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Stroke  
association

# State of the nation

Stroke statistics

February 2018

Together we can conquer stroke



# Contents

- 3 Glossary
- 4 Key statistics

## What is stroke?

- 6 Understanding stroke
- 7 Transient ischaemic attack (TIA)

## The stroke population

- 9 How common is stroke in the UK?
- 10 Age
- 11 Childhood stroke
- 12 Gender, ethnicity and social deprivation
- 14 Surviving stroke
- 15 Deaths from stroke in the UK
- 16 Stroke worldwide

## The devastating effects of stroke

- 18 Effects of stroke
- 19 Living with the effects of stroke

## Stroke risk factors and prevention

- 25 High blood pressure
- 26 Diabetes
- 27 Atrial fibrillation
- 28 Other risk factors
- 30 Lifestyle

## Stroke treatment and care

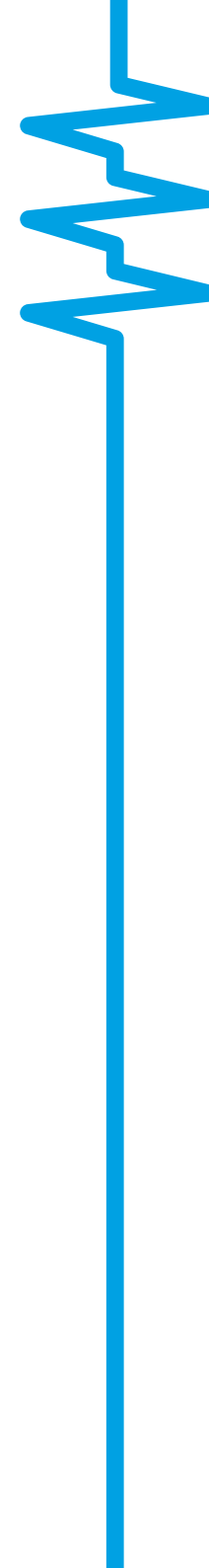
- 33 Act FAST
- 34 Stroke units
- 35 Treatments for ischaemic stroke (due to a clot)
- 36 Rehabilitation and life after stroke support

## Economic impact of stroke

- 39 The cost of stroke to health and social care
- 41 Research spend in the UK

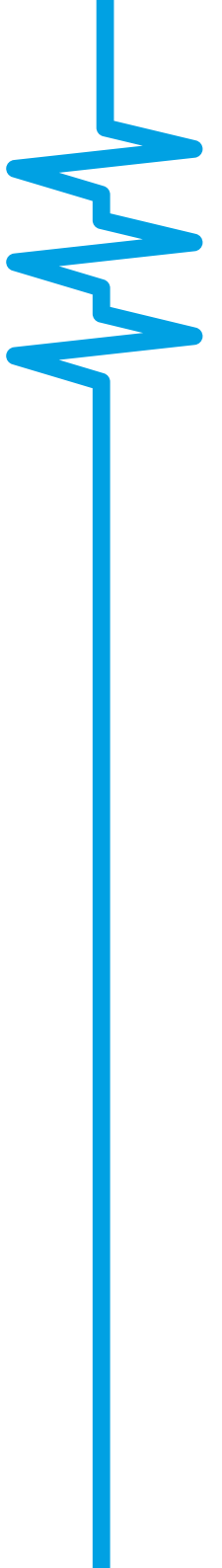
## References

- 42 References



# Glossary

- **Ischaemic stroke:**  
A stroke caused by a clot.
- **Haemorrhagic stroke:**  
A stroke caused by a bleed.
- **Transient ischaemic attack (TIA):**  
Sometimes referred to as a 'mini-stroke' or 'warning stroke' – an event is defined as a TIA if the symptoms resolve within 24 hours.
- **Incidence:**  
The number of stroke occurrences.
- **Prevalence:**  
The number of living stroke survivors.
- **Mortality:**  
The number of deaths caused by stroke.
- **Aphasia:**  
Aphasia is a complex disorder of language and communication caused by damage to the language centres of the brain. People with aphasia may have difficulty speaking, reading, writing or understanding language.
- **Speech and language therapy:**  
Speech and language therapy provides treatment, support and care for people who have difficulties with communication, or with eating, drinking and swallowing.
- **Activities of daily living:**  
Everyday activities generally involving functional mobility and personal care, such as bathing, dressing, going to the toilet and meal preparation.
- **Onset:**  
When the symptoms of stroke first started. Also referred to medically as 'ictus'.
- **Thrombolysis:**  
A clot-busting treatment to dissolve the clot and restore blood flow. Also referred to as 'rt-PA' and 'alteplase'.
- **Door to needle:**  
The time it takes from arrival at hospital (door) to administering thrombolysis treatment (needle).
- **Thrombectomy:**  
A mechanical clot retrieval procedure that pulls the blood clot out of the brain.
- **Early supported discharge (ESD):**  
Designed for stroke survivors with mild to moderate disability who can be discharged home from hospital sooner to receive the necessary therapy at home.
- **Anticoagulant drugs:**  
Medicines that prevent the formation of blood clots.



# Key statistics



There are more than **100,000 strokes** in the UK each year. That is around one stroke every **five minutes**.



There are over **1.2 million stroke survivors** in the UK.



Every **two seconds**, someone in the world will have a **stroke**.



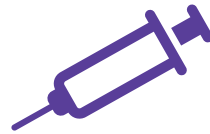
Stroke is the **fourth biggest killer in the** in the UK. Fourth in England and Wales, and the third biggest killer in Scotland and Northern Ireland.



More than **400** children have a **stroke** every year in the UK.



A **third** of stroke survivors experience depression after having a **stroke**.



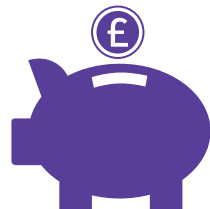
More than **8 out of 10 people** in the **England, Wales and Northern Ireland** who are eligible for the emergency clot-busting treatment, thrombolysis, receive it. In **Scotland** only **1 in 10** of all **patients** will receive this treatment.



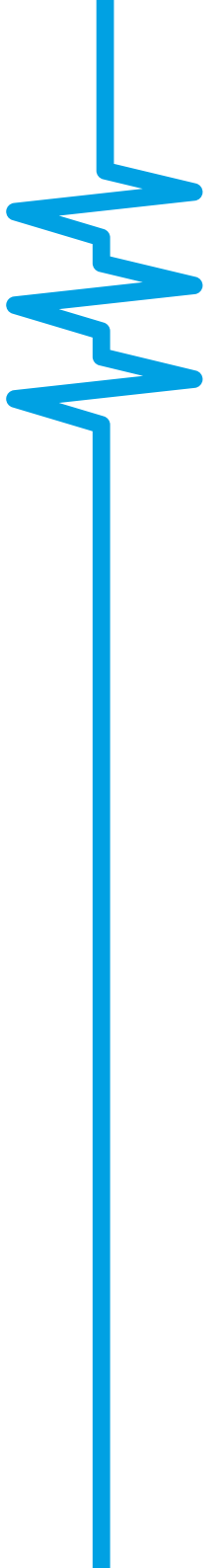
Almost **two thirds** of stroke survivors leave hospital with a disability.



People of working age are **two to three times** more likely to be **unemployed** eight years after their stroke.



The cost of stroke to society is around **£26 billion** a year.

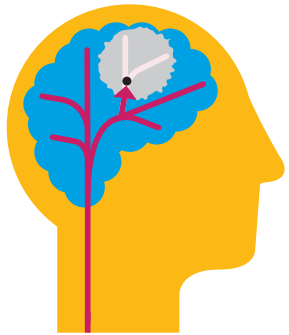


# What is stroke?

# Understanding stroke

A stroke is a brain attack. It happens when the blood supply to part of the brain is cut off, killing brain cells. Damage to the brain can affect the way your body works, and it can also change how you think and feel.

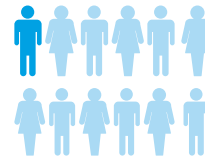
## There are two main types of stroke:



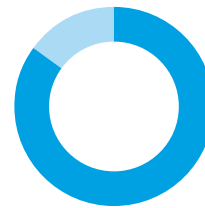
**Ischaemic strokes** are caused by blockages which cut off the blood supply to parts of the brain. Blockages can be caused by a blood clot or other matter (for example, fatty deposits) and can occur in a brain artery or a small blood vessel deep within the brain. Without blood, brain cells begin to die. This damage can have different effects, depending on where it happens in your brain.



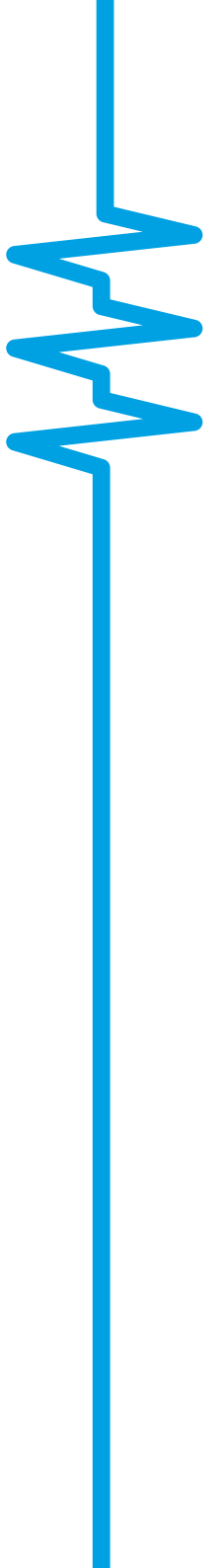
**Haemorrhagic strokes** are caused when a blood vessel bursts within or on the surface of the brain. Haemorrhagic strokes are generally more severe and are associated with a considerably higher risk of dying within the first three months and beyond, when compared to ischaemic strokes. These are also referred to as subarachnoid haemorrhage (bleeding on the surface of the brain) or intracerebral haemorrhage (bleeding within the brain).



Around **1 in 10** patients who have a haemorrhagic stroke die before reaching hospital.<sup>1</sup>



About **85%** of all strokes are ischaemic and **15%** are haemorrhagic.<sup>1</sup>



# Transient ischaemic attack (TIA)

- Transient ischaemic attack, or TIA (also known as a mini-stroke) is the same as a stroke, except that the symptoms last for less than 24 hours.
- A TIA should be treated as seriously as a full stroke.
- Full strokes often happen after a mini-stroke. About half of all strokes that occur after a TIA, happen within 24 hours.<sup>2</sup>
- 1 in 12 people (8%) will have a full stroke within a week of having a TIA.<sup>3</sup>



5%

at 48 hours



8%

at one week



12%

at one month



17%

at three months<sup>3,4</sup>

**Guidelines on TIA:** A new National Clinical Guideline for Stroke was published in 2016. This fifth edition of the guideline on how stroke care should be provided in the UK states that:

- patients with a suspected TIA should be given aspirin and assessed urgently by a neurological specialist or on an acute stroke unit
- the initial symptoms are the same for people having TIAs and full strokes
- you should always call 999 if you spot the signs of a stroke
- patients with a confirmed TIA should receive a specific treatment to reduce their risk of stroke.

