

Stroke Needs Assessment

Hackney and the City of London

2016-17

City and Hackney Public Health Team

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Abbreviations used in this report

ACRT	Adult Community Rehabilitation Team
AF	Atrial Fibrillation
APHO	Association of Public Health Observatories
BME	Black and minority ethnic
BMI	Body Mass Index
CCG	Clinical Commissioning Group
CEG	Clinical Effectiveness Group (Queen Mary University)
CHD	Coronary heart disease
CVD	Cardiovascular disease
DALYs	Disability Adjusted Life Years
DOAC	Direct oral anticoagulant
ESD	Early supported discharge
GLA	Greater London Authority
HASU	Hyper acute stroke unit
HDL	High-density lipoprotein
IIT	Integrated Independence Team
IMD	Index of Multiple Deprivation
LDL	Low-density lipoprotein
NDA	National Diabetes Audit
NDPP	NHS Diabetes Prevention Programme
NICE	National Institute for Health and Care Excellence
NIHSS	National Institute of Health Stroke Scale
OR	Odds ratio
PHE	Public Health England
QOF	Quality and Outcomes Framework
RCP	Royal College of Physicians
RNRU	Regional Neurological Rehabilitation Unit
SCD	Sickle cell disease
SMI	Serious mental illness

SMR	Standardised mortality ratio
SSNAP	Sentinel Stroke National Audit Programme
SSS	Stop smoking services
TIA	Transient ischaemic attack
TNRU	(Homerton) Transitional Neurological Rehabilitation Unit
WHO	World Health Organisation

1 Executive summary

Introduction and methods (Chapter 2)

- This report describes the prevalence, incidence and impact of stroke in Hackney and the City. It provides an assessment of the performance of local services in preventing, treating and rehabilitating stroke against best practice guidelines and performance elsewhere (where evidence is available).
- This needs assessment adopted a mixed methods desk-based approach, using data from a range of different sources to paint as accurate a picture as possible of the burden of stroke and the adequacy of services to meet local needs.

Setting the scene – types of stroke, outcomes and trends (Chapter 3)

- There are two main types of stroke – ischaemic and haemorrhagic.
- Ischaemic stroke is the most common, accounting for around 85% of strokes, and occurs when the blood supply to the brain is blocked. Haemorrhagic stroke is caused by bleeding in or around the brain (for example due to a burst artery).
- A transient ischaemic attack (TIA) is a type of stroke where the symptoms resolve within 24 hours.
- Approximately a quarter of those who have strokes will die within a year – this is more common in the case of haemorrhagic strokes or those which are caused by atrial fibrillation (AF).
- Strokes cause a wider variety of disabilities than any other condition, including difficulties with walking, speaking, and swallowing; and mental health or emotional difficulties.
- In the UK in 2014, approximately 40,000 people died due to a stroke. This accounted for 7% of all deaths.
- Approximately 1.18 million people in the UK have had a stroke and are still alive. This is equivalent to 1.8% of the population.
- Mortality from strokes has declined significantly over the last 40 years.
- Stroke incidence – the number of strokes that occur every year – also appears to have declined, although less significantly. It is likely that mortality has decreased both due to a decrease in incidence and more effective treatment of strokes when they occur.
- Stroke prevalence – the proportion of the population who have experienced a stroke – has remained broadly stable over the last 20 years.
- Predicting future rates of stroke is difficult, and estimates vary. Future occurrence of strokes will depend on demographic profiles (for example, an ageing population), and trends in risk factors such as obesity and smoking.

Causes and risk factors (Chapter 4)

- There are a range of risk factors for stroke, some of which (such as smoking) are modifiable and others which are not (such as age).
- Stroke risk factors interact, with some increasing the likelihood of others.

- Haemorrhagic stroke and ischaemic stroke have many common risk factors.
- Socio-demographic risk factors that increase the risk of stroke include:
 - age - those over 75 have a nine-fold higher risk of stroke than those aged 45-64
 - sex - men have a slightly higher risk of stroke than women
 - ethnicity – members of Asian, African and African Caribbean communities have, on average, a higher risk of stroke
 - socioeconomic status - those of lower socio-economic status or living in more deprived areas have a higher risk of stroke
 - those who have a family history of stroke.
- Lifestyle and behaviour are important risk factors for stroke, including:
 - smoking - the more someone smokes, the greater their risk of stroke
 - physical inactivity
 - unhealthy diet – not enough fruit, vegetables and wholegrains, and too much saturated and trans fats or salt can increase risk
 - alcohol – excessive alcohol consumption can significantly increase stroke risk
 - illegal drug use - mixed evidence, but cocaine and amphetamine use likely increase risk of stroke.
- Existing medical conditions can also act as risk factors for stroke, including:
 - hypertension –thought to be the single biggest modifiable risk factor for stroke
 - AF – found in 15% of all stroke patients
 - diabetes – estimated to more than double the risk of stroke.
 - raised cholesterol – mixed evidence in this area, but likely increases risk of ischaemic stroke
 - obesity – clear link with risk of ischaemic stroke
 - previous stroke/TIA
 - sickle cell disease – estimates suggest that one quarter of those with sickle cell disease will have a stroke by the age of 45
 - mental illness – some evidence that depressive disorder and bipolar disorder are risk factors for stroke.

