time to look at the data from them to support decision-making.

“I think the uptake of new devices is changing within the community of medics in Germany because so many people have these devices now,” says Markus Wagner, senior expert at the German Stroke Foundation. “I would say when it comes to the stroke survivors, as most of them are older, I think they are still quite conservative. But when it comes to prevention, a lot of people are using these devices now, and therefore we have to deal with it. And as I personally use these devices when I do a, for instance, a regular pulse check while jogging, I’m quite positive about them.”

Dr Caso adds that digital health technologies are helpful for boosting prevention among some of the most vulnerable populations, such as older people and those living in rural areas. She notes that in the UK half of people over the age of 50 are living alone.⁷³ “So the only way to regularly control their health,” she says, “is

Figure 15: Have you recommended mobile and/or digital technology applications (including apps, watches and smartphones) to patients for managing any of the following stroke risk factors?



Source: The Economist Intelligence Unit.

⁷³ “The cost of living alone”, Office for National Statistics, 2019. <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/articles/thecostoflivingalone/2019-04-04>

Figure 16: Mobile and/or digital health applications provide me with useful real-world data that helps me support people in the prevention of stroke.

% of respondents



Numbers may not add to 100 because 'Don't know' answers have been excluded.
Source: The Economist Intelligence Unit.

through digital technology, because nobody else will control their blood pressure or their heart rate... and telemedicine especially gives us the possibility to treat patients in rural areas.”

Opinion is split on the current sufficiency of government incentives in digital health technology for stroke prevention: 46% say it is sufficient, versus 54% that say it is lacking. But experts are almost unanimous on the future role of government: 85% think their government should play a more active role in

encouraging the uptake of digital technologies for stroke prevention. The opinion that government should be more active is held most strongly in Italy (94%).

Even while governments grapple with their role in digital health technologies, uptake of the tools are on the rise, particularly as more digitally savvy younger generations age into the at-risk populations. The number of clinically tested apps and tools also continues to rise.^{74,75,76}

Figure 17: How sufficient would you say government incentives are in digital health technology for stroke prevention (eg, mobile technology, apps, wearables)?

% of respondents

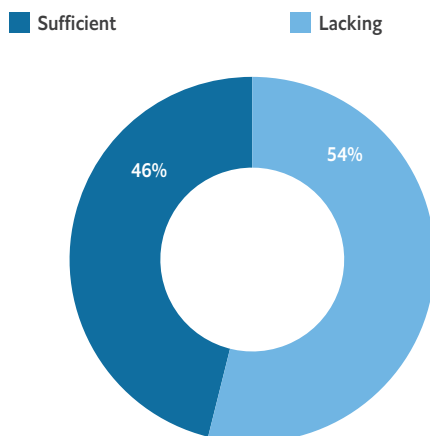
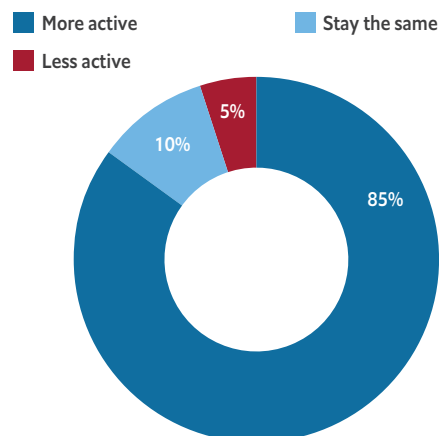


Figure 18: How much more or less of an active role should your government play in encouraging the uptake of digital technologies for stroke prevention?

% of respondents



Source: The Economist Intelligence Unit

⁷⁴ B Freedman, J Camm, H Calkins et al., “Screening for Atrial Fibrillation, A Report of the AF-SCREEN International Collaboration”, *Circulation*, 2017, pages 1851-1867. <http://dx.doi.org/10.1161/CIRCULATIONAHA.116.026693>

⁷⁵ SC Mathews, M McShea, L Casey et al., “Digital health: a path to validation”, *Digital Medicine*, 2019. <https://www.nature.com/articles/s41746-019-0111-3>

⁷⁶ CL Ventola, “Mobile Devices and Apps for Health Care Professionals: Uses and Benefits”, *Pharmacy and Therapeutics*, 2014. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4029126/>

However, the rapid availability and uptake of digital devices presents a challenge for regulators and demands their greater involvement. Nearly 7 in 10 (67%) survey respondents are concerned that mobile and/or digital health apps have not been fully regulated to address their effectiveness and quality. And 66% are concerned that mobile and/or digital health apps have not been fully regulated to address privacy and data security. But on the other side of the coin, 67% believe that healthcare systems are too slow to incorporate real-world data that have been captured through these likely under-regulated mobile and/or digital health applications.

Experts would like to see the government take a more active role in digital technology regulation, and in its support for stroke prevention.

“The visibility of the accuracy of these digital health technologies, at least those which are attached to the smartphone, are not really well tested,” says Massimo Piepoli, chair at the European Association for Cardiovascular Prevention and Rehabilitation (EACPR), Italy.

Dr Piepoli, who is also the chair of the 6th Joint Task Force for the European Guidelines on Cardiovascular Disease Prevention in Piacenza, Italy, adds: “They’re useful, because of increased awareness and increased interest towards stroke risks. But I’m not aware of any specific large trials demonstrating anything in this direction.”

Approval standards and regulatory systems for medical devices across Europe are already in place, although some argue more improvement is needed. “The main thing with digital health tools is to have similar standards

as we have with drugs or with medical devices so that people can be sure that these devices really work, and that they work in their favour,” says Dr Wagner. “The last thing we want is people panicking all the time looking at their smartphones or watches, and then doctors have a lot of problems putting these [readings] in the right perspective.”

Implementation of clinical guidelines needs work

As stroke risk detection and management evolves, local, regional and national clinical guidelines often provide the latest available evidence and best practices. They provide a framework against which the quality of stroke care is measured.

At present, the great majority of European countries have national or local guidelines for the management of stroke and for its risk factors. But despite the wide availability of guidelines, there is significant under-treatment to recommended standards.⁷⁷ According to a SAFE report, existing European Stroke Organisation guidelines are not consistently applied and a continent-wide, evidence-based system of specialist stroke care is yet to be realised.⁷⁸

“Guidelines are just that—guidelines,” says Trudie Lobban, founder and CEO of Arrhythmia Alliance. “If it’s a guide it’s just a suggestion. Publishing them is not a solution on its own.”

In alignment with this thinking, our survey respondents believe that only 39% of local/regional authorities adhere to clinical guidelines for managing patients at risk of stroke in their country (see box on AF and Hypertension screening on page 27).

⁷⁷ E Stevens, E Emmett, Y Wang et al., “The Burden of Stroke in Europe: 2:2 Hypertension,” *Stroke Alliance for Europe*, 2016. <https://strokeeurope.eu/index/stroke-prevention-in-europe/2-2-hypertension/>

⁷⁸ E Stevens, E Emmett, Y Wang et al., “The Burden of Stroke in Europe: The Challenge for Policy Makers,” *Stroke Alliance for Europe*, 2016. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

Seventy-three percent of those surveyed thought that cardiologists “entirely” or “mostly” followed clinical guidelines or national policies, followed by primary care physicians (65%) and nurses (63%). And only 32% of all respondents think that payers are “entirely” or “mostly” following guidelines. Which tracks well when the data is crossed by that very subset: only 31% of the “healthcare policy makers and payers” audiences say that payers entirely/mostly adhere.

In Italy 48% of respondents feel guidelines are “mostly” or “entirely” implemented, more than any other country surveyed (Spain: 31%, France: 35%, Germany: 39%, UK: 40%). But many challenges still remain.⁷⁹ According to Dr Caso, the greatest adherence

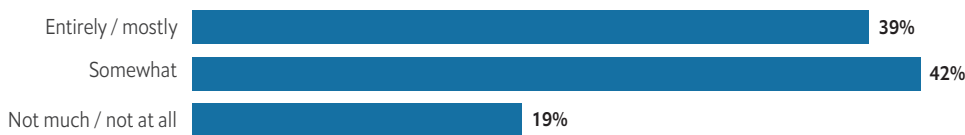
challenges in Italy are not about determining and disseminating what guidelines are best for their patients, but the hurdles around actioning them.

And in France, Mr Giroud notes that other factors need to be considered such as a shortage of stroke neurologists and lack of stroke units.

As for why adherence to guidelines is so low across the surveyed countries, nearly one in three respondents (31%) believe that a lack of funding from national authorities is the greatest barrier for HCPs in managing patients according to clinical guidelines or national policies—and 23% point to lack of funding from regional authorities.

Figure 19: To what extent do you believe your regional/local authorities in your country implement the latest national or clinical guidelines when managing patients at risk of stroke?