# The stroke population

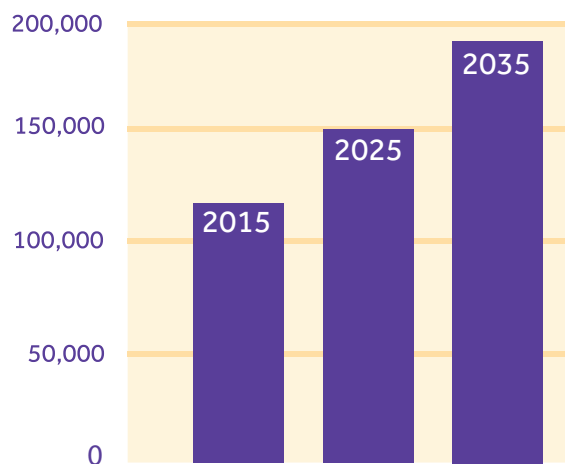


# How common is stroke in the UK?

- There are more than 100,000\* strokes in the UK each year.<sup>5 6</sup>
- That is around one stroke every five minutes in the UK.
- Between 1990 and 2010 the incidence of strokes fell by almost a quarter.<sup>7</sup>
- Around 1 in 6 men will have a stroke in their life.<sup>8</sup>
- Around 1 in 5 women will have a stroke in their life.<sup>8</sup>
- The rate of first time strokes in people aged 45 and over is expected to increase by 59% in the next 20 years (between now and 2035).<sup>9</sup>
- In the same period, it's estimated that the number of stroke survivors, aged 45 and over, living in the UK is expected to rise by 123%.<sup>9</sup>

\*It's hard to determine with accuracy how many people have a stroke each year. We know that there are at least 100,000 strokes, but there may be more. The available data relies on hospital admissions and does not include who die before reaching hospital, or were not treated in hospital. For these reasons, we have agreed, together with the professional and academic community, to utilise this estimate.

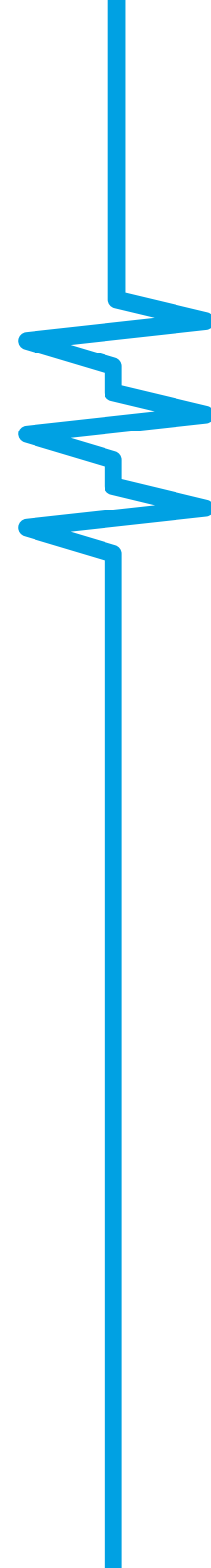
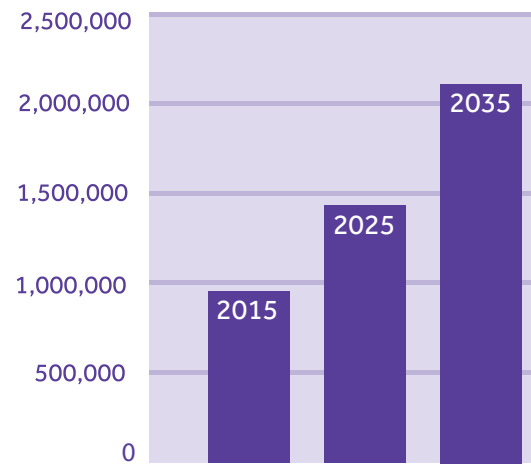
Stroke incidence (number of people)



## Recurrence

- Stroke survivors are at greatest risk of having another stroke in the first 30 days following a stroke.<sup>10</sup>
- Around 1 in 4 stroke survivors will experience another stroke within five years.
- In England, Wales and Northern Ireland, over a quarter of people who have a stroke have had a previous stroke or TIA.<sup>5</sup>
- In England, Wales and Northern Ireland 1 in 17 (6%) stroke patients have another stroke while still in hospital.<sup>5</sup>
- In Scotland the number of people having TIAs has increased by 17% in the last decade (since 2006).<sup>11</sup>

Stroke prevalence (number of people)

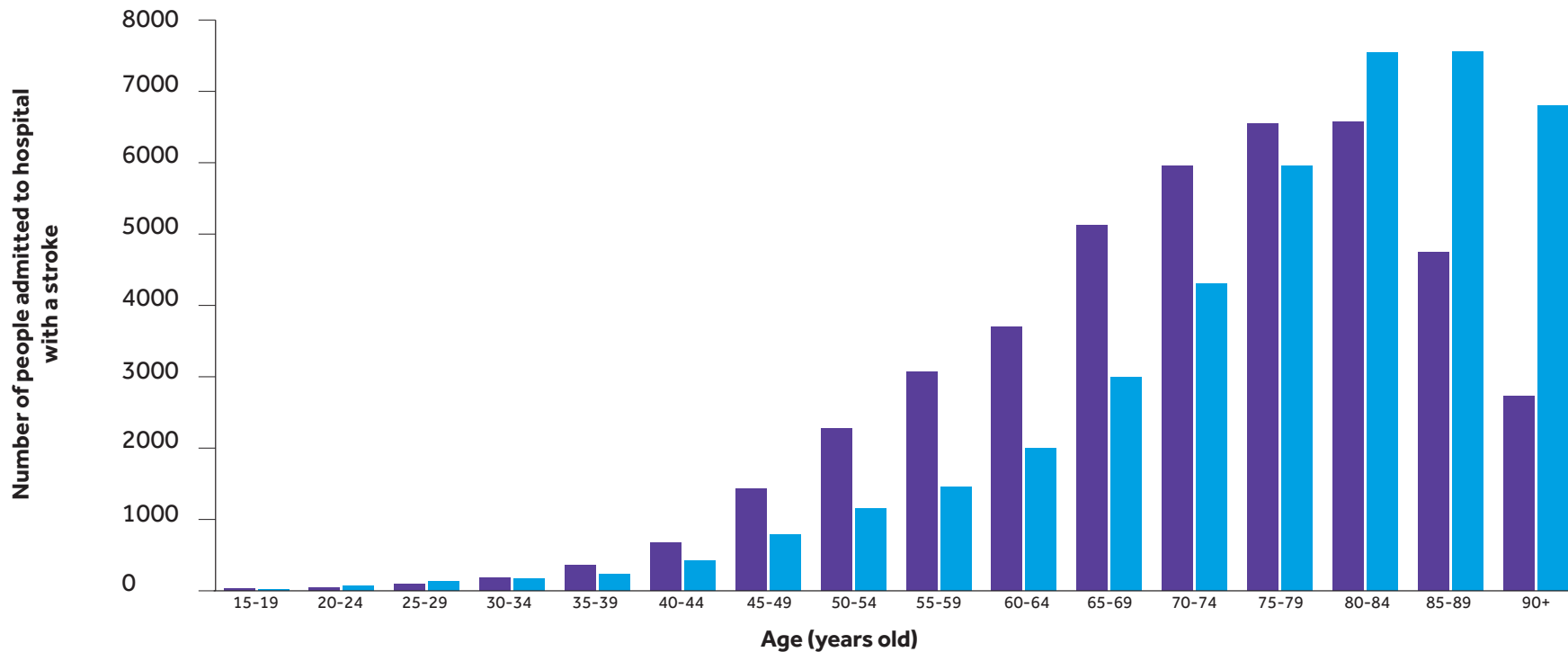


# Age

- In England, Wales and Northern Ireland the average age for someone to have a stroke is 72 for men and 78 for women.<sup>5</sup>
- In Scotland the average age to have a stroke is 71 for men and 75 for women.<sup>6</sup>
- Around one in four strokes happen to people of working age.<sup>12</sup>
- People are having strokes earlier in their lives.<sup>7</sup>
- In 1990 only a quarter of all strokes occurred in people aged 20-64. In 2010, a third of all strokes happened to people in that age group.<sup>7</sup>
- People are most likely to have a stroke after the age of 55.<sup>13</sup>

## Stroke Hospital Admissions in England, Wales and Northern Ireland <sup>5</sup>

Key: ■ Men ■ Women



# Childhood stroke

- Anyone of any age can have a stroke, including babies and children. The causes of stroke in children are very different from those in adults.
- Strokes occurring in babies less than 28 days old (known as prenatal and perinatal ischaemic stroke) are usually caused by clots breaking off from the placenta and lodging in the baby's brain. This can sometimes be due to a blood clotting disorder that the mother or child may have.
- Strokes in babies and children aged 28 days to 18 years are associated with pre-existing conditions, most commonly congenital heart disease and sickle cell disease. Other risk factors include infectious disease, trauma to the head or neck, vascular problems and blood disorders.
- There are over 400 childhood strokes a year in the UK<sup>12</sup>, which is more than one child every day.
- Three quarters of these are in children under 10 years old.<sup>12</sup>
- Up to 25% of childhood ischaemic strokes are linked to congenital heart disease.<sup>14</sup>
- Strokes caused by a bleed (haemorrhagic) are more common in children than in adults. Only about 15% of adult strokes are due to a bleed, but it is thought that up to 50% of childhood strokes are due to a bleed.<sup>15 16 17</sup>
- Stroke can affect the psychological and social development of children. Studies report that children who have had a stroke tend to be less able to socialise with other children.<sup>18</sup>

## Childhood stroke risk

- Although the risk of stroke in healthy children is extremely low, the risk of a stroke caused by a clot is six times higher following a recent illness, such as cold, flu or chickenpox.<sup>19</sup>
- For children who have had none or only some of their routine vaccinations, the risk of a stroke caused by a clot is eight times higher compared to those who've had all of their routine vaccinations.<sup>19</sup>
- The risk of stroke in children is 19 times higher in children with congenital heart disease.<sup>20</sup>