Incidence, prevalence and outcomes of stroke in Hackney and the City (Chapter 5)

- Recorded prevalence of stroke/TIA (using GP data) in City and Hackney is much lower than modelled estimates would imply – 0.9% vs. 2.3% (age standardised rates). However, neither of these sources are likely to be an accurate representation of underlying trends and so it is difficult to determine the level of unmet need locally. There is significant variation across GP practices in the age-adjusted recorded stroke/TIA prevalence (from less than 1% to over 3%).
- There is also some uncertainty about local incidence of stroke, estimated on the basis of stroke-related hospital admissions. Published data (aggregated over a 10 year period) suggests that incidence of stroke in City and Hackney

is broadly in line with most similar areas in London (220 per 100,000 population), but higher than the national average.

- The vast majority of strokes locally are ischaemic in nature.
- An estimated 7% of deaths in City and Hackney are caused by stroke (77 deaths each year), one third of which are deemed to be avoidable.
- More stroke patients are moderately impaired, and fewer have a minor impairment, than nationally. Most stroke survivors in Hackney and the City require occupational therapy, physiotherapy or speech and language therapy.
- Analysis by socio-demographic characteristics reveals the following for City and Hackney:
 - 64% of prevalent stroke patients are over the age of 65 and 41% are age 75+; stroke is much more likely to be fatal in older adults (age 75+)
 - as nationally, women have slightly lower prevalence of stroke/TIA at most ages
 - the highest recorded prevalence of stroke/TIA is in GP patients of Black Caribbean ethnic origin
 - there is only a very weak association between local area deprivation and recorded stroke prevalence
- A higher proportion of local stroke/TIA survivors are recorded to be non-smokers and non-drinkers than average, which is likely to reflect behavior modification following stroke (as well the older age profile of stroke patients).
- As nationally, prevalence of hypertension, AF, diabetes and obesity are substantially higher in stroke patients than average. Conversely, a much lower proportion of stroke patients in City and Hackney are recorded to have high cholesterol, which reflects successful treatment following stroke.
- The additional risk of stroke in patients with diabetes is significantly higher locally than some comparable areas and the England average.
- Patients with serious mental illness (SMI) are twice as likely to have experienced stroke/TIA, according to City and Hackney GP records.

Review of evidence-based interventions for stroke (Chapter 6)

- Stroke can be prevented by assessing people for their level of risk. Opportunistic screening in primary care and systematic screening such as the NHS Health Check programme can both help to identify those at risk.
- For those at risk of stroke, tackling lifestyle risk factors such as smoking and diet can help to reduce risk. This can be done by:
 - helping people to adapt their behaviours
 - changing the physical and social environment
 - working with other organisations such as food outlets and schools.
- Stroke prevention should also seek to tackle medical risk factors such as hypertension and diabetes. This can be achieved through:
 - prevention activity – primarily to act on lifestyle risk factors
 - increasing diagnosis rates of medical conditions
 - providing treatment for or management of conditions.

- Effective acute care of stroke relies on fast recognition of stroke, and a timely response, including providing brain scanning, thrombolysis, addressing the short-term risk of recurrent stroke, and enabling essential functions such as hydration and movement.
- It is recommended that people who have had a stroke are admitted to a specialist acute stroke unit for the entirety of their acute care.
- There are guidelines that set out how to deliver good quality rehabilitation for those who have had a stroke, including:
 - ensuring they are cared for by a multidisciplinary team providing specialist care
 - setting and reviewing rehabilitation goals
 - providing minimum therapy requirements, both in terms of type and amount of therapy received.
- Discharging someone from secondary care into the community should be preceded by effective planning and assessment, and accompanied by key information and a joint health and social care plan for the individual.
- Early supported discharge has been shown to be effective in improving outcomes and reducing costs, and therefore should be offered where suitable.
- Ongoing support and care should be provided for someone following discharge from hospital, including regular follow-up assessments and return to work support when required.
- Carers should be included in key decisions about a patient's ongoing care, and supported throughout acute treatment, rehabilitation and following discharge.

Local services and support to prevent, treat and rehabilitate stroke (Chapter 7)

- Screening and risk assessment for stroke is available in Hackney and the City through the NHS Health Check programme and the Long-Term Conditions contract held by the GP Confederation. Both of these services are performing well and have good reach into high risk patient groups.
- The local pathway for managing patients with a family history of stroke is not clear.
- A number of lifestyle services are commissioned locally which address the main modifiable risk factors for stroke. These include specialist smoking cessation support, weight management and exercise on referral, diabetes prevention, and community exercise and 'cook and eat' sessions – referrals on to these programmes are incentivised through the LTC contract. In addition, there are local partnerships in place focused on addressing the wider determinants of smoking and obesity-related ill-health. Many/most of these programmes are targeted at communities at increased risk of stroke.
- A possible gap has been identified in the identification of, and support for, increasing risk drinking behavior - a key modifiable risk factor for stroke.
- Local management of hypertension in general, and specifically among stroke patients, is very good. The picture for diabetes management is mixed (and being addressed), and for AF there is room for improvement both in terms of case finding and management of diagnosed patients.