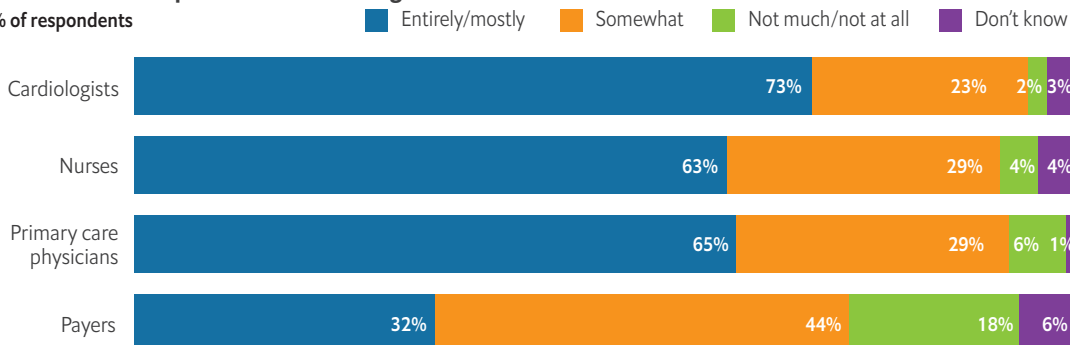
% of respondents



Source: The Economist Intelligence Unit.

Figure 20: What extent do you believe each of the following groups adhere to clinical guidelines or national policies on stroke prevention and management?

% of respondents



Numbers may not add to 100 due to rounding.

Source: The Economist Intelligence Unit.

⁷⁹ F De Sensi and F Paneni, 2016. “Stakeholders in non-Vitamin K antagonist oral anticoagulants prescription: the case of Italy”, *EP Europace*, Volume 18, Issue 5, May 2016, Page 788, doi:10.1093/europace/euv400. <https://academic.oup.com/europace/article-pdf/18/5/788/7471820/euv400.pdf>

Hypertension and AF screening

According to *Preventing stroke: uneven progress*, a 2017 Economist Intelligence Unit report, levels of screening for hypertension and atrial fibrillation (AF) are low despite both being significant risk factors for stroke.

In a survey of 1,000 physicians across 20 countries, most thought that less than 25% of patients aged 40 and above were screened for hypertension. This ranged from 30% in France, 16% in Germany, 14% in Italy, 11% in the UK and 8% in Spain.

For AF screening, physicians were asked to calculate the proportion of patients aged 65 and over who they screened for AF by pulse palpation or electrocardiogram in clinical practice.

They were specifically asked about patients seen during the previous two weeks who were not already being monitored for AF. On this measure Italy reported 17%, France 15%, Germany 13%, Spain 12% and the UK 8%.

Dr Wagner notes that although many passionate and experienced clinicians and committees are volunteering to update guidelines for stroke prevention and conduct trials, the process of the development is difficult, expensive and takes a long time. Independent funding from the government for the research is also not sufficient.

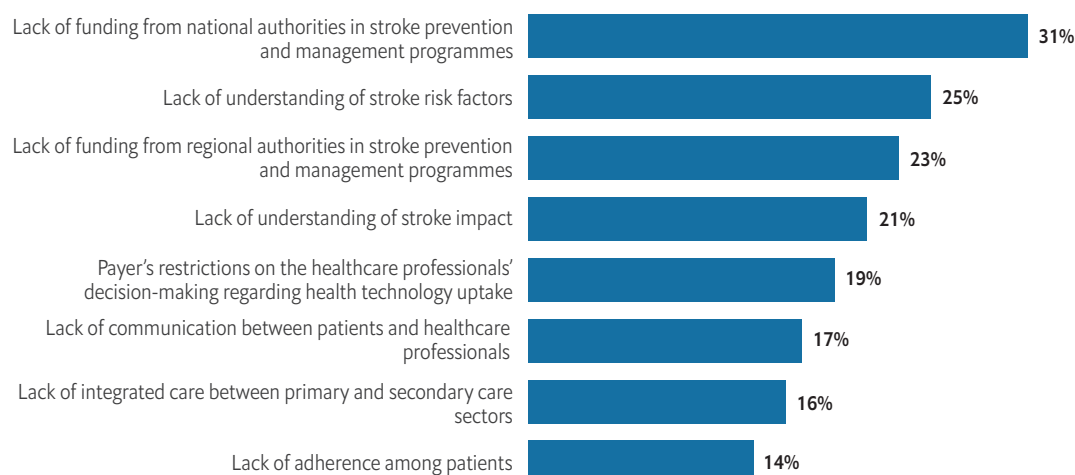
And even once guidelines are completed they are difficult to disseminate effectively, Dr Wagner explains. “We don’t have updated guidelines for stroke prevention or treatment too often in Germany. And when you do distribute new guidelines, medical doctors are not too aware of them. You would also need a patient version of the guidelines, or leaflets picking out the most important points of the guidelines. If you ask researchers, ‘Well, are you willing to produce leaflets for patients and patient-adapted guidelines?’ they say, ‘Yes, but we don’t have the time or funding.’ This is really a quite big topic.”

Additionally, 25% of survey respondents say a lack of understanding of stroke risk factors among healthcare workers is a barrier to clinical guideline implementation.

This understanding and awareness issue may be twofold. The first is that doctors are not always able to stay up to date with the latest clinical guidelines. “Guidelines are not necessarily targeted at the right people,” says Ms Lobban. “There are so many guidelines, they are supposed to be adhered to, but a GP wants a guideline that is specific for primary care, but often the guideline goes straight through to tertiary care. It’s too much information and in an already busy day a GP cannot be expected to know all guidelines for every condition—we need to make it quick and easy to reference. The guidelines need to be written for each step along the care pathway and the GP should not have to flick through 50 pages to find the paragraph relevant to them.”

Figure 21: Main barriers for healthcare professionals to managing patients in a manner that adheres to clinical guidelines or national policies on stroke prevention.

% of respondents (multiple responses allowed)



Source: The Economist Intelligence Unit.

Moreover, there is not enough stroke-specific education given to front line medical staff.⁸⁰ For example, Spain reports above-average adherence to European guidelines, and respondents say 84% of primary care physicians and 80% of nurses are “entirely” or “mostly” implementing the guidelines—by far the highest rate among all surveyed countries.

Miquel Gallofré, former director of the stroke programme for the Health Department of the Autonomous Government of Catalonia, believes this is due to strong education around stroke risks among front line healthcare professionals. “In most countries, primary care is the gatekeeper of healthcare,” he says. “Of course at the first instance of an acute health problem, they go to the hospital, but for detection of hypertension or for AF they go to primary care. And in my country primary care physicians and nurses are very prepared for that and know that their work and the European guidelines are very important.

They are very active about following them correctly.”

Greater funding for more targeted guidelines, education and oversight, experts say, can mitigate both of these professional awareness concerns.

Divergence between guidelines and access to new medicines

Other experts flagged that guidelines can be at odds with realities on the ground, particularly when it comes to prescribing newer medicines. For example, Dr Caso explains that in the guidelines it is written that novel anticoagulant drugs are given to patients with AF when their AF is not associated with a problem in a heart valve. But in clinical practice, a lot of hurdles must be overcome to prescribe them. “To prescribe these new drugs we need special permission. Not all doctors can prescribe them. A GP cannot prescribe

⁸⁰ E Stevens, E Emmett, Y Wang et al., “The Burden of Stroke in Europe: The Challenge for Policy Makers”, *Stroke Alliance for Europe*, 2016. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

them. They can only be prescribed through selected centres and specialists which, in a way, creates a lack of implementation of the guidelines.”

In Spain, Mr Agredano reports similar structural barriers to adherence. “Our penetration rate of new generation anticoagulants to prevent stroke is at the bottom of Europe. Our problem is that we must seek ‘visas’ (approval of funding by the government) for the use of this treatment. But there are communities in Spain that do not have that visa and the vast majority of other communities have a restrictive visa and they are not funded.”

Additional funding and policy support, both say, can help bridge the gaps between clinical guidelines and implementations

Greater investment and government support is needed

Although current investment for stroke prevention modifiable risk factors is largely well prioritised in areas such as managing hypertension and healthy lifestyle and living, according to the survey respondents (see Figure 13), the prevailing rallying cry among stroke prevention stakeholders is that more is necessary.

“There is never enough,” says Dr Gallofré. “For investment in intervention there never is enough. I think it could improve.”

“Clearly government funding is insufficient,” adds Mr Agredano. “In Spain we are talking about over 120,000 cases of stroke annually. It is the first cause of death among women and the second globally, that means we are talking about one of the most prevalent diseases in

Spanish society. Yet awareness campaigns aimed at the population to increase their knowledge [and facilitate] prevention and early detection are being promoted from social movements and not from the institutions.”

For example, he points out that the Fundación Freno al ICTUS, a Spanish association for the prevention of stroke through education, has never received public funds for its projects. “We are the most active national organisation in the fight against stroke, we are the ones promoting projects around public awareness, but we do everything with our own resources and with private support.”

Mr Giroud adds that because the number of strokes will continue to rise due to an ageing population, investment in stroke prevention, including further research into stroke, needs to increase. “Government must reform the organisation of the research on stroke and must invest into this research.” He also observes that as the number of survivors is increasing, more rehabilitation centres will be necessary.

Indeed, long-term care is an important cost consideration for stroke survivors. A third are disabled, and the majority of survivors report significant day-to-day challenges after a stroke. Their long-term care, which can last for decades, is also very costly to people and societies, both directly and indirectly.⁸¹ (See Figure 6 for direct and indirect costs of stroke in Europe.)