# Gender, ethnicity and social deprivation

## Gender

- Men are at a higher risk of having a stroke at a younger age than women.<sup>5 21</sup> This is generally due to a combination of behavioural and medical factors.<sup>22</sup>
- Diabetes and heart disease, both risk factors for stroke, are more common amongst men.<sup>23</sup>
- In addition, on average, men consume more alcohol and are more likely to smoke.<sup>23</sup>
- More women than men die of stroke.<sup>24 25 26</sup> This is because women tend to live longer than men, and the risk of stroke increases with age.
- Women can experience increased stroke risk due to hormone changes, contraception, pregnancy and childbirth.<sup>27</sup>
- Hormonal contraception with oestrogen can increase the chance of blood clots. Studies have reported that taking the pill can increase your risk of heart attack and stroke by 1.6 times.<sup>28</sup> Although for healthy women who don't have other risk factors, the risk is still extremely low.
- Hormone replacement therapy (HRT) can slightly increase your risk of stroke. For every 1,000 women taking HRT, an extra six will have a stroke and an extra eight will develop a blood clot.<sup>29</sup>
- Although the overall risk of younger women having a stroke is very low, pregnancy can increase your risk of stroke. In 100,000 pregnancies, 30 soon-to-be mothers will have a pregnancy-related stroke.<sup>30</sup>
- Women tend to experience worse psychological and physical repercussions from stroke. This may be because women tend to have strokes when they're older and often living alone.<sup>31</sup>



# Gender, ethnicity and social deprivation



## Ethnicity

- White people in the UK are more likely to have atrial fibrillation (a type of irregular heart beat), smoke and drink alcohol than other ethnicities.<sup>32,33</sup> These are all factors that increase the risk of stroke.
- Black people are almost twice as likely to have a stroke than white people.<sup>13</sup>
- On average, people of black African, black Caribbean and South Asian descent in the UK have strokes earlier on in their lives.<sup>36</sup>
- Studies suggest that black and South Asian people tend to have strokes 10 years earlier than white people.<sup>34</sup>
- Research suggests this is because black people are more likely to have high blood pressure and diabetes than white people, both of which are stroke risk factors.<sup>34</sup>
- In the last 20 years, stroke incidence in London has decreased by 40% for white people, but has not decreased for black people.<sup>13</sup>
- Black people are also more likely to have sickle cell disease, which increases the risk of a stroke.<sup>35</sup>
- South Asian people are almost twice as likely to develop diabetes (a risk factor for stroke) as the rest of the UK population,<sup>36</sup> and are likely to develop it at an earlier age.<sup>38</sup>

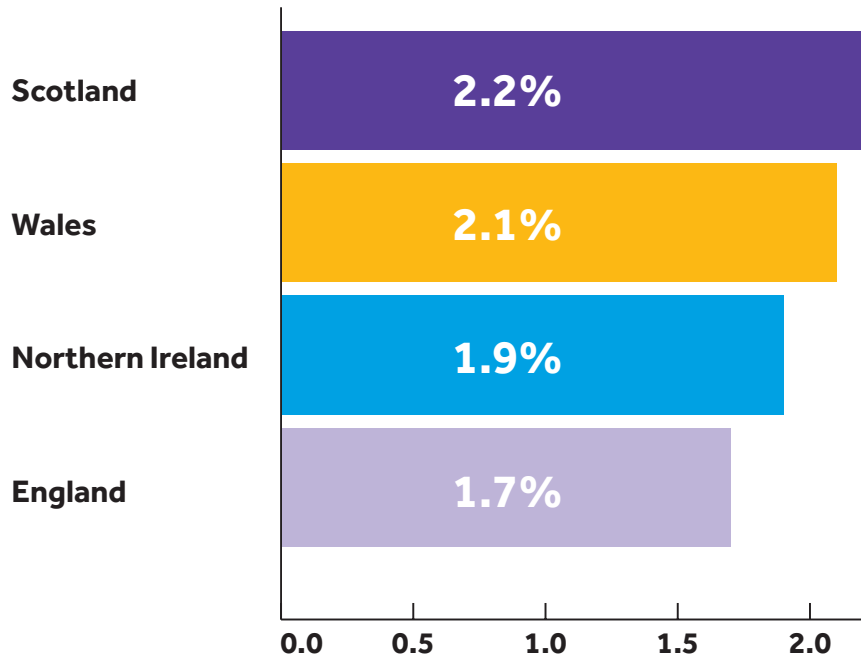
## Social deprivation

- In general, people from more deprived areas have an increased risk of stroke.<sup>37</sup>
- A study in Norfolk found that people living with the greatest levels of social deprivation were two and half times more likely to have a stroke.<sup>38</sup>
- In general, people from more deprived areas are likely to experience more severe strokes.<sup>39</sup>
- A study using data from England, Wales and Northern Ireland found that people with the greatest levels of social deprivation experienced strokes approximately five years earlier in their lives, compared to the least deprived.
- On average, people from low and middle income countries have strokes at a younger age than people from higher income countries.<sup>7</sup>

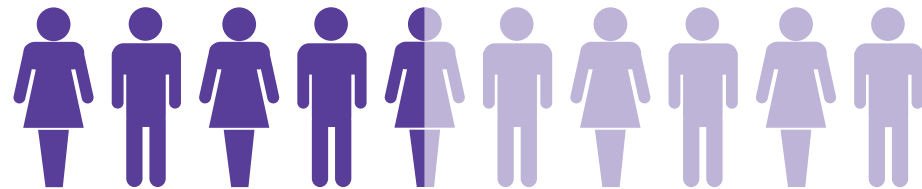
# Surviving stroke

- Across the globe, more people are surviving stroke than ever before.<sup>7</sup>
- There are over 1.2 million stroke survivors in the UK.<sup>39 40 41 42</sup>
- Scotland has the largest percentage of the population who are stroke survivors, and the highest mortality rate of the UK nations.
- The percentage of people in Scotland surviving for more than 30 days after their stroke has slightly improved in the last decade, from 81% in 2007, to 85% in 2016.

## Percentage of UK population who are stroke survivors

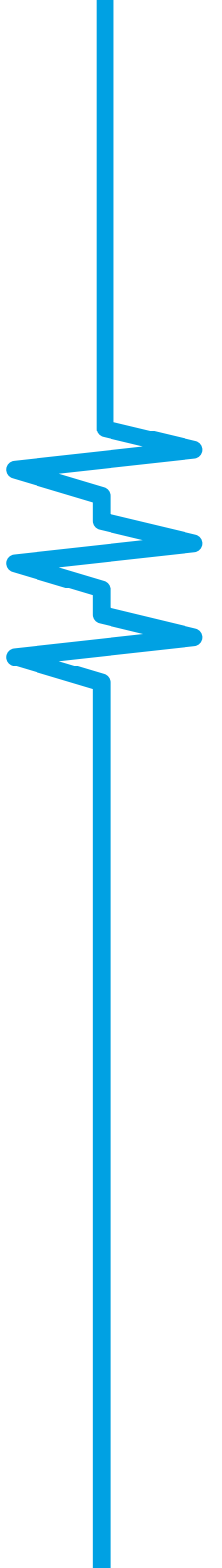


- More than 8 out of 10 stroke patients in England, Wales and Northern Ireland survive their stay in hospital, and two thirds of stroke survivors are able to return home and live independently or with support in their own homes.<sup>5</sup>
- 9 out of 10 stroke survivors in England, Wales and Northern Ireland have returned to living at home six months after their stroke.
- A quarter of all stroke survivors in England, Wales and Northern Ireland live alone after their stroke.<sup>5</sup>
- Almost half (45%) of stroke survivors feel abandoned after they leave hospital.<sup>43</sup>



**45%** of all stroke survivors

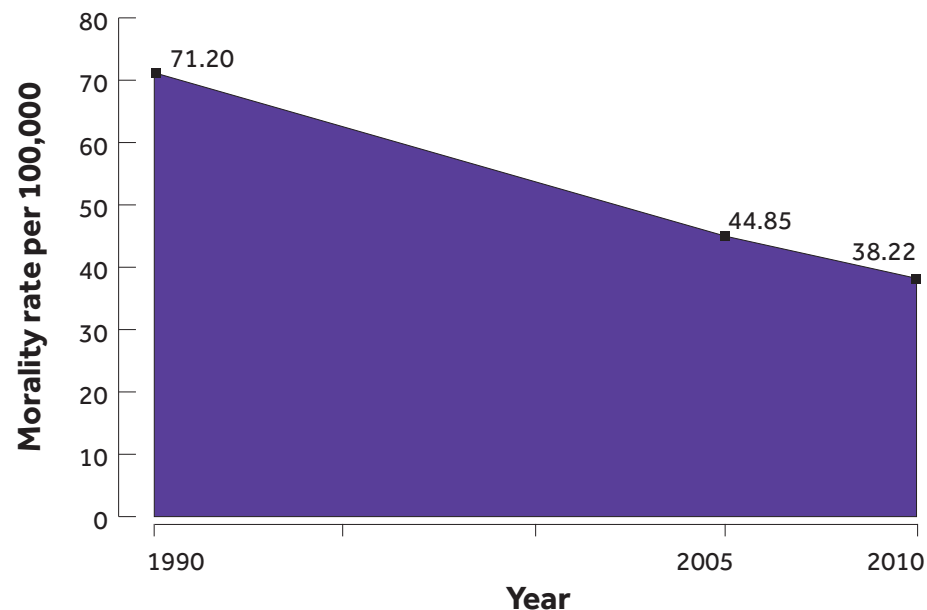
feel abandoned when they leave hospital.