- There is currently no clinical service in place locally to manage obesity in patients with complex needs.
- There is limited funded activity to promote awareness of stroke locally (over and above the national 'Act FAST' campaign).
- In terms of acute care, most stroke patients locally are seen at the Royal London Hospital HASU and then transferred as appropriate to Homerton stroke rehabilitation unit. Accurate data on the number of patients transferring from the HASU are not easily accessible.
- The full local stroke pathway includes a specialist (regional) neurological rehabilitation unit, a transitional neurological rehabilitation unit, early supported discharge, community rehabilitation, palliative care, and nursing care. A local consensus protocol is currently being developed to inform and guide long-term secondary prevention of stroke. A recent review of the local stroke unit at Homerton hospital assessed the local pathway to be working well.
- This needs assessment has identified a potential risk in the final stage of the community rehabilitation pathway, with one of the core programmes (Fit4Health) relying on short-term grant funding which comes to an end in 2018.

Recommendations (Chapter 8)

- A set of recommendations for local action in the prevention, acute care and rehabilitation of stroke have been developed with local partners, based on the results of this needs assessment. These include the following.
 - **Prevention:** ensure adequate reach of the national 'Act Fast' campaign into high risk communities; improve identification and management of lifestyle risk factors (e.g. by embedding the principles of Making Every Contact count into all relevant service contracts); improve management of medical risk factors (e.g. promote use of the GRASP-AF tool in primary care and address gap in obesity care pathway to meet the needs of patients with complex needs).
 - **Acute care:** reduce time to repatriate patients from HASU; reduce length of stay at Homerton acute stroke unit; complete the consensus protocol for long-term secondary prevention.
 - **Rehabilitation:** ensure all applicable patients receive six month follow-up; take urgent action to safeguard the final stage of the community rehabilitation pathway against short-term funding risk; integrate employment support fully into rehabilitation pathways.
- The new City and Hackney Integrated Commissioning arrangements provide an excellent opportunity to improve support for prevention, care and rehabilitation across the stroke pathway.

2 Introduction and methods

This report describes the findings of a population health needs assessment of stroke in adults in Hackney and the City, carried out in 2016-2017.

The objectives of this needs assessment are to:

- describe the incidence and prevalence of stroke and TIA, the main associated causes and risk factors, and outcomes from stroke in the local population
- provide an overview of key evidence-based interventions to prevent, treat and rehabilitate stroke
- assess the adequacy of local services and support to meet identified population need in line with evidence-based guidelines
- make recommendations for improvements to local services to address any gaps identified.

2.1 Literature review

A rapid, pragmatic literature search was undertaken to identify the key outcomes and risk factors for stroke (as described in Chapters 3 and 4) and evidence-based strategies or interventions for prevention, acute care and rehabilitation (Chapter 6). This included a review of:

- articles in targeted peer reviewed journals (including *Stroke*), including follow-up of relevant references
- statistical releases from verified data sources
- reports from third sector organisations, in particular the Stroke Association and British Heart Foundation
- national government strategies, action plans and other official documents relating to stroke
- official audit reports, such as those produced by the Sentinel Stroke National Audit Programme (SSNAP).

The review focused on recent UK literature where possible, but also used international or older studies where necessary, particularly to confirm evidence of risk factors and outcomes. The focus was on established evidence that was supported by a number of good quality sources, which could therefore be included with a degree of confidence in the findings.

In addition, a comprehensive review was undertaken of the latest national clinical guideline for stroke, plus all relevant documentation in the National Institute for Health and Care Excellence (NICE) stroke pathway (including quality statements, clinical guidelines, technology appraisals and interventional procedures guidance). This was used to inform and verify the narrative and conclusions in Chapter 6.

All sources used in the literature review are referenced throughout this report.

2.2 Local data sources

Table 1 summarises the various data sources used to describe the prevalence, incidence, outcomes and risk factors for stroke/TIA in Hackney and the City (Chapter 5).

Chapter 7 relies heavily on data from SSNAP and Public Health England (PHE)'s local cardiovascular disease profiles to assess the performance of local services in the effective prevention and treatment of stroke/TIA. [1] [2]

Table 1: Sources of local data used in Chapter 5 this report

	Prevalence	Incidence	Outcomes	Risk factors
Modelled estimates (based on national survey data) ^a	✓			
Local GP data extract (April 2016) ^b	✓			✓
GP data – QOF	✓			✓
Hospital Episode Statistics ^c		✓		
SSNAP		✓	✓	✓
ONS mortality statistics ^c			✓	✓
Population estimates ^d				✓
Area-based deprivation statistics ^e				✓
City and Hackney Health and Wellbeing Profile (JSNA)				✓
National Diabetes Audit				✓

^a Association of Public Health Observatories [3]

^b Courtesy of the Clinical Effectiveness Group (CEG) at Queen Mary University

^c Obtained via PHE Fingertips Tool [2]

^d 2015 round projections [4] [5]

^e Index of Multiple Deprivation 2015 [6]

2.2.1 A note on the SSNAP data used in this report

SSNAP is the leading source of data on admissions to recognised stroke units in England. [1] All stroke units in the country are required to submit data on patients admitted for stroke.