Only 40% of our survey respondents feel government funding is sufficient to prevent the use of hospital emergency departments in the long term. Interestingly, there is little variation in these findings between the three survey audiences (healthcare professionals,

⁸¹ B Norrving, J Barrick, A Davalos et al., “Action Plan for Stroke in Europe 2018–2030”, *European Stroke Journal*, 2018. <https://actionplan.eso-stroke.org/images/2396987318808719.pdf>

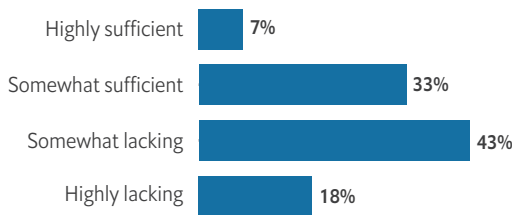
policy makers/payers and patient advocacy groups). Analysed by country, however, Italy stands out. (See box: The Italian exception.)

In contrast, respondents are, on the whole, more satisfied with the financial investment and commitment of their regional or local authorities to support patients at risk of stroke.

Worryingly, 62% think their national government departments, such as finance and health, are not adequately co-operating on stroke prevention funding. It's a sentiment most strongly felt in Italy (74%), and least in France (55%).

Figure 22: Would you say that government funding in stroke prevention is sufficient to prevent the use of hospital emergency departments in the long term?

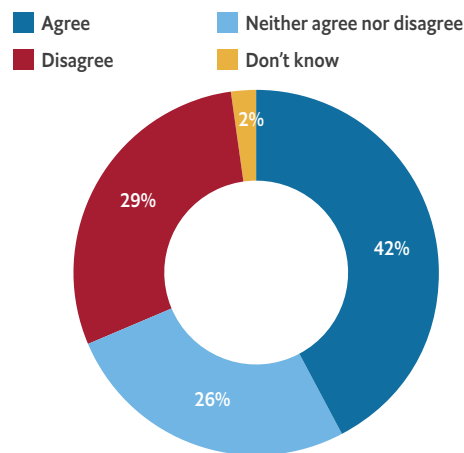
% of respondents



Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit

Figure 24: I am satisfied with the financial investment and commitment of my regional and/or local authorities to support patients at risk of stroke.

% of respondents



Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit

Figure 23: Is government funding in stroke prevention sufficient to prevent the use of hospital emergency departments in the long term?

% of respondents

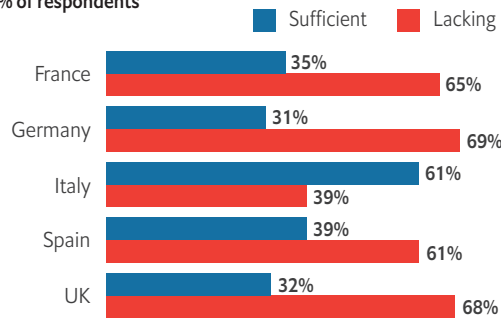
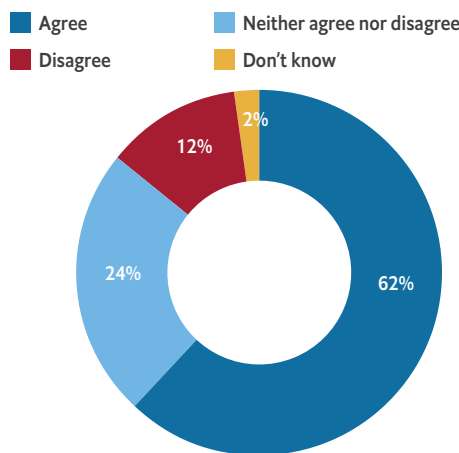


Figure 25: Government departments (eg, finance, health) are not adequately co-operating on stroke prevention funding.

% of respondents



The Italian exception

Italy is the “oldest” country in Europe from a demographic perspective, an indicator that a greater proportion of its population is at risk of CVDs including stroke.⁸²

Yet Italy consistently ranks as the most optimistic country for stroke prevention. For example, we find that public perception and understanding of stroke and its risk factors are low in every country—but Italians have better awareness than most. For example, 71% of all respondents think many people do not understand the impact of stroke and how it is a leading cause of disability compared with 65% of Italian respondents. Eighty percent of all respondents think stroke only affects the elderly versus just 74% of Italians. And only 40% of respondents think the direct and indirect costs of stroke to economies is well understood by the public versus 48% of Italians.

Even when it comes to detecting specific risk factors, Italians come in ahead. Only 54% of Italians surveyed say AF is often missed as a risk factor for stroke (versus an average of 64% across the five countries). And 56% of Italians say health literacy around AF is high, more than any other country surveyed (for example, 37% in France).

Furthermore, 61% of Italians think government funding in stroke prevention is sufficient to prevent the use of hospital emergency departments in the long term—the highest by far against the

five-country average of 40%. And when it comes to regional/local stroke prevention funding, Italians (57%, more than any other country) are satisfied. Italy is also most satisfied with the level of investment in innovation in new health technologies to help prevent and manage stroke (69% of Italians satisfied versus 49% average).

So why does Italy appear so far ahead in stroke prevention?

“I have no idea,” says Massimo Piepoli, chair of the European Association for Cardiovascular Prevention and Rehabilitation, Italy, admitting some surprise. But he has a theory: “In my country, almost every weekend there is an initiative, either by the neurologists or the cardiologists or the physicians or nurses involved in stroke campaigns. They are well represented by the media, including by newspapers promoting free check-ups for the public or a campaign that helps keep people interested and knowledgeable around stroke risk factors. Every year we go into schools and workplaces to spread the message. This may explain, at least partially, the awareness of Italians concerning the importance of stroke.”

Of course, it could still be better, he says. “The central government doesn’t invest very much in prevention. What we do is more related to local initiatives, from the ground up. But more national investment would certainly be welcome.”

⁸². “State Of Health In The EU: Country Health Profile 2017 – Italy”, WHO, 2017. http://www.euro.who.int/__data/assets/pdf_file/0008/355985/Health-Profile-Italy-Eng.pdf?ua=1

Chapter 3: Boosting stroke awareness campaigns for early action

Both research and our survey confirms that public understanding of stroke, its modifiable risk factors and how it constitutes a medical emergency is often poor.⁸³ This is a sizable barrier to prevention efforts, as it means most people do not know how to prevent a stroke or what to do when it occurs.

Poor awareness is cited as an important reason why there are delays to hospital admission.^{84,85} This is worrying because delays in care not only disqualify patients from certain time-dependent clot-removal treatments, it also results in greater damage. For example, for an ischaemic stroke, which accounts for about 80% of strokes, intravenous thrombolysis administered to patients within 6 hours of onset is considered a safe, effective treatment with a strong cost-benefit for the reduction of long-term disability.⁸⁶ But according to one 2014 report, only one-third of patients in Europe and the US with acute stroke arrive at the hospital

in adequate time to receive thrombolytic treatment and less than 7% receive it.⁸⁷

In one study that includes the five target countries, 19% could not identify any stroke symptoms and 51% would not call an ambulance if they suspected stroke.⁸⁸

“In Italy, we know that only 55% of the Italian population correctly identify stroke as a brain disease, while only 26% is aware of the existence of thrombolysis and [just] 15% of the existence of stroke units. Only 59% would call an ambulance in case of a suspected stroke. And less than 50% of patients are going to ER within 3-4 hours (the therapeutic window) from stroke onset,” says Antonio Di Carlo of the Italian National Research Council’s Institute of Neuroscience.⁸⁹

Additionally, according to our survey respondents, most (71%) say people in their country do not understand the impact of stroke and that it is a leading cause of disability. And 69% say a key challenge to

⁸³ E Stevens, E Emmett, Y Wang et al., “The Burden of Stroke in Europe: Public Knowledge Of Stroke As An Emergency”, *SAFE*, 2016. . <https://strokeeurope.eu/index/stroke-as-a-medical-emergency/3-1-public-knowledge-of-stroke-as-an-emergency/>

⁸⁴ Y Lachkhem, S Rican, E Minvielle, “Understanding delays in acute stroke care: a systematic review of reviews”, *European Journal of Public Health*, 2018. <https://doi.org/10.1093/eurpub/cky066>

⁸⁵ KR Lees, E Bluhmki, R von Kummer, “Time to treatment with intravenous alteplase and outcome in stroke: an updated pooled analysis of ECASS, ATLANTIS, NINDS, and EPITHET trials”, *The Lancet*, 2010, pages 1695–703. <https://mayoclinic.pure.elsevier.com/en/publications/time-to-treatment-with-intravenous-alteplase-and-outcome-in-strok>