# Deaths from stroke in the UK

- Stroke is the fourth biggest killer in the UK.<sup>25 26 27</sup>
- Stroke is the fourth single leading cause of death in England and Wales, and the third biggest cause of death in Scotland and Northern Ireland.<sup>25 26 27</sup>
- In 2016, almost 38,000 people died of stroke in the UK. That's a life lost every 13 minutes.<sup>25 26 27</sup>
- 1 in 14 deaths are caused by stroke in the UK. This is equivalent to 6% of all deaths in men, and 7% of all deaths in women.<sup>25 26 27</sup>
- 1 in 8 strokes are fatal within the first 30 days.<sup>44</sup>
- Stroke death rates in the UK fell by almost half in the period from 1990 to 2010.<sup>7</sup>
- In 2016, stroke caused almost twice as many deaths in women as breast cancer.<sup>25 26 27</sup>
- In men, stroke causes 5,000 more deaths a year than prostate cancer.<sup>25 26 27</sup>

## Stroke mortality trend in the UK



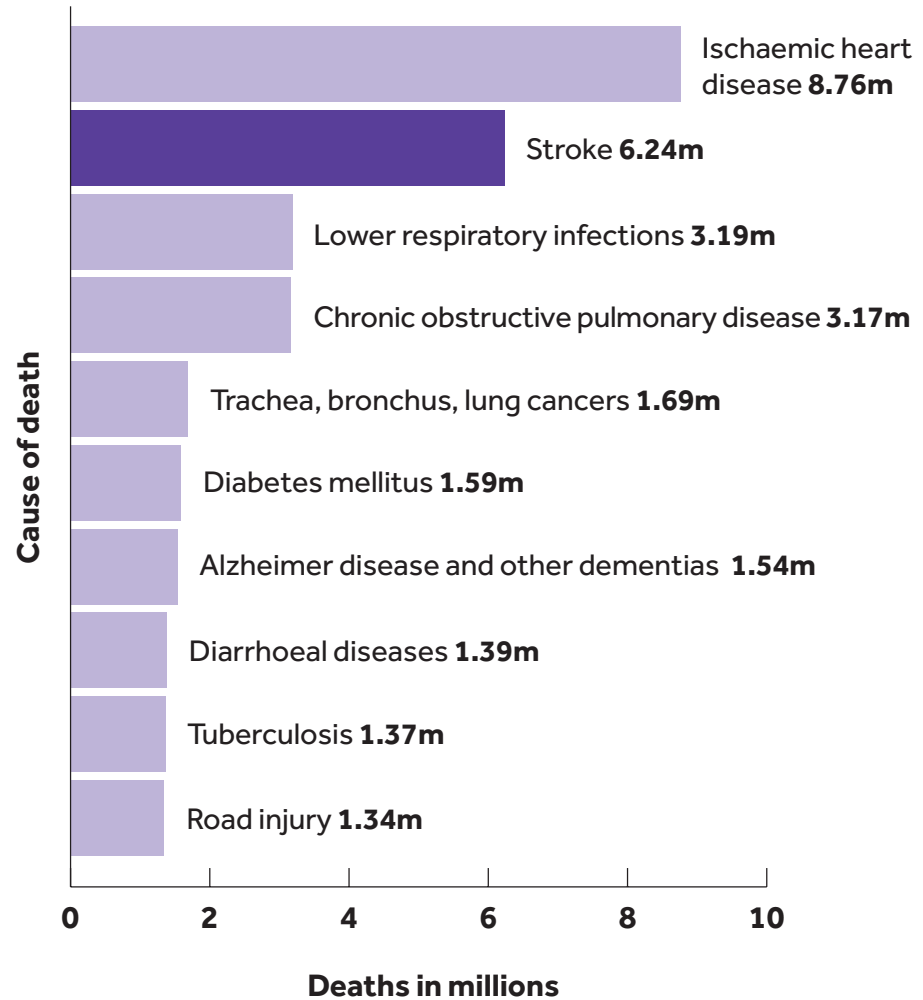
## Deaths from stroke (2016)

Country	Male	Female	Total
England and Wales	13,877	18,750	<b>32,627</b>
Scotland	1,712	2,430	<b>4,142</b>
Northern Ireland	434	568	<b>1002</b>
<b>Total</b>	<b>16,023</b>	<b>21,748</b>	<b>37,771</b>

# Stroke worldwide

- Stroke is the second leading cause of death worldwide.<sup>45</sup>
- Every two seconds, someone in the world will have a stroke.
- In 2016, there were almost 14 million incidences of first-time strokes worldwide.<sup>46</sup>
- Stroke causes around 6.2 million deaths each year, taking a life every five seconds.<sup>47</sup>
- Worldwide stroke-related illness, disability and early death is set to double in the next 15 years (by 2035).<sup>7</sup>
- Almost 1 in 8 (12%) deaths worldwide are caused by stroke.<sup>48</sup>

## Top 10 causes of death globally 2015





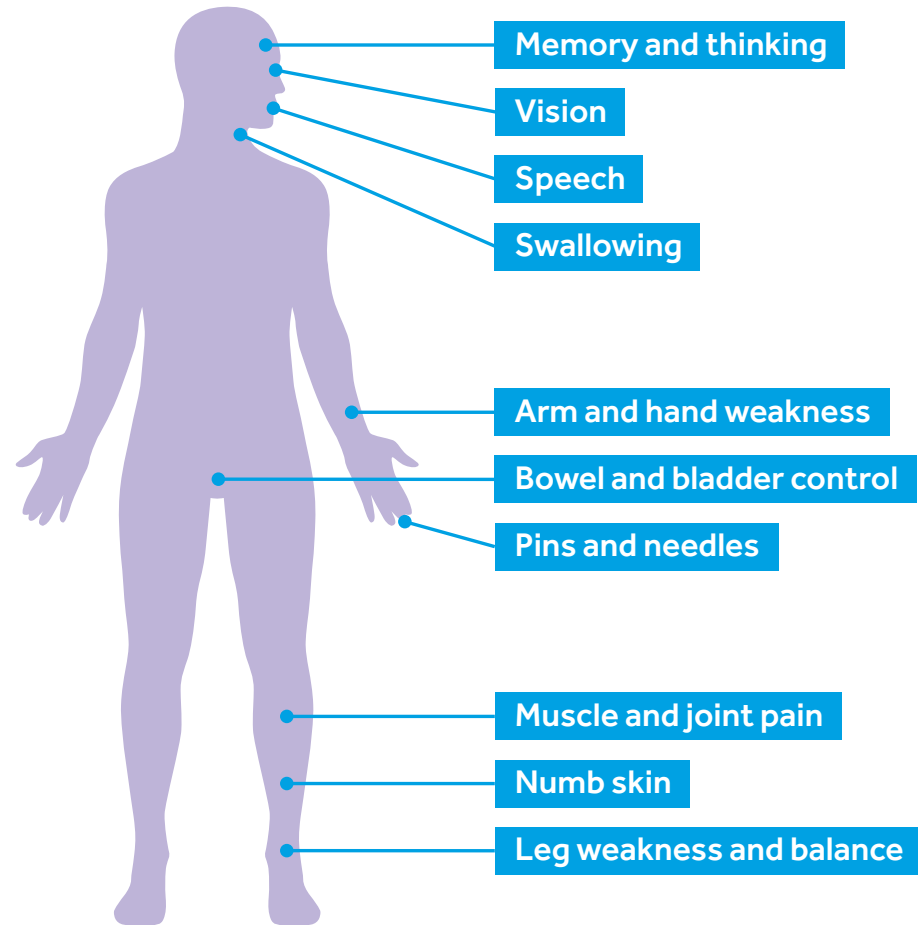
# The devastating effects of stroke

# The devastating effects of stroke

- The effects of a stroke depend on where it takes place in the brain, and how big the damaged area is.
- Stroke is a leading cause of disability in the UK. Almost two thirds of stroke survivors in England, Wales and Northern Ireland leave hospital with a disability.<sup>48</sup>
- Stroke causes more disabilities than any other condition.<sup>49</sup>
- In England, Wales and Northern Ireland, 84% of patients leave hospital requiring help with their daily living activities (occupational therapy), but 20% of those who need help will not receive it.<sup>5</sup>

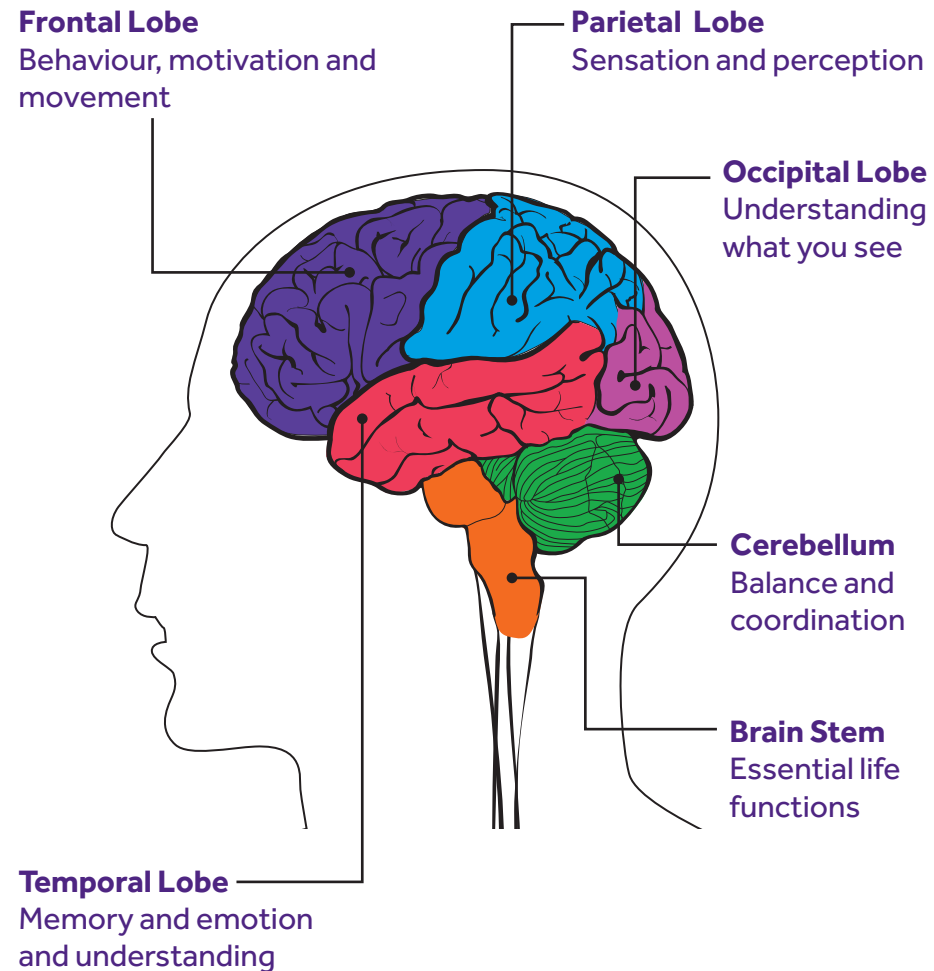
## Some of the effects of stroke are:

- weakness in arms and legs
- problems with speaking, understanding, reading and writing
- swallowing problems
- vision problems
- losing bowel and bladder control
- pain and headaches
- fatigue – tiredness that does not go away with rest
- problems with memory and thinking
- eyesight problems
- numb skin, pins and needles.