Local reporting issues with the most recent (2015/16) audit data mean that the figures reported for Hackney and the City patients relate to 2014/15, unless otherwise stated. The reliability of these data is measured using a case ascertainment rate,¹ which for the City and Hackney was around average when compared to similar areas in London (72% vs. 70-79% in 2014/15), but lower than the England average (92%).

2.3 Comparisons with other areas

Throughout Chapters 5 and 7, reference is made to City and Hackney's 'statistical peers' when making comparisons with other areas. For the purpose of this needs assessment, City and Hackney's statistical peer group has been identified using NHS RightCare suggested comparators (based on similar population demographics), plus Newham and Tower Hamlets as neighbouring areas and historical comparators. The full list of statistical peers used for this needs assessment includes:

- Brent
- Greenwich
- Hammersmith and Fulham
- Haringey
- Islington
- Lambeth
- Lewisham
- Newham
- Southwark
- Tower Hamlets
- Waltham Forest
- Wandsworth.

¹ case ascertainment rate: the number of stroke cases recorded on SSNAP as a proportion of the number of cases expected (denominator based on Hospital Episode Statistics).

3 Setting the scene – types of stroke, outcomes and trends

Key Points

- There are two main types of stroke – ischaemic and haemorrhagic.
- Ischaemic stroke is the most common, accounting for around 85% of strokes, and occurs when the blood supply to the brain is blocked. Haemorrhagic stroke is caused by bleeding in or around the brain (for example due to a burst artery).
- A transient ischaemic attack (TIA) is a type of stroke where the symptoms resolve within 24 hours.
- Approximately a quarter of those who have strokes will die within a year – this is more common in the case of haemorrhagic strokes or those which are caused by atrial fibrillation.
- Strokes cause a wider variety of disabilities than any other condition, including difficulties with walking, speaking, and swallowing; and mental health or emotional difficulties.
- In the UK in 2014, approximately 40,000 people died due to a stroke. This accounted for 7% of all deaths.
- Approximately 1.18million people in the UK have had a stroke and are still alive. This is equivalent to 1.8% of the population.
- Mortality from strokes has declined significantly over the last 40 years.
- Stroke incidence – the number of strokes that occur every year – also appears to have declined, although less significantly. It is likely that mortality has decreased both due to a decrease in incidence and more effective treatment of strokes when they occur.
- Stroke prevalence – the proportion of the population who have experienced a stroke – has remained broadly stable over the last 20 years.
- Predicting future rates of stroke is difficult, and estimates vary. Future occurrence of strokes will depend on demographic profiles (for example, an ageing population), and trends in risk factors such as obesity and smoking.

3.1 Different types of stroke

A stroke occurs when the blood supply to the brain is interrupted, and the brain is deprived of the necessary oxygen that it needs in order to operate. This section defines and describes the two main types of stroke, ischaemic and haemorrhagic, and the related condition of transient ischaemic attack (TIA). Throughout this needs assessment, we report data and evidence by type of stroke/TIA where possible. However, much of the literature aggregates ischaemic and haemorrhagic stroke and does not provide separate figures for each.

3.1.1 Ischaemic stroke

Ischaemic strokes occur when there is a blockage in the blood flow to the brain – usually caused by a clot. These clots can occur in an artery that supplies the brain, or in a blood vessel inside the brain. When the regular flow of blood to the brain is interrupted, brain cells begin to die. Ischaemic strokes are the most common type of strokes, making up approximately 85% of all cases. [7]

Ischaemic strokes can be categorised according to where the clot originated – for example, in the brain, in the heart, or of an unknown source.

3.1.2 Haemorrhagic stroke

The remaining 15% of stroke cases are haemorrhagic, caused by bleeding in to the brain. [7] These occur when a brain aneurysm bursts or a weakened blood vessel leaks into the brain. Two thirds of haemorrhagic strokes involve bleeding within the brain, the other third occur when there is bleeding on the surface of the brain.

3.1.3 Transient ischaemic attack (TIA)

A TIA is a type of stroke, the only differentiation is that in the case of a TIA, the symptoms do not last longer than 24 hours. Due to the short-term nature of TIAs, they have also been called ‘mini-strokes’. However, there is an increasing recognition that TIAs should be treated seriously as they often predate a ‘full’ stroke, have the same causes, and require the same preventive interventions. [7] [8] For this reason, they are also known as ‘warning strokes’. TIAs can, very rarely, be caused by a haemorrhage in the brain. However, they are usually ischaemic in cause – i.e. as a result of a blockage in the flow of blood to the brain.

3.1.4 ‘Silent’ stroke

A silent stroke is a stroke that does not have any obvious associated symptoms, and the person is unaware that they have had a stroke. The stroke can still cause damage to the brain and typically occurs in older people, often gradually eroding their memory. This often leads to multi-infarct dementia and places the individual at risk of both TIA and major stroke in the future.

3.2 Outcomes from stroke

Stroke is regularly fatal, and was the third greatest cause of death in England and Wales in 2014. [9] However, the majority of people who have strokes do survive, often with a range of disabilities – it has been claimed that stroke is the largest single cause of severe disability in the UK. [10] This section will examine the mortality burden of stroke, and the range and impact of stroke-related morbidities.