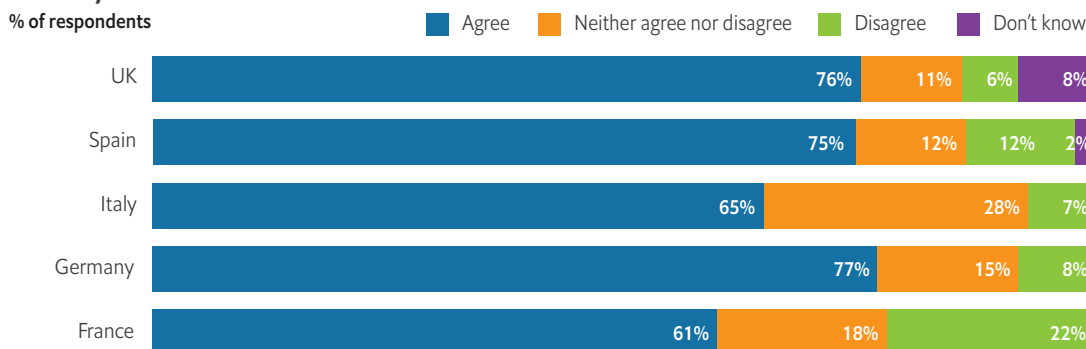
⁸⁶ Y Lachkhem, S Rican, E Minvielle, “Understanding delays in acute stroke care: a systematic review of reviews”, *European Journal of Public Health*, 2018. <https://doi.org/10.1093/eurpub/cky066>

⁸⁷ A Ragoschke-Schumm, S Walter, C Balucani et al., “Translation of the ‘time is brain’ concept into clinical practice: focus on prehospital stroke management”, *International Journal of Stroke*, 2014, pages 222-340. <https://www.ncbi.nlm.nih.gov/pubmed/24593156>

⁸⁸ E Stevens, E Emmett, Y Wang et al., “The Burden of Stroke in Europe: The Challenge for Policy Makers”, *Stroke Alliance for Europe*, 2016. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

⁸⁹ M Baldereschi, A Di Carlo, Vaccaro C et al., “Stroke knowledge in Italy”, *Neurological Sciences*. Vol. 36, 2015, pages 415-421. <https://doi.org/10.1007/s10072-014-1964-5>

Figure 26: I don't think many people understand the impact of stroke and how it is a leading cause of disability.



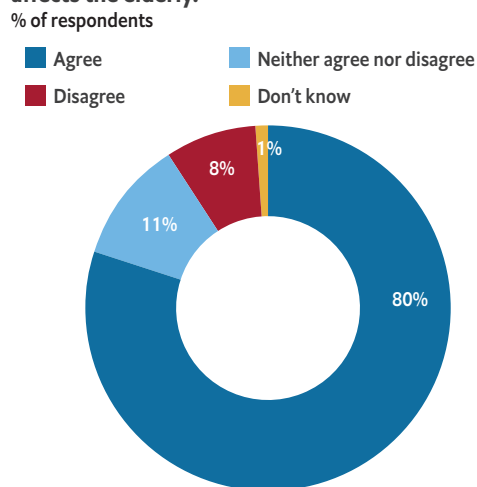
Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit.

prevent stroke in future is tackling patient views such as the belief that stroke won't happen to them (felt most strongly in Germany (75%)) while 80% say most people believe that stroke only affects the elderly. This is not true: 15% of the patients may be younger than 50 years of age.^{90,91}

But experts argue that targeted education campaigns can significantly increase awareness, correct widespread misconceptions about the disease and, ultimately, reduce the incidence of stroke.

The ESO has put forward guidelines for educational programmes to help in this effort.⁹² It sets as a 2030 target: "Full implementation of national strategies for multisectorial public health interventions promoting and facilitating a healthy lifestyle and reducing environmental,

Figure 27: Many people believe that stroke only affects the elderly.



Source: The Economist Intelligence Unit

⁹⁰ European Stroke Organisation FAQ. <https://eso-stroke.org/faq/>

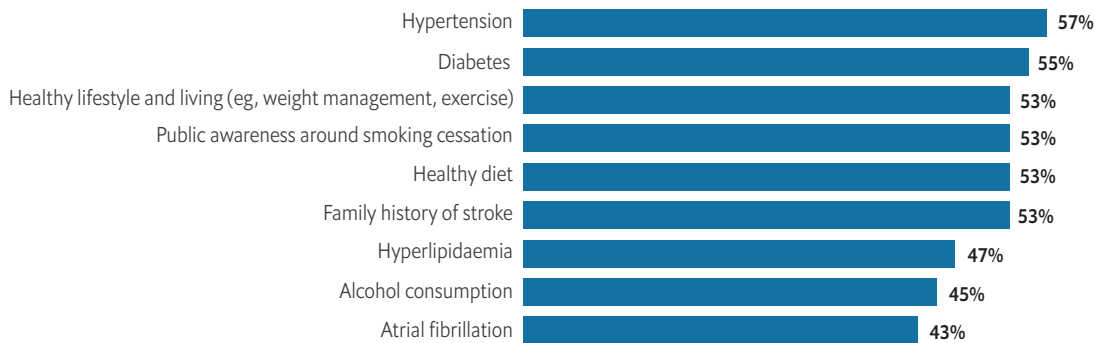
⁹¹ "CO Johnson, M Nguyen, GA Roth et al., "Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016", *The Lancet: Neurology*, Vol. 18, No. 5, 2019, pages 439–458. [https://www.thelancet.com/journals/lanneur/article/PIIS1474-4422\(19\)30034-1/fulltext](https://www.thelancet.com/journals/lanneur/article/PIIS1474-4422(19)30034-1/fulltext)

⁹² "Stroke Action Plan Europe 2018-2030", *European Stroke Organisation*, May 23rd 2018. <https://eso-stroke.org/action-plan-stroke-europe-2018-2030-2/>



Figure 28: Health literacy of stroke risk factors

Percentage of people who say their country's health literacy (public awareness and knowledge) around different risk factors is "somewhat or very" high.



Source: The Economist Intelligence Unit.

socioeconomic and educational factors that increase the risk of stroke." However, it recognises that there is no blanket approach. Each country and region needs to evaluate their population's primary risk-education deficiencies and gauge the effectiveness of local efforts on a continual basis.

Encouragingly, Dr Caso says much has already changed in the past 20 years thanks to existing initiatives. Patients are, on the whole, more aware about the therapeutic window for treatment, but there are still unacceptable delays. "I still see that there's a lot more awareness for myocardial infarctions [heart attacks] compared to stroke. But I do see that there is a global improvement."

Connecting risk awareness with stroke awareness

The key to a good, effective stroke prevention campaign, argues Ms Lobban, is not communicating that "stroke is bad" but rather that certain lifestyles and conditions cause stroke. "Think of lung cancer campaigns. They

don't target cancer, they target smoking and emphasise that smoking can lead to cancer. A good anti-stroke campaign takes the same approach."

"The behaviours of individuals must be associated with stroke prevention, such as tobacco and cannabis abuse, alcohol use, lack of physical activity, poor choices around food and drink and sleep hygiene," says Mr Giroud. "Individuals must change their way of life."

And most people, experts agree, do not realise that healthy lifestyle activities have any impact on their brain and their risk of stroke-related disability over their lifespan.

"The idea of a healthy lifestyle for the general people is that if, for example, I exercise or reduce consumption of fat calories, my heart improves, not my brain," Dr Gallofré comments. "People need to know that stroke is also a consequence of no prevention." He agrees public health campaigns around risk factors could be more effective if the information was clearly linked with stroke, and therefore with risk of disability, loss of

productivity and higher rates of dementia.

Indeed, health literacy (public awareness and knowledge) around the different risk factors for stroke is low according to our survey respondents and existing research. Notably, a 2009-11 EU health literacy project—which was the last time the EU general population was measured on the subject—showed public awareness and knowledge of stroke varied widely across eight member states (including two that are the focus of this report).⁹³

Specifically, 46% of German respondents and 58% of Spanish respondents demonstrated “inadequate” or “problematic” general health literacy, including difficulties understanding food and drug packaging information and the effects of health policy decisions on managing mental health problems.

This is concerning as people with low health literacy are more likely to delay seeking medical care after a stroke and often experience adverse outcomes.⁹⁴

“We have to fight the lack of knowledge and sometimes fatalistic approach towards stroke with more diffuse and efficient educational campaigns,” urges Dr Di Carlo.

Experts also express dismay that the general public often sees stroke as a byproduct of ageing. That way of thinking makes them less aware or perhaps less incentivised to actively change the natural course of risk as with other diseases like, for instance, smoking and lung cancer.

“Maybe they know that high blood pressure may hurt. Or they know that irregular heartbeats, like atrial fibrillation, can be a risk

factor for cardioembolic stroke. But they do not really know how much they can actively change this kind of prognosis,” says Dr Caso.

In Spain, Dr Gallofré says there are awareness campaigns that target the connection between modifiable risk factors and brain health, not just the heart or lungs. “Our campaigns say stroke is avoidable and preventable. If you control your diet, cholesterol, diabetes and do your exercise, you are acting against stroke.”

“One of the easiest, cheapest proven ways to do this is with a simple pulse check,” says Ms Lobban. “One of the most common causes of stroke is AF-related stroke and yet we could so easily reduce the risk if everyone had a pulse check when they went to the doctor, or people were aware of their pulses, or if they downloaded an app on their phone that could give them an ECG, or wear a smartwatch. There are so many digital technologies, but two fingers on your wrist is just as good. The sooner that happens, the sooner prevention can improve. We need campaigns about the causes of stroke such as AF—not just about stroke, where stroke is a consequence of AF for example.”