# Living with the effects of stroke

- In a survey of over 1,000 stroke survivors conducted in 2015, 4 in 10 people told us the physical impact of stroke was the hardest to deal with.<sup>49</sup>
- It is estimated that 60% of stroke survivors have vision problems immediately after their stroke. This reduces to about 20% by three months after stroke.<sup>50</sup>
- Limb weakness is common after stroke:
  - More than three quarters of stroke survivors report arm weakness, which can make it difficult for people to carry out daily living activities, such as washing and dressing.
  - Almost three quarters of stroke survivors report leg weakness<sup>51</sup>, which can make walking and balancing more difficult.
- Today, around one million stroke survivors across England, Wales and Northern Ireland require further care after being discharged from hospital.<sup>52</sup>
- In Scotland, more than half of stroke survivors need the assistance of another person to be able to walk.<sup>6</sup>
- Loss of bladder and bowel control (incontinence) is a common problem for stroke survivors. Around half of stroke survivors experience problems with bladder control.<sup>52</sup>



## Communicating after stroke

- Around a third of stroke survivors experience some level of aphasia, which affects their ability to speak, write, read or understand what others say.
- Aphasia is a language and communication disorder caused by damage to the language centres of the brain.
- Stroke can also cause dysarthria, a weakness in the facial muscles which makes it difficult to speak clearly; and apraxia, a condition which makes it difficult to move or coordinate the face, mouth and throat muscles needed for speech.
- Communication problems tend to improve quite quickly, usually within the first three to six months.<sup>53</sup>
- However, between 30-40% of those affected will remain severely affected in the long term.<sup>54</sup>
- Around half of all stroke survivors in England, Wales and Northern Ireland require speech and language therapy after a stroke. However, only half of the people who need this therapy to aid their recovery actually receive it.<sup>5</sup>
- This means that more than half of the stroke survivors who need help to communicate have to go without the support they need.<sup>5</sup>
- A recent study found that 44% of stroke survivors experiences severe anxiety as a result of their aphasia.<sup>55</sup>

## Impact on swallowing and breathing

Swallowing is a complicated task, which needs your brain to coordinate lots of different muscles. If a stroke damages the parts of your brain needed to do this, it can affect your ability to swallow. Doctors use the term dysphagia to describe problems with swallowing.

If you can't swallow safely then food and drink may be getting into your airways and lungs. This is called aspiration. It can lead to infections and pneumonia, so it's extremely important that swallowing problems are identified early.

Everyone who has a stroke should be checked to see whether they can swallow safely. This should happen within the first few hours after arriving at the hospital.

- Around half of all stroke survivors have problems swallowing. This can make eating and drinking difficult. Delays in hospital assessments for swallowing are associated with a higher risk of pneumonia.<sup>56</sup>
- In England, Wales and Northern Ireland, 1 in 3 patients are not assessed to see if they can swallow properly within the recommended time window of four hours. 1 in 5 patients is not assessed at all.<sup>5</sup>
- In Scotland, 1 in 3 patients is not assessed to see if they can swallow properly, however this is improving every year.<sup>6</sup>
- In England, Wales and Northern Ireland, 8% of stroke survivors contract pneumonia within seven days of being discharged from hospital.<sup>5</sup>



## Emotional Impact of Stroke

- Emotionalism, or difficulty controlling emotional responses such as crying or laughing, is common after stroke. Emotionalism affects about 1 in 5 stroke survivors in the first six months after stroke.<sup>57</sup>
- In a 2015 Stroke Association survey of over 1000 stroke survivors, 1 in 5 told us the emotional impact of stroke was hard to deal with.<sup>50</sup>
- 42% of people report a negative change in their relationship with their partner after a stroke.<sup>58</sup>
- A quarter of people report that stroke had a negative impact on their family.<sup>62</sup>

## Cognitive impairment and psychological impacts of stroke

- Fatigue is common after a stroke: half of stroke survivors report fatigue. It can affect many aspects of daily life. It can be a serious problem for people returning to work and is associated with depression after stroke.<sup>1</sup>
- Stroke can affect your mood, and cause changes in the way you feel. Around a third of stroke survivors experience depression after their stroke.<sup>61,59</sup>
- Over half of stroke survivors experience symptoms of anxiety at some point within the ten years of their stroke.<sup>60</sup>
- Cognitive impairments include problems with thinking, memory, concentration and practice such as basic arithmetic, and can make simple tasks very difficult.<sup>61</sup>
- Some stroke survivors experience apraxia (sometimes called dyspraxia), which affects their ability to plan tasks and order the steps they need to take in their heads, making it difficult to complete daily tasks such as making a cup of tea.
- Neglect is another cognitive impairment which can occur after stroke. Neglect occurs when your brain has difficulty processing information from your body. If your stroke has caused loss of movement in one arm or leg it might feel like this is not part of your body.



## Vascular dementia

Cognitive impairments after a stroke may improve in some patients, but in others it may worsen and develop into dementia.

Vascular dementia has similar symptoms to other types of dementia, including difficulties with understanding and responding to things quickly; struggling to remember things; and problems concentrating. The main difference is that vascular dementia is caused by a loss of blood supply to the brain, which often happens over a long period of time.

Vascular dementia can happen through a single stroke or a series of strokes, and is linked to small vessel disease. Small vessel disease is caused by the narrowing of small blood vessels deep inside the brain. At the moment relatively little is known about how to diagnose, treat or prevent vascular dementia.

- 20% of all people with dementia in the UK have vascular dementia. Another 10% of people are diagnosed with mixed dementia, which could consist of a combination of dementia types like Alzheimer's disease and vascular dementia.<sup>62</sup>
- It is estimated that around 7 out of 10 65-year-olds and almost all 90-year-olds show signs of small vessel disease in the brain.<sup>63 64</sup> This is thought to be a contributing factor in 4 out of 10 dementias.<sup>65</sup>
- Stroke and vascular dementia are both consequences of small vessel disease of the brain.<sup>66</sup>
- A recent study has found that up to 1 in 3 stroke survivors are at risk of developing [vascular] dementia within five years.<sup>67</sup>
- Three quarters (75%) of dementia cases in stroke survivors are thought to be caused by vascular dementia.<sup>71</sup>
- Vascular dementia is a condition strongly linked to stroke, and there is currently no proven treatment.<sup>68</sup>
- People live an average of five years after being diagnosed with vascular dementia.
- People with vascular dementia are most likely to die from a stroke or a heart attack.<sup>69</sup>



# Stroke risk factors and prevention

# Stroke risk factors and prevention

- Some stroke risk factors are known as modifiable risk factors: aspects of people's lifestyle that can be managed or improved through their own behaviour. Managing modifiable risk factors, such as poor diet, smoking or being overweight can help with other risk factors, such as high blood pressure and diabetes, and in turn reduce stroke risk.
- A large international study published in 2016 found that 10 modifiable risk factors cause 9 out of 10 strokes worldwide.<sup>7071</sup>



<b>Modifiable:</b> risk factors under your control <sup>72</sup>	<b>Non modifiable:</b> risk factors out of your control <sup>72</sup>
High blood pressure	Age
High blood cholesterol	Ethnicity
Diabetes (type 2)	Gender
Being overweight	Family history of heart disease
Smoking	History of heart disease
Alcohol consumption	PFO (hole in the heart)
Drug use	Diabetes (type 1)
No physical exercise	Atrial Fibrillation



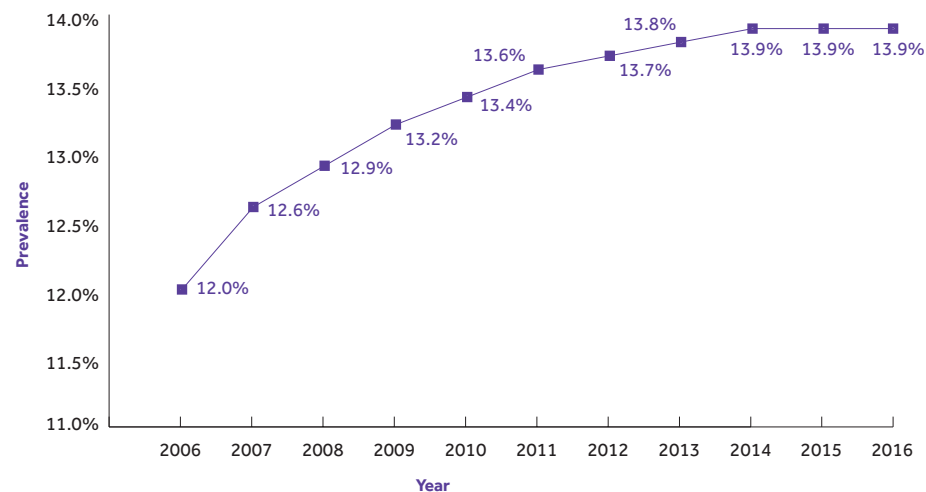
# High blood pressure

- Having high blood pressure can triple your risk of stroke and heart disease.<sup>73</sup>
- High blood pressure is a contributing factor in around half of strokes in England, Wales and Northern Ireland.<sup>5</sup>
- There are 9.5 million people in the UK diagnosed as having high blood pressure, also known as hypertension.<sup>41 42 43 44</sup> That is 1 in 7 people in the UK.
- The number of people diagnosed as having high blood pressure has consistently increased since 2005.<sup>41 42 43 44</sup>
- For every 10 people diagnosed with high blood pressure, seven remain undiagnosed and untreated.<sup>74</sup>
- In England, 5.5 million people are living undiagnosed with high blood pressure.<sup>75</sup>
- Treatment for high blood pressure significantly reduces the risk of stroke, heart attack and heart failure. Every 10 mmHg reduction in systolic blood pressure reduces the risk of stroke and heart attack by 20%.<sup>78</sup>

## Prevalence of high blood pressure in 2016

Country	% adults with high blood pressure
Wales	15.6%
Scotland	14.1%
England	13.8%
Northern Ireland	13.3%
<b>UK average</b>	<b>13.9%</b>

## Prevalence of high blood pressure in the UK



Blood pressure is the measure of how strongly blood presses against the walls of the arteries when it is pumped around the body. Blood pressure is measured in millimetres of mercury (mmHg) and is given as two figures:

1. systolic pressure – the pressure your arteries experience when your heart beats.
2. diastolic pressure – the pressure when your heart rests between beats.