3.2.1 Mortality

Estimates suggest that one in eight strokes are fatal within the first 30 days, and one in four of those who have a stroke will die within a year. [11]

The risk of death depends on a number of factors, including the speed with which treatment is received. Haemorrhagic strokes also tend to be fatal more often than ischaemic strokes. In haemorrhagic stroke cases that involve bleeding on the surface of the brain, 10–15% of people affected die before reaching hospital. [7] Between a quarter and a third of survivors of this type of stroke re-bleed within a month in the absence of treatment, 70% of whom die as a result of the re-bleed. [12]

Strokes that are caused by atrial fibrillation (AF) (see section 4.3.2) also seem to be more likely to be fatal. One study found that 30 day mortality after AF-related strokes was 25%, compared to 14% among those without AF. [13]

3.2.2 Morbidity

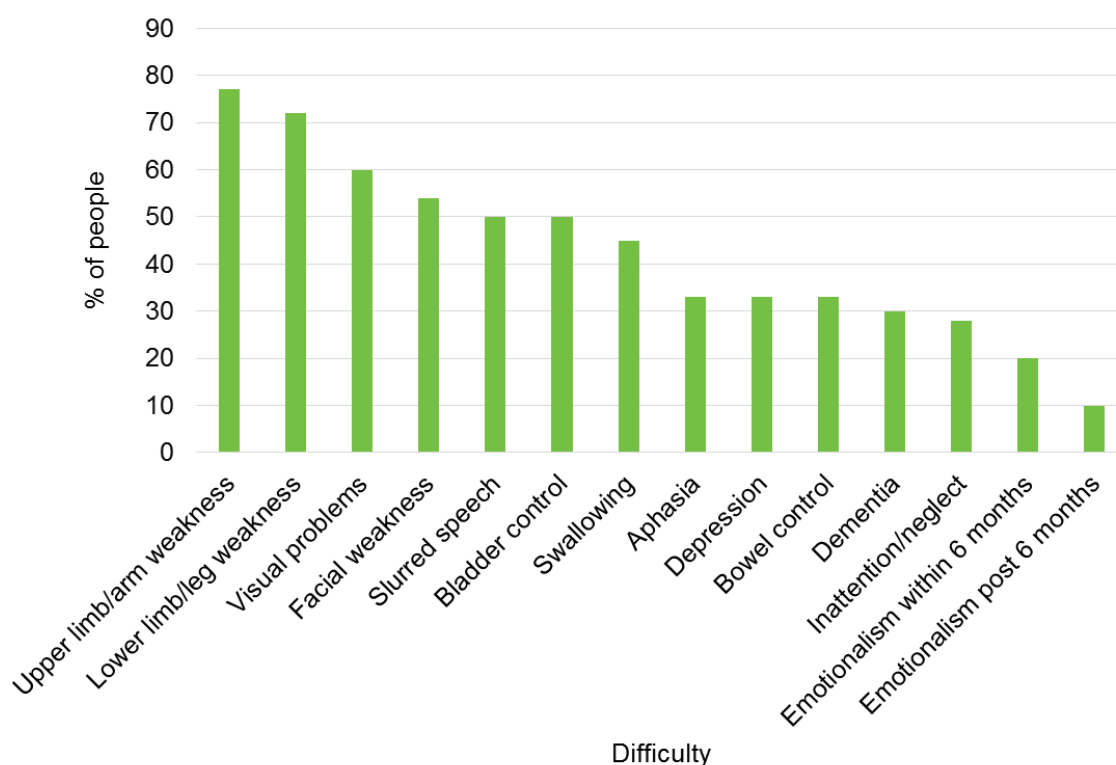
There are a significant range of disabilities that can be caused by stroke, depending on which parts of the brain are affected, and the extent to which they are damaged. The brain has an impact on both physical functions and emotional/mental health, therefore impacts occur across these categories. Stroke causes a greater range of disabilities than any other condition. [14]

Half of all stroke survivors have a disability as a result of their stroke. [11] In terms of physical functions, strokes can affect walking, talking, speech, balance, co-ordination, vision, spatial awareness, swallowing, bladder and bowel control, and can cause memory impairment. It is estimated that over a third of stroke survivors in the UK are dependent on others and that of those, one in five are cared for by family or friends. [11]

A 1996 study using a postal questionnaire to 18,000 people in northern England found that full recovery from stroke was reported by 23% of those who had had a stroke. The most common reported impairments at the time of the study were cognitive impairments (33%), problems with lower limbs (33% for right leg, 27% for left leg) and speech difficulties (27%). Over half (55%) reported a disability that meant they required help from someone else in one or more of 10 activities of daily living. [15] In addition, stroke increases the risk of dementia; the incidence of new onset dementia is higher in haemorrhagic versus ischaemic stroke. [16]

Figure 1 uses data taken from a range of different sources all published more recently (2005 – 2013), and shows the estimated extent of a range of 'difficulties', both physical and mental, among stroke survivors.