Stroke-prevention campaigns

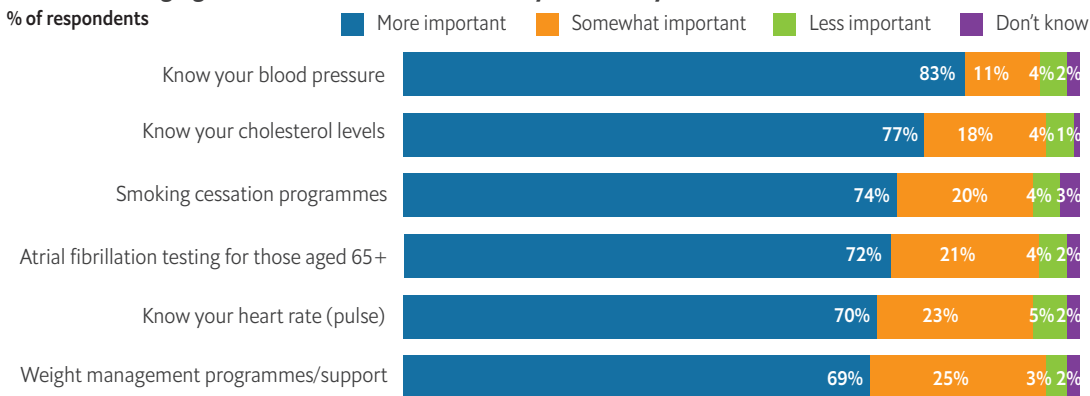
Because the great majority of strokes could be avoided if people were aware of risk factors and how to reduce them, more widespread educational campaigns are a critical part of addressing the overall stroke burden.

We asked surveyed experts with a number of initiatives that aim to help populations increase awareness and manage modifiable

⁹³ Health literacy chart adapted from comparative report on health literacy in eight EU member states, Health Literacy EU Consortium’s European Health Literacy Project 2009–2012.

⁹⁴ JE Lloyd, HJ Song, SM Dennis, “A paucity of strategies for developing health literate organisations: A systematic review”, *PLoS One*, 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5895007/>

Figure 29: In the future, how important would you say each of the following initiatives will be when it comes to managing modifiable stroke risk factors in your country?



Numbers do not total 100 due to rounding.
Source: The Economist Intelligence Unit.

risks factors, such as “weight management” programmes and “know your cholesterol level” programmes. Then we asked which, if any, they felt would be “more”, “somewhat” or “less” important in the future to tackle risk stroke factors in their country. Nearly all respondents said more of everything will be key to managing modifiable risk factors in their country.

Specifically, 83% of respondents said “know your blood pressure” initiatives would become more important, followed by “know your cholesterol levels” (77%), smoking cessation programmes (74%) and AF testing for people over 65 years of age (72%).

These results have little variation between the three survey groups (patient advocacy, health professionals and healthcare policy makers/payers). But by country, variations in priority emerge. Germany, for example, places

most importance on “know your heart rate” (79% “more important” versus 59% in France). And in Spain, the selection of “know your cholesterol levels” is significantly higher than Italy (86% “more important” in Spain versus 70% in Italy).

More generally, the importance of initiatives largely aligns with foremost risk factors: AF, high blood pressure and high cholesterol (sometimes referred to as the ABCs which increase the risk of stroke). They are the major causes of cardiovascular disease with low awareness, but each can be detected through routine checks across community and healthcare settings.⁹⁵ The UK’s NHS has made ABC health checks the primary action of its Long Term Plan, which sets the ambition for the NHS to help prevent over 150,000 heart attacks, strokes and dementia cases over the next ten years.^{96, 97, 98, 99}

⁹⁵ “Ambitions set to address major causes of cardiovascular disease”, Gov.uk, 2019. <https://www.gov.uk/government/news/ambitions-set-to-address-major-causes-of-cardiovascular-disease>

⁹⁶ NHS. Long term Plan, 2019. <https://www.longtermplan.nhs.uk/wp-content/uploads/2019/01/nhs-long-term-plan-june-2019.pdf>

⁹⁷ NHS. Long Term Plan: Stroke. <https://www.longtermplan.nhs.uk/areas-of-work/stroke/>

⁹⁸ NHS England: Cardiovascular disease (CVD). <https://www.england.nhs.uk/ourwork/clinical-policy/cvd/>

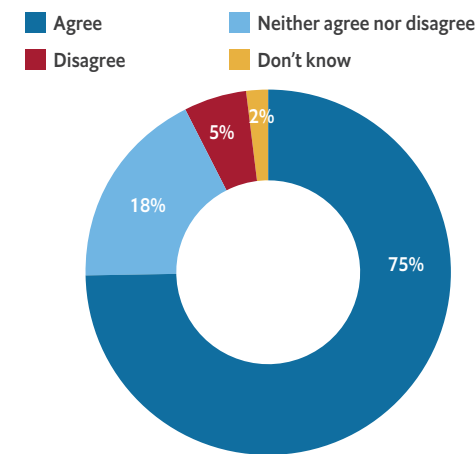
⁹⁹ NHS England: Cardiovascular disease. <https://www.longtermplan.nhs.uk/areas-of-work/cardiovascular-disease/>

A. Atrial Fibrillation is an irregular heartbeat in the upper chambers of the heart. This can cause blood to pool and lead to clots which potentially reach the brain and cause a stroke.¹⁰⁰ While AF is often asymptomatic, it is the most common heart arrhythmia and is associated with increased risk of stroke.¹⁰¹ It is associated with a fivefold increase in stroke risk, and AF-related strokes are associated with a greater risk of mortality and long-term disability compared with other types of stroke.¹⁰² Screening for AF in people aged 65 years and above is recommended by guidelines and expert consensus. Risk of AF-related stroke is largely manageable with appropriate anticoagulation.¹⁰³

B. High blood pressure, or hypertension, is the single most important modifiable risk factor for stroke.¹⁰⁴ Over time, hypertension damages and narrows blood vessels, increasing the risk of blockages that stop the flow of blood to the brain. Its prevalence rises significantly with age.¹⁰⁵ As it is a risk factor for a number of diseases, not just stroke, screening is in several NCD policies and guidelines in primary care settings for people aged 40 and above.

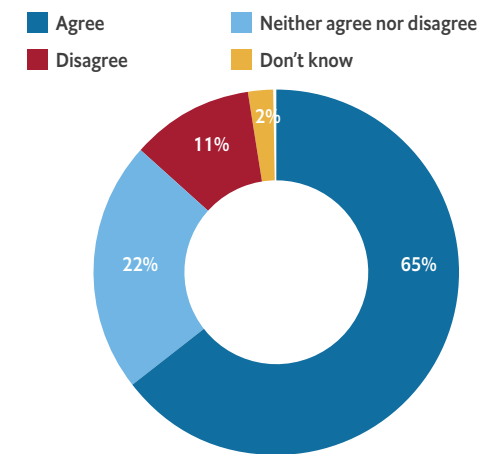
C. High cholesterol can cause fatty deposits to build up in the arteries over time. As a consequence, arteries can become narrowed and stiff, making it harder for blood flow. It also increases

Figure 30: Reducing a person’s high blood pressure is one of the most effective ways to tackle stroke.
% of respondents



Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit

Figure 31: Atrial fibrillation is often missed as a risk factor for stroke.
% of respondents



¹⁰⁰ “AF-related stroke”, Heart Rhythm Alliance. <http://www.heartrhythmalliance.org/afa/uk/af-related-stroke>
¹⁰¹ J Orchard, L Neubeck, B Freedman et al., “Atrial Fibrillation Screen, Management And Guideline Recommended Therapy (AF SMART II) in the rural primary care setting: an implementation study protocol”, *Cardiovascular Medicine*, Vol. 8, No. 10, 2017. <https://bmjopen.bmj.com/content/8/10/e023130>
¹⁰² “What is atrial fibrillation?”, *Centres for Disease Control and Prevention*. https://www.cdc.gov/heartdisease/atrial_fibrillation.htm
¹⁰³ P Kirchhof, S Benussi, D Kotecha et al., “ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. 2016”, *European Heart Journal*, 2016. <https://academic.oup.com/eurheartj/article/37/38/2893/2334964>
¹⁰⁴ AK Boehme, C Esenwa, M Elkind, “Stroke Risk Factors, Genetics, and Prevention”, *Stroke Compendium*, 2017. <https://www.ahajournals.org/doi/pdf/10.1161/CIRCRESAHA.116.308398>
¹⁰⁵ “High blood pressure and stroke”, *National Stroke Association*. 2012. https://www.stroke.org.uk/sites/default/files/high_blood_pressure_and_stroke.pdf

chances of a blood clot developing.¹⁰⁶ It is the risk factor that affects the greatest proportion of the European population, with the UK, Italy, France and Germany among the most at risk.¹⁰⁷ A healthy diet and use of cholesterol-lowering medicines can help prevent fatty deposits or plaques from forming and breaking off from the walls of arteries.

Smoking raises blood pressure, which also increases a person's risk for stroke and heart attack.¹⁰⁸ Despite significant reductions in the past two decades,¹⁰⁹ a sizable portion of the European population aged 15+ still smokes tobacco (ranging from 9% to 27% across the EU), meaning more work is needed to support quitting.^{110,111}

"Know your heart rate" and "weight management programmes" score slightly lower on the "will become more important" scale than the ABC risk factors (70% and 69% respectively), but they are still important. "Knowing your pulse is the most cost-effective way to reduce risk of AF-related stroke," says Ms Lobban. "It could be done at home if we teach children at school how to take their pulse, they then teach parents, grandparents and elderly neighbours as part of their homework. You don't even need a watch, just a two fingers on your wrist to check the rhythm of your heart."