**Normal blood pressure is around 120/80.**

**High blood pressure is considered to be 140/90 or higher.**

# Diabetes

Diabetes is a condition that causes a person's blood sugar (glucose) levels to become too high. Persistently elevated glucose levels from diabetes can raise the likelihood of atherosclerosis, where the blood vessels become clogged up and narrowed by fatty substances. This can increase the risk of stroke.<sup>79</sup>

## There are two main types of diabetes.<sup>76</sup>

1. Type 1 diabetes develops when the immune system attacks and destroys the cells producing insulin. Insulin is a hormone that moves glucose from the bloodstream into body cells to produce energy.
2. Type 2 diabetes develops when the body does not produce enough insulin or when the body does not react to it in the right way. This type of diabetes is largely preventable and manageable. It is mainly caused by being overweight; however family history, ethnicity, age and genetics may also play a part.



- Type 2 diabetes almost doubles the risk of stroke within the first five years of diagnosis, and is a contributing factor in up to 1 in 5 strokes in England, Wales and Northern Ireland.<sup>5</sup>
- There are 3.6 million adults diagnosed as diabetic in the UK, which is about 5% of the population.<sup>41 42 43 44</sup>
- 9 out of 10 (90%) diabetes cases are type 2.<sup>77</sup>
- It is estimated there are another one million people with undiagnosed diabetes in the UK. This includes both types of diabetes.
- Obese people are 80 times more likely to develop diabetes than a healthy person with a BMI under 22.<sup>78</sup>

Country (2016-17)	% with diabetes
England	6.67 %
Wales	5.9%
Scotland	5.0%
Northern Ireland	4.71%
<b>UK total</b>	<b>5.5%</b>



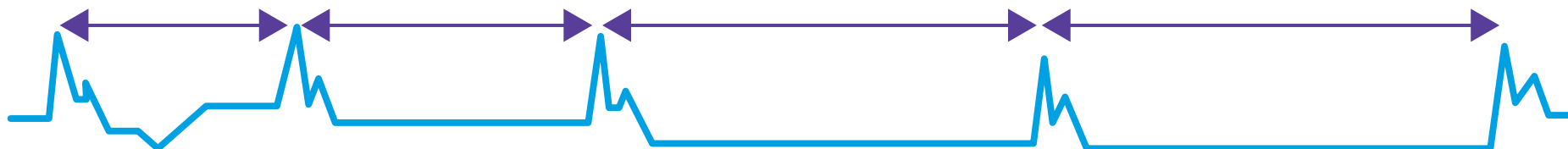
# Atrial fibrillation (AF)

- Atrial fibrillation (AF) is a heart condition that causes an irregular and often abnormally fast heartbeat.
- There are about 1.2 million people with AF in the UK.<sup>41 42 43 44</sup>
- It is estimated there could be another half a million people in the UK with undiagnosed AF.<sup>79</sup>
- People with AF are five times more likely to have a stroke.
- AF is a contributing factor in up to 1 in 5 strokes in the UK.<sup>5 6</sup>

## Treatment for AF

- Anticoagulant drugs, such as warfarin, can be given to people with AF to reduce the risk of blood clots forming.
- Anticoagulants continue to be under-prescribed. In the UK, around a quarter of eligible patients with AF do not receive anticoagulant drugs. But, this is improving year on year.<sup>81</sup>
- Some studies suggest the reason for this is that people tend to be prescribed antiplatelet medicines such as aspirin, even though they have been found to be less effective in stroke prevention.<sup>82</sup>
- It is estimated that if AF were adequately treated, around 7,000 strokes would be prevented and over 2,000 lives saved every year in England alone.<sup>83</sup>
- Anticoagulants have also been found to lower the risk of dementia by 26% in patients with AF.<sup>84</sup>
- Only half of all of the patients with known AF in England, Wales and Northern Ireland are on anticoagulant medication when they go to hospital with a stroke.<sup>5</sup> In Scotland, less than one third of patients with AF are on anticoagulation when they are admitted with a stroke.<sup>6</sup>
- Almost all (97%) of the stroke survivors in England, Wales and Northern Ireland with AF are prescribed anticoagulant medication when they're discharged from hospital.<sup>5</sup> In Scotland, only 68% of stroke survivors are prescribed anticoagulants when they leave hospital.<sup>6</sup>

## Example of AF heartbeat



# Other risk factors

## High cholesterol

- Cholesterol is a fatty substance in the blood. It is vital to the healthy working of the body, but too much cholesterol in the blood can cause fatty deposits to build up in your arteries, restricting blood flow.<sup>85</sup> It can also increase the risk of a blood clot developing, which can lead to stroke. Cholesterol is carried in your blood by proteins and when they combine they form lipoproteins. There are two types of lipoprotein:
- **high-density lipoprotein (HDL)** – is known as 'good' cholesterol, because it carries 'bad' cholesterol away from the cells and to the liver, where it is broken down or processed out of the body as waste.
- **low-density lipoprotein (LDL)** – carries cholesterol to the cells that need it. It is often known as 'bad' cholesterol because if there's too much it can build up on the artery walls.

It is the overall balance of good and bad cholesterol in the body that affects your risk of having a stroke. The recommended levels of cholesterol vary between people who have high and low risk of developing arterial disease.

As a general guide, 'bad' cholesterol (LDL) levels should be:<sup>89</sup>

- 3mmol/L or less for healthy adults
- 2mmol/L or less for those at high risk.
- Statins are medicines which limit the production of 'bad' cholesterol in the liver.<sup>86</sup> The use of statins in people at high risk of cardiovascular events reduces the risk of stroke by 25%.<sup>87</sup>
- Reducing cholesterol by 1mmol/L reduces stroke risk by 21%.<sup>88</sup>
- Daily consumption of oats and barley can help maintain healthy levels of cholesterol.<sup>89</sup>
- Consumption of 'good fats' (monosaturated and polysaturated) like the ones found in nuts, avocados, and fish contributes to healthy levels of cholesterol. Consumption of saturated fats, like the ones found in meat and dairy, can increase cholesterol levels in the blood. Foods containing trans fats, such as crisps, cookies, and fried foods, have the most impact on cholesterol levels.<sup>90</sup>

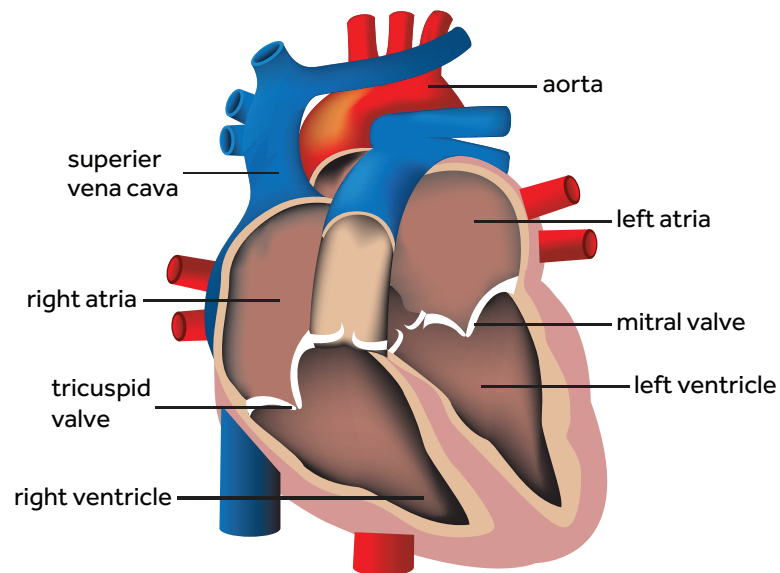


# Other risk factors

## A hole in the heart (PFO)

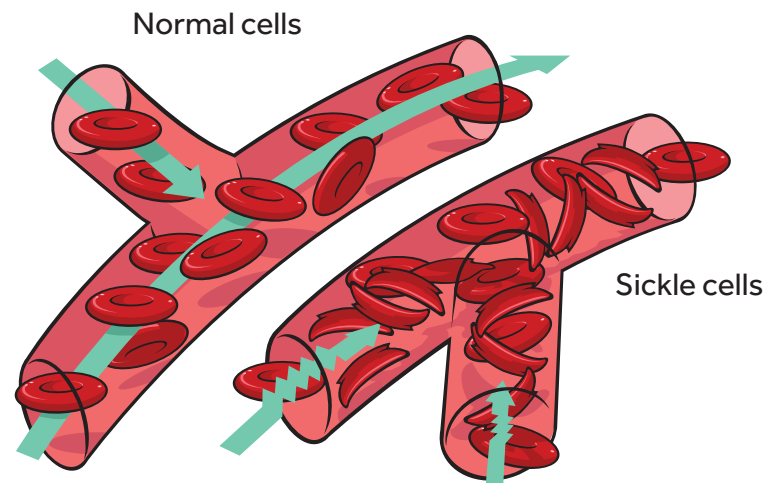
- A patent foramen ovale (PFO or hole in the heart) is an opening between the left and right upper chambers of the heart. This hole normally closes at birth, but in as many as one in four people it remains open.
- A PFO is thought to increase stroke risk because it will allow a clot to travel through the heart and to the brain.
- However, it's unclear whether a PFO increases the risk of stroke, as some studies have shown that someone with a PFO is at no higher risk of stroke than someone who does not have a PFO.<sup>91</sup>

## Parts of the human heart



## Sickle cell disease

- Sickle cell disease is a disorder which affects the red blood cells. These are usually round and flexible to enable them to carry oxygen around the body.
- In people with sickle cell disease, red blood cells become crescent (or sickle) shaped. This can lead them to clog up blood vessels, causing health problems and increasing the risk of stroke.
- Sickle cell disease mainly affects people of African, African-Caribbean, South Asian and Mediterranean heritage.<sup>92</sup>
- A quarter of people with sickle cell disease will have a stroke before the age of 45.<sup>35</sup>
- Children with sickle cell disease are over 300 times more likely to have a stroke than children without it.<sup>93</sup>



## Alcohol

- Regular consumption of large amounts of alcohol greatly increases the risk of having a stroke<sup>94</sup>, as it can lead to high blood pressure, diabetes, obesity, and trigger atrial fibrillation. Drinking too much alcohol can also damage the liver and stop it from making substances that help your blood to clot, increasing your risk of having a stroke caused by bleed.
- When asked, 1 in 3 adults in the UK reported drinking more than recommended at least once a week. Drinking over the recommended weekly amount of alcohol was most common among adults aged 55 to 64.<sup>95</sup>
- One study found that heavy drinking (considered as more than two drinks per day) was found to shorten the time to stroke by five years.<sup>96</sup>
- Another study found that drinking more than five drinks a day increases your risk of stroke by 1.6 times.<sup>97</sup>