Figure 1: Percentage of people who have had a stroke who are affected by various difficulties, 2005 - 2013



Sources: [17] [18] [19] [20] [21] [22] [23] [24] [25]

The mental health and emotional impacts of stroke are likely to be the result of both physical changes in the brain and due to the stress and emotional burden of stroke on individuals and their families. In addition to the mental health impacts in Figure 1, further studies have found the following among those who have experienced a stroke: [26] [27] [11]

- 24% experience extreme fatigue, and an additional 33% experience moderate fatigue
- 73% lack confidence
- 63% live in fear of another stroke (approximately a third of those who have had a stroke go on to have another stroke or TIA)
- 44% find it difficult to talk about their stroke and its effect on their lives
- 56% feel friends and family treat them differently
- 55% are unable to care for family in the same way as before
- 44% of 30-59 year olds had broken up with their partner or considered doing so as a result of stroke.

3.2.3 Economic impact of stroke

The social costs of stroke include direct costs to the public sector, productivity loss and informal care costs.

A 2009 economic analysis of the societal costs of stroke in the UK estimated these to be around £9 billion a year, comprised of: [28]

- health and social care costs - approximately £4.38 billion a year (49% of total costs)
- informal care costs - £2.42 billion a year (27%)
- productivity loss (due to caring responsibilities, disability and death) - £1.33 billion (15%)
- benefit payments - £841m (9%).

Estimates of the direct costs of stroke to the NHS in England in 2013/14 are reported in Table 2 below.

In terms of *preventable* costs at *local* level, a recent report by PHE estimated that City and Hackney Clinical Commissioning Group (CCG) spent £326,540 in 2013/14 on treating ischemic strokes that could be avoided through higher levels of physical activity - or £331,928 in 2016 prices. [29]

Table 2: Direct costs of stroke to the NHS in England (2013/14)

Setting	Annual cost (£million)
Primary prescribing	21.0
Unscheduled care	399.5
Secondary care	88.4
Community and end of life care	165.8
Running costs	15.1
Total costs	689.9

Source: British Heart Foundation [30]

3.3 Stroke incidence, prevalence and mortality

This section sets out some key trends in stroke, based primarily on national evidence and also international evidence where relevant. There are three primary ways to measure stroke trends:

- mortality – the number or proportion of people who die from stroke in a given time period
- incidence – the number of strokes that occur within a given time period, whether they are fatal or not; incidence can also be reported as a proportion of a given population who have had a stroke in a given time period
- prevalence – the number or proportion of people in a given population who have ever experienced a stroke and survived.

Data on mortality tends to be comparatively robust, as it is mandatory in the UK to record cause of death, and this data can be used to calculate the burden of mortality – for example, the proportion of deaths in a year that are caused by stroke.

Incidence and prevalence studies can be more prone to error. They are often calculated using hospital inpatient data, GP practice data, or surveys of individual participants. Those that rely on GP practice data or inpatient data tend to show lower estimated levels than those based on population surveys – it has been suggested that this may be because healthcare settings are unaware of a proportion of those

who have had strokes. [31] However large scale surveys have their own weaknesses, including low response rates or reporting bias.

For these reasons, the statistics on prevalence and incidence used throughout this report should be treated with some caution. However, there are some general conclusions that can be drawn, even where there is doubt about the accuracy of particular numbers.

3.3.1 Current rates of stroke/TIA

In 2014, there were just under 40,000 deaths from stroke in the UK, which is equal to approximately 7% of all deaths. The significant majority of these (over 80%) occurred among those over 75 years old. [32] Premature mortality – deaths among those aged under 75 – is less common. There were almost 7,500 premature stroke deaths in 2014, which represents approximately 4% of all premature deaths. [32]

The incidence of stroke can be approximated from records of inpatient episodes. Data from 2013/14 showed approximately 115,000 stroke inpatient episodes for men and 118,000 for women, “which translates as someone going to hospital just over every two minutes due to stroke.” [32] In 2013/14, stroke accounted for approximately 1.2% of inpatient episodes among men, and 1.0% among women. [32]

Prevalence (the proportion of people who have ever had a stroke) can be estimated using Quality and Outcomes Framework (QOF) data from GP surgeries, although this may result in underestimates. These data suggest that there are 1.18million people in the UK who have had a stroke and are still alive. This is equivalent to 1.8% of the population. In London this is lower, at 1.1% of the population – probably in part due to the younger age profile. [32]