As for weight management, it is a problem across Europe. For example, in Germany 60.5% of the adult population is overweight.¹¹²

Although many people understand that being overweight is not good for health generally, experts argue that more can be done to connect being overweight with risk of stroke and other CVDs.

More funding, more impact

Experts believe that more funding is needed. "Currently, there is no funding from the UK government for these campaigns and that's why we struggle with this," says Ms Lobban. "There needs to be more investment from public bodies that work with foundations and build on the success of the work of patient advocacy groups."

She adds that there's no need to reinvent the message around "know your pulse" and "know your heart rhythm" campaigns and other existing public health initiatives. "Don't come up with another version—we already have the evidence to show that these are working. So, help fund that, put it on buses, have TV adverts before and after the news, that kind of thing. Stroke is a disaster and yet the most common stroke—AF-related stroke—can and should be avoided. If we could advertise on TV like we do for other disasters around the world, we would see a big difference in awareness and ultimately in prevention."

In Italy regular stroke risk awareness campaigns on TV and on buses are likely the reasons why it scores so well compared to other countries on issues of health

¹⁰⁶ "High Cholesterol", *Stroke Association*. <https://www.stroke.org.uk/what-is-stroke/are-you-at-risk-of-stroke/high-cholesterol>

¹⁰⁷ E Stevens, E Emmett, Y Wang et al., "The Burden of Stroke in Europe: The Challenge for Policy Makers", *Stroke Alliance for Europe*, 2016. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

¹⁰⁸ "ABCs of Heart Health", *Million Hearts*. https://millionhearts.hhs.gov/files/4_Steps_Forward_English.pdf

¹⁰⁹ "Smoking and Tobacco Use", *Centres for Disease Control and Prevention*. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/effects_cig_smoking/index.htm

¹¹⁰ "WHO global report on trends in prevalence of tobacco smoking", *WHO*, 2015. http://apps.who.int/iris/bitstream/10665/156262/1/9789241564922_eng.pdf?ua=1

¹¹¹ Tobacco consumption statistics, *Eurostat*, 2014. https://ec.europa.eu/eurostat/statistics-explained/index.php/Tobacco_consumption_statistics

¹¹² "Germany Country Profile: Nutrition, Physical Activity and Obesity", *WHO*, 2013. http://www.euro.who.int/__data/assets/pdf_file/0020/243326/Germany-WHO-Country-Profile.pdf

literacy, says Dr Piepoli. (See box: The Italian exception.) However, he notes that even in Italy all action is privately funded and that even greater impact could be achieved with government support.

Ms Lobban points to the success of the “FAST” campaign in the UK which helped raise stroke awareness and the need to call emergency services at the onset of suspected stroke. It led to [an increase of] thousands—

potentially tens of thousands—of extra people reaching hospital within an appropriate window to receive the medical treatment they needed.^{113, 114, 115} “It was one of the most successful campaigns ever,” Ms Lobban says. “It was funded by the Department of Health. And that is what we need, we need that funding to be able to deliver these campaigns and therefore save lives as well as millions of pounds for the NHS.”

FAST

Face—has their face fallen on one side? Can they smile?

Arms—can they raise both their arms and keep them there?

Speech—is their speech slurred? If they notice any of these symptoms it is...

Time—time to call medical emergency if you see any single one of these signs.

¹¹³ “Stroke campaign ‘saved 4,000 from serious disability’”, *BBC*, February 2nd 2015. <https://www.bbc.co.uk/news/health-31057650>

¹¹⁴ D Flynn, G Ford, H Rodgers et al., “A Time Series Evaluation of the FAST National Stroke Awareness Campaign in England”, *PLoS One*, 2014. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4131890/>

¹¹⁵ SU Dombrowski, JE Mackintosh, FF, Sniehotta et al., “The impact of the UK ‘Act FAST’ stroke awareness campaign: content analysis of patients, witness and primary care clinicians’ perceptions”, *BMC Public Health*, 2013. <https://bmcpublihealth.biomedcentral.com/articles/10.1186/1471-2458-13-915>

Chapter 4: Who should play the biggest role?

Stroke prevention influencers

Empowering the healthcare workforce will also help tackle stroke from preventative care pathways through to the emergency room.

This workforce includes healthcare professionals on the front line (doctors, specialists, nurses and pharmacists) and can extend to local councils (who can have public health roles), patient advocacy groups (which can support campaigns) and professional medical societies (which support evidence-based research and best practice guidelines).

Survey respondents were asked to select one stakeholder they felt should play the biggest role in supporting stroke prevention.

Primary care physicians

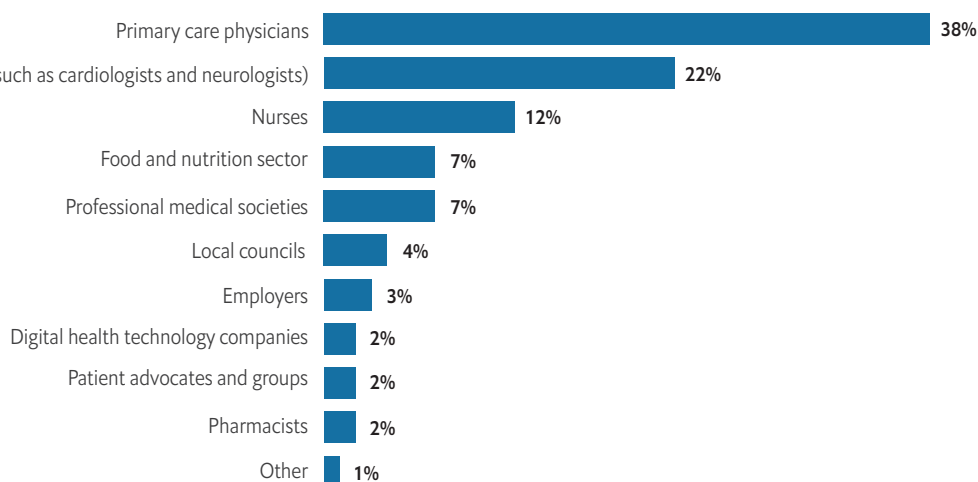
Most agree that “primary care physicians” have the biggest role to play (38%) in preventing stroke. But there was wide variation by country. Weighing down the average, in Italy the selection of primary care physicians was 15% compared with 49% in Spain.

As for the specific areas in which they should play a bigger role, survey respondents ranked as number one healthy lifestyle and living (28%), followed by managing hypertension (21%), addressing a family history of stroke (16%) and managing AF (12%).

And indeed primary care physicians play a critical role in reducing the costly incidence

Figure 32: Which of the following stakeholders should play the biggest role in supporting stroke prevention?

% of respondents



Source: The Economist Intelligence Unit.

of stroke. During patient check-ups they can engage in opportunistic screening of risk factors such as high blood pressure and encourage patients to exercise. They are also pivotal to long-term risk management efforts.¹¹⁶

However, a 2008 report on stroke education for healthcare professionals suggests that stroke requires management from more specialist stroke staff with clinical skills. It goes on to argue that more upskilling of current staff and a national education pathway is needed.¹¹⁷

“Consider the case of AF. Screening and prescribing for AF is important because oral anticoagulation effectively prevents strokes in these patients, with a risk reduction up to 70%,” says Dr Di Carlo. He adds that “GPs may also inform patients on possible AF symptoms, such as palpitations, racing or irregular pulse, shortness of breath, chest pain and dizziness, and they can teach [patients] how to evaluate radial pulse”.

Specialists

After primary care physicians, specialists—such as cardiologists and neurologists—are seen to have the biggest role to play in supporting stroke prevention (cited by 22% of respondents). Specifically, respondents say they could make the most impact through managing family history of stroke, AF and hypertension.

However, a 2017 European Heart Journal article that summarises the views of the

European Society of Cardiology (ESC) Council on Stroke calls for more specifications to their role in prevention. It states that while specialists such as cardiologists and neurologists have an important role in prevention, it is largely reserved for secondary prevention, which is reducing the risk of stroke-reoccurrence in patients who have already been diagnosed with stroke.¹¹⁸

According to the paper, primary prevention of stroke should be a broad population-wide initiative, “where cardiologists (along with other specialists—especially neurologists) may serve as triggers, educators, or facilitators, but otherwise primary prevention is [a] task for the politicians, media, health care providers, primary care physicians, and every individual citizen.” By contrast, secondary stroke prevention “may rest particularly with the specialist medical health care provider and includes the screening for and both the monitoring and treatment of all risk factors.”

It adds: “In some areas (eg diagnosis and treatment of AF, diagnostic workup to uncover the cardiac cause of stroke) the role of cardiologists is essential, while in other areas the role of cardiologists currently is rather complementary.”

Nurses

With 2020 being designated by the World Health Organisation as Year of the Nurse,¹¹⁹ these HCPs practice in a variety of clinical settings and have many opportunities to engage with, educate and empower patients about stroke prevention.