## Illegal drugs

- Each type of illicit drug has a different effect on the brain and circulatory system, but all can have severe health repercussions which can cause both ischaemic and haemorrhagic strokes in young healthy people.
- A recent study found that 6 out of 10 young adults were actively engaged in smoking, alcohol abuse or illegal drug use at the time of their stroke.<sup>109</sup>
- Marijuana use increases your risk of stroke. Some studies estimated it can increase your risk of heart disease by 30%.<sup>105</sup>
- Cocaine increases the risk of stroke in the 24 hours following use,<sup>106</sup> as it can cause your blood to thicken and can drastically increase your blood pressure.
- A study from 2012 found that 1 in 5 (20%) of those under 45 who had a stroke had used illegal drugs.<sup>107</sup>



## Smoking

- Smoking doubles the risk of dying from a stroke.<sup>98</sup>
- Tobacco smoke contains over 7,000 toxic chemicals, including carbon monoxide, formaldehyde, arsenic and cyanide. These chemicals are transferred from your lungs into your blood stream, changing and damaging cells all around your body, and increasing your risk of stroke.
- Cigarette smoke can affect cholesterol levels, reducing the amount of 'good' cholesterol (HDL) in your blood stream and increasing the amount of 'bad' cholesterol (LDL).
- When you inhale cigarette smoke, carbon monoxide and nicotine enter your bloodstream. The carbon monoxide reduces the amount of oxygen in your blood. Nicotine makes your heart beat faster and raises your blood pressure, increasing your risk of a stroke. Smoking can also trigger an episode of atrial fibrillation.
- The chemicals in cigarette smoke also make platelets in your blood more likely to stick together. This increases the chance of a clot forming.
- 1 in 6 (16%) people in the UK are active smokers<sup>104 105 106 107</sup>, however the number of smokers is rapidly declining.
- There are about 1.9 million visits to UK hospitals a year for conditions related to smoking.<sup>99 100 101 102</sup>
- Shisha smoking carries the same risks as cigarette smoking.
- A study conducted in Sweden on healthy non-smokers showed that 30 minutes of e-cigarette smoking increased heart rate, arterial stiffness, and blood pressure. All of these are factors that can contribute to an increased risk of stroke.<sup>103</sup>
- Despite this, Public Health England has been encouraging switching from tobacco to e-cigarettes if people find it difficult to quit because other studies have found them to be less toxic.<sup>104</sup>



# Stroke treatment and care



It's vital to know how to spot the warning signs of a stroke in yourself or someone else. Using the FAST test is the best way to do this.



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



**Arms:** can they raise both arms and keep them there?



**Speech:** is their speech slurred?

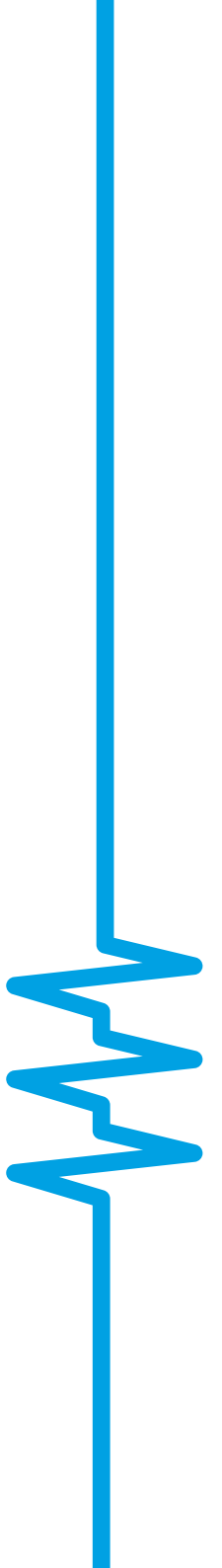


**Time:** to call 999 if you see any single one of these signs of a stroke.

These are the three most common signs of stroke but there are other symptoms you should also take seriously. They include:

- sudden loss of vision or blurred vision in one or both eyes
- sudden weakness or numbness on one side of your body (including your leg)
- sudden memory loss or confusion
- sudden dizziness, unsteadiness or a sudden fall, especially with any of the other symptoms.
- Almost a third of people who went to hospital with a stroke in England, Wales and Northern Ireland in 2016–17 did not know what time their symptoms started.<sup>5</sup>
- An estimated 1.9 million neurons are lost every minute a stroke is untreated.

- 80% of people having a stroke in England, Wales and Northern Ireland arrived at hospital by ambulance.<sup>5</sup>
- In England, Wales and Northern Ireland, about half of patients who go to hospital while having a stroke receive a brain scan within an hour of arriving, and almost 9 out of 10 of stroke patients receive a brain scan within 12 hours.<sup>5</sup>
- In Scotland, 9 in 10 patients receive a brain scan within 24 hours of admission.<sup>6</sup>
- It takes an average of seven and half hours from the onset of symptoms to be admitted to a stroke unit across England, Wales, and Northern Ireland.<sup>5</sup>
- In Scotland, 8 out of 10 people are admitted to a stroke unit within 24 hours.<sup>6</sup>
- In Scotland, less than 70% of stroke patients receive the complete stroke care bundle (a group of intervention processes, which together can significantly improve the patient's outcomes).<sup>6</sup>



- A stroke unit is a specialist hospital ward where stroke patients are cared for by a team of professionals who specialise in stroke care.<sup>109</sup>
- Stroke patients who are cared for on stroke units are more likely to be alive and living independently one year after having a stroke than those cared for on other wards.<sup>110</sup>
- In England, Wales and Northern Ireland, 9 out of 10 (96%) stroke patients are cared for on a stroke unit.<sup>5</sup>
- In 2016, 82% of patients in Scotland were cared for at a stroke unit; this is a significant improvement from 2015, when only 78% of patients were cared for on a stroke unit.<sup>6</sup>
- According to NICE (National Institute for Health and Clinical Excellence), 1 in 20 strokes in Wales, England and Northern Ireland are treated in hospital facilities which are not adequate.<sup>5</sup>
- Stroke care is improving in England, Wales and Northern Ireland. Four years ago, 20% of stroke patients were treated in general wards rather than a stroke unit. Now, 17% of patients are treated in facilities other than stroke units.<sup>5</sup>
- 4 out of 10 hospitals in England, Wales and Northern Ireland have a shortage of stroke consultants.<sup>111</sup>
- In England, Wales and Northern Ireland, only 51% of hospitals have adequate numbers of senior nurses to treat stroke patients.<sup>5</sup>

## Hyper-acute stroke units (HASU)

HASUs are a type of stroke unit that exist in some hospitals in the UK.

HASUs bring experts and specialist equipment for the emergency treatment of stroke under one roof to provide world-class treatment, 24 hours a day, seven days a week. This model was first adopted in London and then in Greater Manchester.

In London, the HASU model saves about 96 extra lives a year; and in Greater Manchester, they have reduced the length of hospital stays by two days. Other areas across the UK are centralising their acute stroke care and introducing the HASU model.



# Treatments for ischaemic stroke (due to a clot )

## Clot-busting treatment (thrombolysis)

Thrombolysis is a treatment that uses drugs to break down and disperse a clot for people who have had an ischaemic stroke. It is licensed to be used up to four and a half hours from the onset of stroke symptoms.<sup>112 113</sup>

- In 2016-2017, more than half of the patients who received the clot-busting treatment, thrombolysis, in the UK received it within an hour of arriving in hospital. If the time when symptoms started is unknown, or it is more than four and a half hours after symptoms started, the treatment cannot be provided.<sup>5 6</sup>
- Clot-busting drugs increase the chance of a good outcome by 30%.<sup>114</sup>
- 12% of stroke cases in England, Wales and Northern Ireland are eligible to receive thrombolysis<sup>5</sup>, equivalent to around 10,000 people. Of these, 85% received thrombolysis treatment in 2016.<sup>5</sup>
- In Scotland eight years ago, only 3% of all stroke patients received thrombolysis; today 10% receive it. Half of these received thrombolysis within one hour of their arrival in hospital.<sup>6</sup>
- 6 out of 10 patients in England, Wales and Northern Ireland arrived at hospital after the four and a half hour time window, or had a stroke during their sleep so the time could not be calculated.<sup>5</sup>
- The average door-to-needle time (the time gap between the patient's arrival at the emergency department and being administered anaesthetic) in the UK is around 55 minutes.<sup>5 6</sup>
- The number of patients who survive a stroke and are able to return to their lives without any added assistance increases by 2% when thrombolysis is given within three hours.<sup>115</sup>

## Mechanical clot retrieval (thrombectomy)

Thrombectomy is a procedure used to mechanically pull a blood clot out of the brain. It can be performed up to six hours after a stroke.

- Although a relatively small number of patients are eligible for thrombectomy, it is shown to provide significant benefits and NICE guidance says it is safe and effective.<sup>116</sup>
- There are a few centres where thrombectomy is available in the UK, but there are currently not enough trained professionals for the service to be rolled out across the UK:
  - Almost a third of hospitals have no access to thrombectomy either on site or by referring to another hospital.<sup>114</sup>
  - In order to have full UK coverage 150 trained consultants are required. However, in 2016 only 83 consultants across England, Wales, and Northern Ireland could undertake the procedure."
- The adoption of thrombectomy treatment has been slow in the UK compared to Germany, France and the US. However over 400 patients received thrombectomy in England, Wales and Northern Ireland in 2015-16.<sup>114</sup>
- In Scotland, fewer than 10 thrombectomies took place 2015 and 2016.<sup>5</sup>
- Clot retrieval treatment increases the chance of a good outcome by more than 50%.<sup>117</sup>



# Rehabilitation and life after stroke support

## Rehabilitation

- Patients receive post-acute treatment after their stay in hospital. This happens when patients are considered clinically stable and the focus moves to their ongoing rehabilitation, or which occurs in rehabilitation units where patients are transferred following their treatment in a stroke unit.
- One million stroke survivors in England, Wales and Northern Ireland need post-acute care.<sup>118</sup>
- Although the biggest steps in recovery are usually in the first few weeks after a stroke, the brain's ability to 're-wire' itself, known as neuroplasticity, means it is possible to continue to improve for months or years.<sup>119</sup>
- In England, Wales and Northern Ireland, over a third of stroke survivors are discharged to an Early Supported Discharge (ESD) or community rehabilitation team. The majority of stroke survivors discharged via these routes are cared for by stroke or neurology specialist teams.<sup>5</sup>
- 2 out of 10 hospitals in England, Wales and Northern Ireland do not offer ESD services.<sup>114</sup>
- Only approximately half of the stroke survivors in England, Wales, and Northern Ireland are discharged from hospital having been assessed for all appropriate therapies and with agreed goals for their rehabilitation.<sup>5</sup>

**Early Supported Discharge (ESD):** stroke survivor's rehabilitation care, coordinated by a team of therapists, nurses and a doctor, at home rather than in hospital.