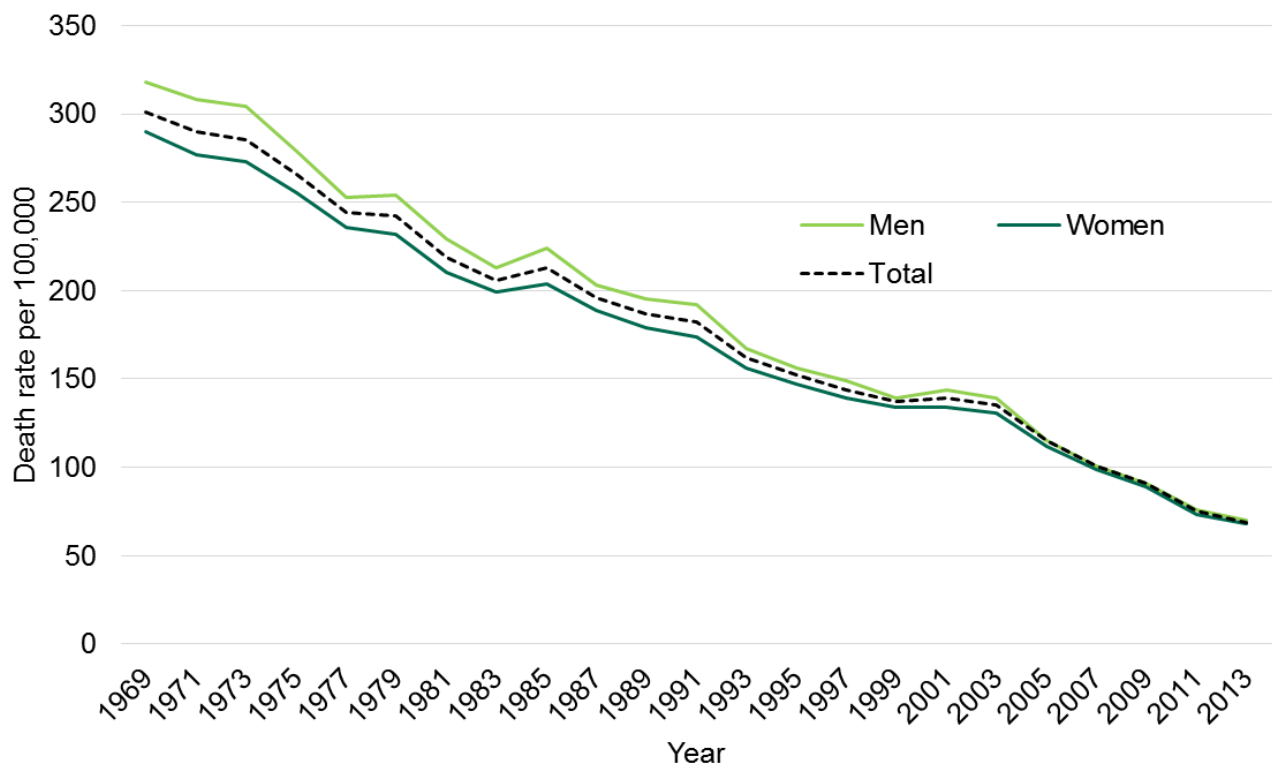
There are clear regional inequalities in reported stroke prevalence within the UK. Scotland has the highest estimated prevalence at 2.1%, compared to 1.7% in England, 2.0% in Wales and 1.8% in Northern Ireland. [33] More detail on demographic trends in stroke prevalence and incidence is provided in section 2.1 of this report.

There is less data available on TIA, as it is less likely to result in death or hospital admission. However, estimates suggest that approximately 46,000 people in the UK have a first incidence of TIA every year. [34]

3.3.2 Trends in stroke over time

There has been a clear reduction in stroke-related mortality over time. Death rates from stroke declined by approximately 78% from 1968 to 2013, and premature death rates (those aged under 75) decreased by 85% over the same period. [32] Figure 2 shows this trend for all-age mortality.

Figure 2: Age standardised death rates from stroke, by sex, UK 1968 - 2013



Source: [32]

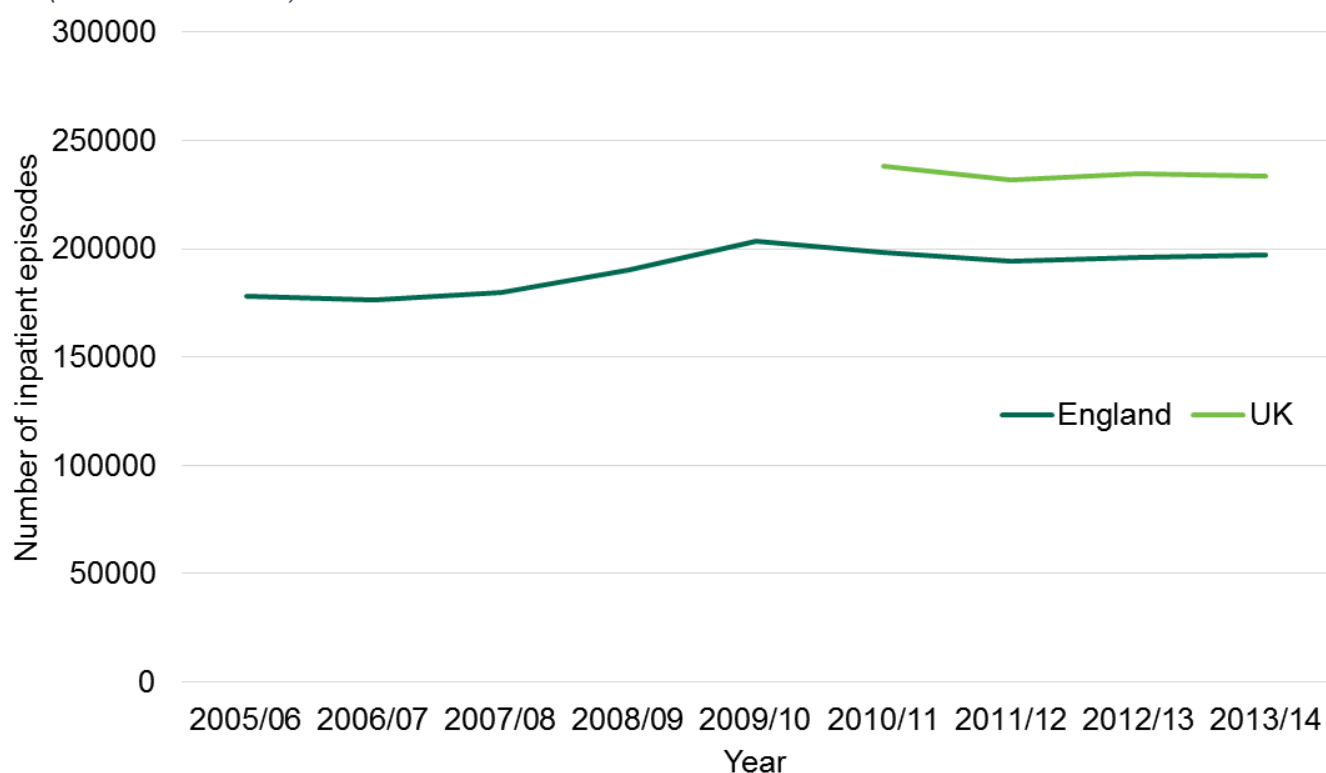
Data from the countries within the UK is available from 1980 to 2013, and shows that stroke mortality rates fell by 69% in England, 67% in Wales and Scotland, and 74% in Northern Ireland over this period. Premature death rates also declined – by 77% in England, 76% in Wales, 75% in Scotland and 82% in Northern Ireland. [32]