¹¹⁶ A Grady, M Carey, C Oldmeadow et al., “GP detection of health risk factors among general practice patients at risk of primary and secondary stroke”, *Family Practice*, 2015. <https://www.ncbi.nlm.nih.gov/pubmed/25900676>
¹¹⁷ LN Smith, LE Craig, CJ Weir et al., “Stroke education for healthcare professionals: Making it fit for purpose”, *Science Direct*, 2015. <https://www.sciencedirect.com/science/article/abs/pii/S0260691707000925>
¹¹⁸ P Widimsky, W Doehner, HC Diener et al., “The role of cardiologists in stroke prevention and treatment: position paper of the European Society of Cardiology Council on Stroke”, *European Heart Journal*, 2017. <https://doi.org/10.1093/eurheartj/ehx478>
¹¹⁹ World Health Organisation. Year of the Nurse and Midwife, 2020. <https://www.who.int/news-room/campaigns/year-of-the-nurse-and-the-midwife-2020>

For example, a review published in 2018 found that interventions in which nurses played a primary role were effective in improving medical and behavioural risk factors as well as knowledge of risk factors as part of secondary prevention of stroke. Statistically significant reductions in blood pressure were recorded amongst other improved factors.¹²⁰

Yet only 12% of our survey respondents believe nurses should play the biggest role in supporting stroke prevention. Dr Caso thinks too many are underplaying or undervaluing the nurse's role.

"They have a very direct contact with the patient. Nurses take patients' blood pressure, and they touch the patient more so there's a physical contact because they visit them much more than a physician," she says. "When there's a nurse, patients tend to talk much more, even share their most intimate fears. So there are some situations where we should absolutely guide our nurses to do this work."

Mr Agredano agrees. "Many times it is not about allocating new resources, but about rearranging existing ones," he says. "The work of primary care in the promotion of health in society is essential, but in fact primary care doctors are overwhelmed. The primary care system has a resource that is 'underused' which is primary nursing. All risk factor controls can be done through nursing without the intervention of the doctor."

These sentiments seemed to be shared by nurses as well. According to the *Journal of*

Community Nursing, "providing advice on lifestyle behaviours such as smoking, alcohol consumption, diet and exercise all fall under the remit of the nurse in health promotion and in secondary stroke care. By providing a primary prevention service, community nurses could work as case managers for a larger multidisciplinary team and provide prevention advice and treatment".¹²¹ And this is backed by survey respondents who ranked healthy lifestyle and living as an area in which nurses can play the biggest role in stroke prevention, followed by healthy diet.

Pharmacists

Only 2% of respondents thought pharmacists are the stakeholders that should have the biggest role to play in stroke prevention. It raises the question of whether pharmacists are another important yet underutilised group, particularly given that they are the most accessible HCPs in communities as no appointment is necessary.

Furthermore, more than 20m people visit a pharmacy in Europe every day.¹²² Some already offer health checks to measure blood pressure and cholesterol levels and offer weight management support if requested by a patient or in relation to medication management.¹²³ Research shows that community pharmacy blood pressure measurements are comparable in accuracy to those of ambulatory services and home measurements. As they are highly accessible, they are ideally positioned for population-based screening purposes.¹²⁴

¹²⁰. "European Journal Of Cardiovascular Nursing: Advancing Knowledge in Cardiovascular Nursing and the Promotion of Evidence-Based Clinical Practice", *European Society of Cardiology*, 2018. <https://www.escardio.org/Journals/ESC-Journal-Family/European-Journal-of-Cardiovascular-Nursing>

¹²¹. *Journal of Community Nursing*, 2017. <https://www.jcn.co.uk/journal/02-2017/community-nursing/1911-the-role-of-community-nurses-in-stroke-prevention>

¹²². A Albarasi, "A comparison of blood pressure in community pharmacies with ambulatory, home and general practitioner office readings: systematic review and meta-analysis", *Journal of Hypertension*, 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5585128/>

¹²³. *Journal Of The American Pharmacists Association: Japha*. [J Am Pharm Assoc (2003)] 2014 May-Jun; Vol. 54 (3), pp. 302-7.

¹²⁴. A Albarasi, JW O'Sullivan, NW Roberts et al., "A comparison of blood pressure in community pharmacies with ambulatory, home and general practitioner office readings: systematic review and meta-analysis", *Journal of Hypertension*, 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5585128/>

In England, for instance, there are over 9,300 “healthy living pharmacies” which play a role in prevention by improving the health and wellbeing of the local population and helping to reduce health inequalities.¹²⁵ And in a big step of recognition for the role they play in community health, in early 2020, the Royal Pharmaceutical Society’s English Pharmacy Board was welcomed as a consultant to the National Institute for Health and Care Excellence (NICE) to develop guidelines for how pharmacies can better promote community health and wellbeing.¹²⁶ Such measures include stronger integration of pharmacies into local care and referral pathways.¹²⁷

“We have an ageing population. Once a doctor has made the diagnosis, and given the patient initial advice around prevention, in the long run, we need nurses and also pharmacists. This is because patients go to pharmacies for their prescription medicine, but while there, they also want to ask about other matters. So, in addition to doctors and nurses, pharmacists should be on board for better stroke prevention,” says Dr Caso

Earlier this year, it was reported that a pilot showed that pharmacists can help cut stroke through AF screening.¹²⁸

Furthermore, a 2019 global study that Ms Lobban helped author suggests pharmacists can be a cost-effective mass-screener of AF and contribute to greater outreach of awareness campaigns.¹²⁹ Pharmacists joined forces with an alliance of arrhythmia patient groups to deliver “know your pulse” awareness initiatives. Ms Lobban was encouraged by the results of the study. “People visited pharmacists for their prescription, to buy shampoo and so on, and were offered a free pulse check. The pharmacists detected a number of people with suspected irregular heart rhythms and signposted them to their GP, potentially preventing a number of AF-related strokes. It is a simple, cost effective way to reduce stroke and to save lives.

“Pharmacists and patient advocacy groups are the ones that are on the ground. If you’re seeing a specialist, or a GP or a nurse, it’s likely because you’ve already had a stroke or you’re displaying symptoms of an underlying heart rhythm condition—atrial fibrillation or worse still—symptoms of an AF-related stroke. We need to be getting to people earlier, sooner and with more information. An effective way of doing that is through the campaigns promoted by those who see people more regularly, the pharmacist who is already speaking to people.”

¹²⁵ “Healthy Living Pharmacies”, *Pharmaceutical Services Negotiating Committee*. <https://psnc.org.uk/services-commissioning/locally-commissioned-services/healthy-living-pharmacies/>

¹²⁶ “RPS welcomes NICE consultation on community pharmacy”, *RPS*, 2020. <https://www.rpharms.com/about-us/news/details/RPS-welcomes-NICE-consultation-on-community-pharmacy>

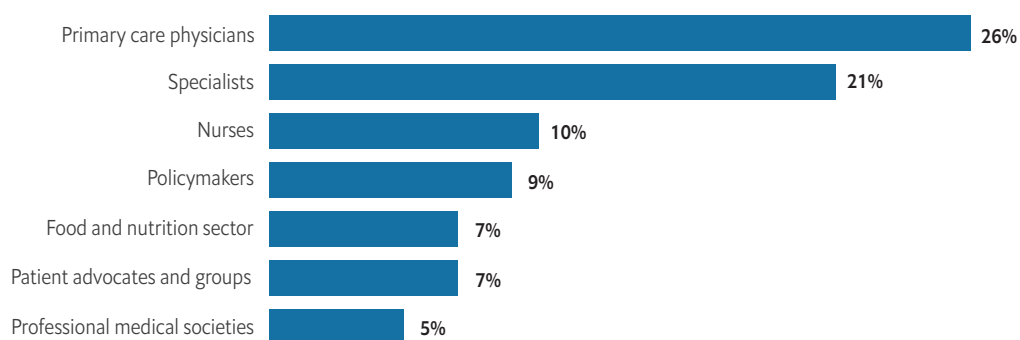
¹²⁷ National Institute for Health and Care Excellence. Community pharmacies: promoting health and wellbeing, 2020. [https://www.rpharms.com/Portals/o/RPS%20document%20library/Open%20access/Consultations/February%202020/NICE%20QS%20comments%20form%20RPs%20response%20final%20\(1\).pdf?ver=2020-02-17-122553-567](https://www.rpharms.com/Portals/o/RPS%20document%20library/Open%20access/Consultations/February%202020/NICE%20QS%20comments%20form%20RPs%20response%20final%20(1).pdf?ver=2020-02-17-122553-567)

¹²⁸ D Andalo, “Pharmacist-led atrial fibrillation screening service cuts stroke numbers by 20%”, *Pharmaceutical Journal*, 2020. <https://www.pharmaceutical-journal.com/news-and-analysis/news/pharmacist-led-atrial-fibrillation-screening-service-cuts-stroke-numbers-by-20/20207598.article>

¹²⁹ FA da Costa, K Mala-Ladova, V Lee et al., “Awareness campaigns of atrial fibrillation as an opportunity for early detection by pharmacists: an international cross sectional study”, *Journal of Thrombosis and Thrombolysis*, 2019. <https://www.readcube.com/articles/10.1007/s11239-019-02000-x>

Figure 33: Which stakeholder group do you believe you should collaborate with more to improve stroke prevention engagement with high-risk individuals?