# Rehabilitation and life after stroke support

## Life after stroke support

- In England, Wales and Northern Ireland, only 3 out of 10 stroke survivors who need a six month assessment receive one.<sup>5</sup> A six month review monitors how well stroke survivors are recovering and identifies additional, tailored support that may be needed to prevent unnecessary readmissions to hospital and care homes.
- 1 in 5 stroke survivors in England Wales and Northern Ireland ask for psychological support at their six month review.<sup>5</sup> However, stroke survivors wait an average of 10 weeks after referral to receive psychological treatment.<sup>114 121</sup>
- Only 15% of post-acute services in England, Wales and Northern Ireland have the resources to help people return to work after their stroke.<sup>121</sup>
- 1 in 3 areas in England, Wales and Northern Ireland do not provide support to the carers and families of stroke survivors.<sup>121</sup>
- 1 in 5 commissioning areas in England, Wales and Northern Ireland do not offer access to speech and language therapy for stroke survivors.<sup>121</sup>

## Guideline for six month reviews

The new National Clinical Guideline for Stroke published in 2016 recommends that stroke survivors, including those living in a care home, should be offered a structured health and social care review at six months and one year after the stroke, and then annually. The review should consider whether further interventions are needed, and the person should be referred for further specialist assessment if:

- new problems are present
- the person's physical or psychological condition, or social environment has changed.



# Economic impact of stroke

# The cost of stroke to health and social care

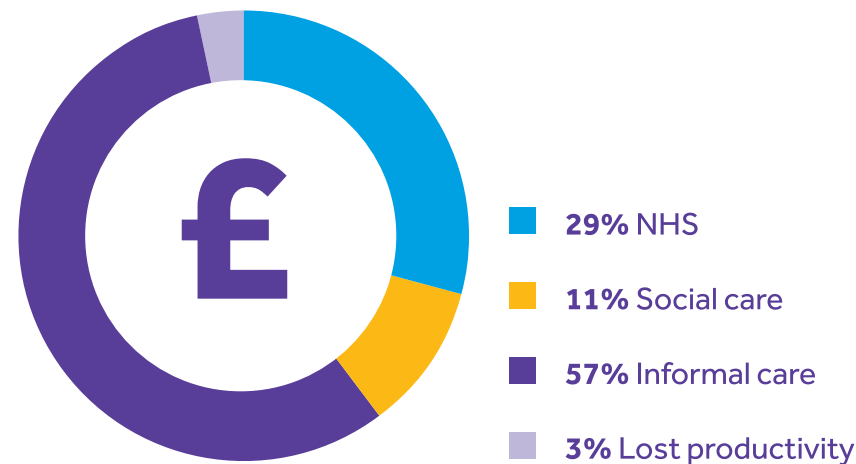
## The cost of stroke to society

- The economic burden of stroke falls on different sectors of society. Every new case of stroke represents significant costs to the NHS, social care services, the stroke survivor and their family, and may signify a loss of productivity for the economy (when stroke survivors or their carers can no longer work). These costs are borne by different people throughout the stroke pathway.
- The estimated cost of stroke to UK society is £26 billion a year.<sup>9</sup>
- The total cost to UK society for all new cases of stroke is £5.3 billion a year.<sup>9</sup> Around 30% of this sum will be costs to the NHS.<sup>9</sup>
- The informal care sector (relatives and friends providing care) contributes a total of £15.8 billion a year to look after someone who's had a stroke.<sup>9</sup>
- The older you are when you have a stroke, the more expensive the care.<sup>112</sup>
- The NHS could save £4,100 over five years for each stroke patient given thrombolysis, and £1,600 over five years for each patient discharged with Early Supported Discharge, because of better health-related outcomes.<sup>112</sup>

## Current and future costs of stroke to society by nation (in £ millions)<sup>9</sup>

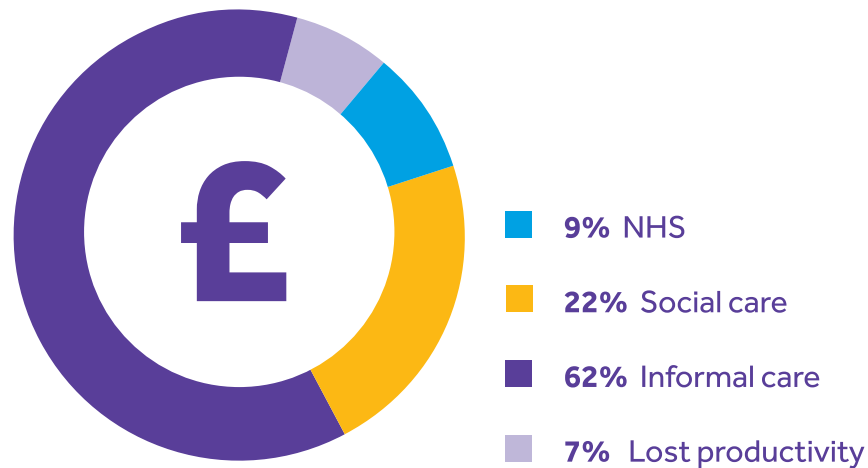
Nation	2015	2035
England	22,514	66,487
Wales	1,008	2,776
Scotland	1,620	4,572
Northern Ireland	484	1,510

## Cost of strokes, by sector (incidence)<sup>9</sup>



# The cost of stroke to health and social care

## Cost of people living with the effects of stroke, by sector (prevalence) <sup>9</sup>



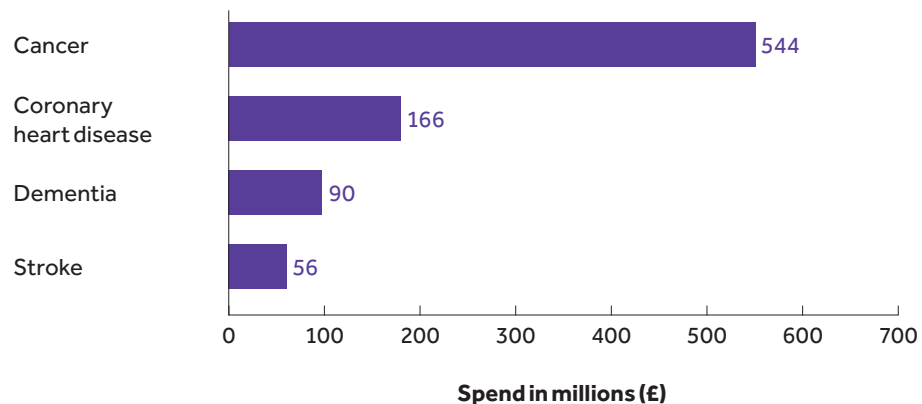
## Financial impact on the individual

- It is difficult to estimate the financial burden of stroke to the family, as each case is unique.
- One report estimates the average cost of stroke to a family in the UK is £22,377.<sup>126</sup>
- The report claims the costs may vary between £5,000 and £100,000, depending on how severe the impacts of the stroke are.<sup>123</sup>
- People of working age who have had a stroke are two to three times more likely to be unemployed 8 years after their stroke.<sup>124</sup>
- Around 1 in 6 stroke survivors experience a loss of income after stroke.<sup>62</sup>
- Almost a third of stroke survivors say they have to spend more on daily living costs.<sup>62</sup>



# Research spend in the UK

## Total government and charity research funding

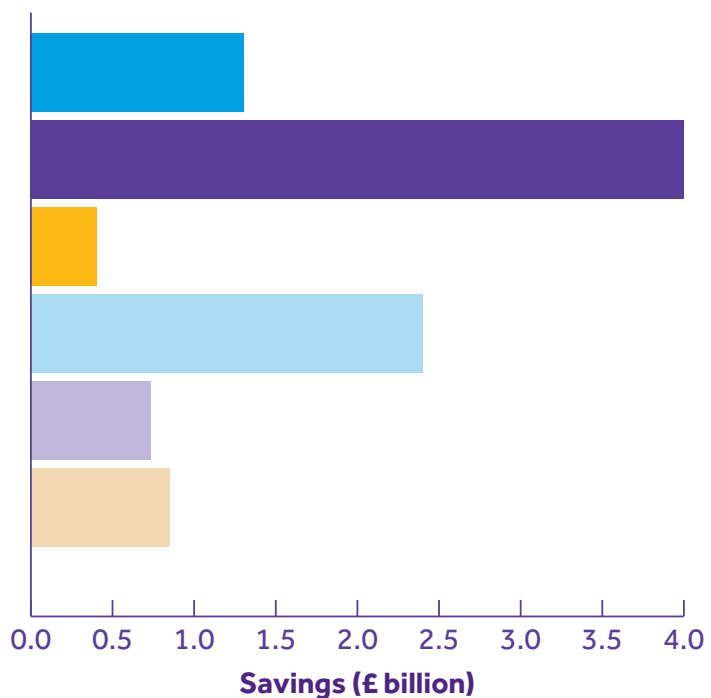


In 2012, government and charities spent £56 million on stroke research in the UK. This figure is dwarfed when compared to the amount spent on cancer research (£544 million). Stroke also receives considerably less funding from the government and charities than coronary heart disease (£166 million) and dementia research (£90 million).<sup>128</sup>

£48 is spent on stroke research for each person in the UK who had a stroke. This is a one fifth of the amount spent on cancer research (£241) and less than half of that spent on dementia research (£118).<sup>125</sup>

## Potential savings to society for £10 million investment in research

A recent study concluded that research in each of the below five priority research areas could generate benefits that would substantially decrease the costs of stroke to society by 2035.<sup>9</sup>



- Evidence-based practice: treatment improving stroke survival
- Evidence-based practice: improved stroke prevention
- Thrombectomy
- Vascular dementia
- Cognitive rehabilitation
- Physical rehabilitation



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## We are the Stroke Association

We believe in life after stroke. That's why we support stroke survivors to make the best recovery they can. It's why we campaign for better stroke care. And it's why we fund research to develop new treatments and ways of preventing stroke.

**We're here for you. Together we can conquer stroke.  
If you'd like to know more please get in touch.**

**Stroke Helpline:** 0303 3033 100

**Website:** [stroke.org.uk](http://stroke.org.uk)

**Email:** [info@stroke.org.uk](mailto:info@stroke.org.uk)

**From a textphone:** 18001 0303 3033 100

We are a charity and we rely on your support to change the lives of people affected by stroke and reduce the number of people who are struck down by this devastating condition.

**Please help us to make a difference today.**



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