% of respondents



Professionals that are top ranked for those who should collaborate more with high-risk individuals trend similarly with the selection of professionals who should play a biggest role in supporting stroke prevention.

Source: The Economist Intelligence Unit.

Conclusion: Instilling better practices for prevention

Stroke is one of Europe's largest killers and a leading cause of disability, so it needs further investment into prevention from policymakers. With Europe's ageing population on the rise, more healthcare resources will be needed.

Fortunately, stroke is highly preventable and its risk factors are largely manageable so that costly, acute and long-term care can be minimised. Healthcare and social care budgets, already strained, are grappling with the financial burden of stroke: already the cost amounts to more than €60bn (US\$66bn) across 32 European countries.¹³⁰

It is prudent to consider how investment into prevention can be increased and better allocated for significant advances and wider impact. Our survey finds that while current stroke prevention investment is widely well-prioritised for certain modifiable risk-factors in Europe, it is nevertheless considered insufficient to further decrease rates and hit ESO goals of 10% absolute number of stroke reductions by 2030.¹³¹

Many existing prevention measures are proven to decrease incidence of stroke. This includes public awareness campaigns around risk-factors, implementation of clinical guidelines, adoption of health technologies (innovative medicine and digital devices) and the optimised use of underutilised healthcare professionals such as pharmacists and nurses. Yet in many of these cases, impact is limited by lack of funding and government support.

Our survey confirms the need for policymakers to be more active and involved in the funding of prevention, diagnosis and management of stroke. By dedicating additional resources to expand their impact across Europe and reach at-risk populations, countries can more effectively control the future burden of this disease.

¹³⁰. "Full costs of stroke in 32 European countries is €60 billion, says latest SAFE research", *SAFE*, November 27th 2019. <https://www.safestroke.eu/2019/11/27/costofstroke/>

¹³¹. B Norrving, J Barrick, A Davalos et al., "Action Plan for Stroke in Europe 2018–2030", *European Stroke Journal*, 2018. <https://actionplan.eso-stroke.org/images/2396987318808719.pdf>

Investment strategies to improve stroke prevention may include the following:

Consider more funding to improve public awareness of the risk factors for stroke. Public health and government bodies can work with patient advocacy groups to fund the expansion of education and awareness campaigns. To have impact these efforts need visibility on a grand scale, for example through TV, radio and bus advertisements. Campaigns need to draw connections between modifiable risk factors—such as high blood pressure, smoking, irregular heart rhythm and obesity—and stroke.

Empower underutilised healthcare staff such as nurses and pharmacists. These healthcare professionals are an important yet underused resource. They can play a critical role in improving public knowledge of stroke risk factors and assist with risk detection and management. Some countries, such as the UK, are looking at the wider role of pharmacists in CVD health. Progress on this front should be monitored. Furthermore, funding of awareness campaigns can help draw public attention to prevention services already available through pharmacies. Ensure that campaigns emphasise when they are a more appropriate resource than the use of physicians and emergency services. Consider investment in pharmacy reimbursement models which promote the public health roles that could be played by these HCPs.

Boost research into prevention cost-effectiveness studies. Greater research could help all stakeholders better understand which interventions, including novel treatments, are creating the greatest impact for target at-risk populations. Ensure that these studies are well-funded and are reflective of various socioeconomic considerations that impact risk of stroke to improve health equity across regions and populations.

Ensure sufficient funding to support the uptake of clinical guidelines for stroke prevention, which highlight the key interventions such as blood pressure management and other preventative actions. Despite the availability of evidence-based national or local guidelines for the management of stroke and for its risk factors, there is significant variation on how they are applied across Europe. Develop strategies to boost communication around best practices and broaden understanding of stroke risk factors among healthcare professionals and payers. Ensure guidelines are receiving sufficient funding for timely updates and distribution of materials to all stakeholders, including patients.

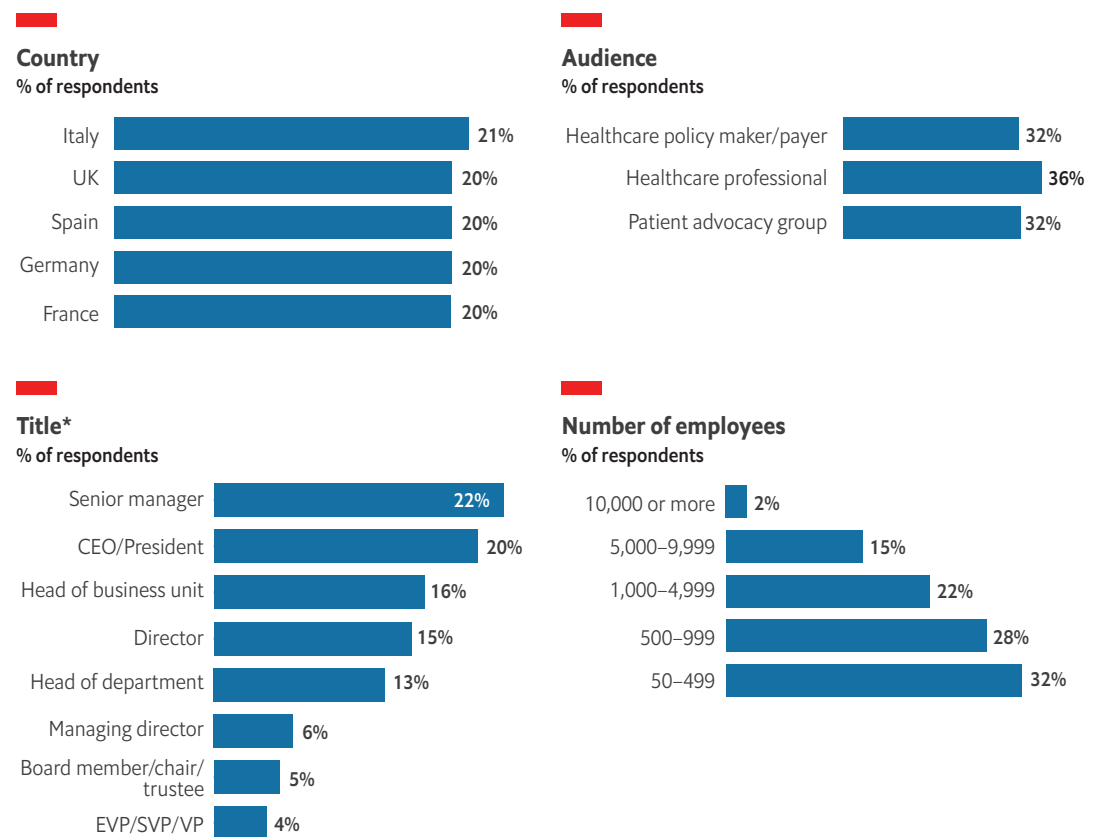
Fund and support for digital technologies. As preventative consumer technologies evolve, it is the responsibility of government and regulators to ensure that their healthcare workers and patients can access and use them responsibly. Ensure regulatory systems are prepared to manage and incorporate the changes in a timely manner.

Appendix: About the survey

The Economist Intelligence Unit conducted a study of 261 respondents from France, Germany, Italy, Spain and the UK. All survey respondents engage in work that involves prevention and management of stroke and/or the financing of services to prevent or manage stroke. All represent organisations with 50 or more employees. Respondents answered all questions in the survey except for a question in relation to recommending digital technology (eg, apps) to patients for managing stroke risk factors: this only applied to healthcare professionals (see Figure 16).

The survey respondents breakdown is as follows:

* Note, healthcare professionals were not asked their seniority and therefore are not reflected in the Title chart.



Numbers may not add to 100 due to rounding.
Source: The Economist Intelligence Unit

While every effort has been taken to verify the accuracy of this information, The Economist Intelligence Unit Ltd. cannot accept any responsibility or liability for reliance by any person on this report or any of the information, opinions or conclusions set out in this report. The findings and views expressed in the report do not necessarily reflect the views of the sponsor.

LONDON

20 Cabot Square
London, E14 4QW
United Kingdom
Tel: (44.20) 7576 8000
Fax: (44.20) 7576 8500
Email: london@eiu.com

GENEVA

Rue de l'Athénée 32
1206 Geneva
Switzerland
Tel: (41) 22 566 2470
Fax: (41) 22 346 93 47
Email: geneva@eiu.com

NEW YORK

750 Third Avenue
5th Floor
New York, NY 10017
United States
Tel: (1.212) 554 0600
Fax: (1.212) 586 1181/2
Email: americas@eiu.com

DUBAI

Office 1301a
Aurora Tower
Dubai Media City
Dubai
Tel: (971) 4 433 4202
Fax: (971) 4 438 0224
Email: dubai@eiu.com

HONG KONG

1301
12 Taikoo Wan Road
Taikoo Shing
Hong Kong
Tel: (852) 2585 3888
Fax: (852) 2802 7638
Email: asia@eiu.com

SINGAPORE

8 Cross Street
#23-01 Manulife Tower
Singapore
048424
Tel: (65) 6534 5177
Fax: (65) 6534 5077
Email: asia@eiu.com