Since mortality is determined by both incidence and survival, the clear decline in death rates could be due to fewer strokes occurring, or due to quicker and more effective treatment increasing the proportion of people who survive a stroke. A UK study published in 2011 examined the outcomes of over 30,000 stroke patients, and found that mortality at 56 days after first stroke fell from 21% in 1999 to 12% in 2008. The study reported that “improved drug treatment in primary care is likely to be a major contributor to this, with better control of risk factors both before and after incident stroke.” [35]

There is some evidence to suggest that stroke incidence has also declined. A study using general practice data estimated that the incidence of stroke in the UK dropped by 30% between 1999 and 2008. [33] However, a different study found that UK incidence rates only fell by 19% from 1990 to 2010 [36], and there is also evidence that the incidence rate only declined until the late 1980s, after which it plateaued. [31]

Figure 3 shows that the number of inpatient episodes for stroke in England has remained quite steady in recent years, particularly since 2009/10.

Figure 3: Number of inpatient episodes for stroke in NHS hospitals, England and the UK (2005/6–2013/14)



Source: [32]

There is some evidence from south London from 1995 to 2010 to suggest that while overall incidence rates declined over this period, there was also a trend towards a higher proportion of ischaemic stroke and a lower proportion of haemorrhagic stroke. [37]

The prevalence of stroke, whether measured using QOF data or self-reported health surveys, has remained fairly static over the last 30 years. For example, self-reported prevalence was 0.8% of men of all ages in 1988 and in 2002 this was 0.7%. The equivalent figures for women were 0.6% in 1988 and 0.4% in 2011 (but 0.6% in 2010). [32] However, there are significant differences in levels of prevalence depending on the data source. The reasons for this are not entirely clear, but might reflect differences in study design, data collection, sample population, or definitions used.

3.3.3 Future predictions of stroke trends

Predicting the likely future burden of stroke is very difficult, as stroke incidence depends on a range of risk factors (see Chapter 4 for evidence on the causes and risk factors for stroke). If one were to judge purely on demographic trends, the crude incidence and prevalence of stroke is likely to increase, as the older age population of the UK increases. Certain medical risk factors, such as obesity and diabetes, are also currently predicted to increase in the UK. [38] [39] This would suggest that in future there will be a higher rate of strokes than there are currently.

On the other hand, some risk factors (such as cigarette smoking), are currently declining in prevalence. In addition, treatments for medical risk factors such as hypertension and cholesterol have become more widely available and have been found to be successful in reducing the incidence of cardiovascular disease (CVD) events such as stroke. [40] [41] If these trends continue, they could balance out other possible increases in demographic and lifestyle risk factors.

It is also important to recognise that mortality, incidence and prevalence could all change in different ways, as has been the case over the last 30 years or so. For example, increasingly fast and effective medical care in the case of stroke could reduce mortality rates, even if incidence rates remain stable. If incidence remains constant, this could also combine with an increased prevalence, as the population ages and lives longer, and therefore the proportion of people who have ever had a stroke increases. It could also be possible that incidence continues to decline and prevalence remains steady, as can be seen in some of the historical trends.

There are a couple of studies that have tried to explore these possibilities and model future stroke trends. A UK parliament briefing note on stroke published in 2014 stated that projections showed there would be “an extra 22,000 stroke-related deaths per year by 2020 because of expected increases in population size, lifespan and the prevalence of lifestyle choices that increase the risk of a stroke.” [42]

One study modelled future CVD occurrence in the UK based on 2010 data. The CVD occurrence included stroke, but did not provide separate figures for it. The study estimated that if current obesity trends (measured by Body Mass Index (BMI)) go unchecked, the cumulative CVD incidence rate would be 519 per 100,000 population in 2010, 5,938 by 2020 and 12,164 by 2030. They also modelled future CVD mortality rates under different scenarios, and reported that if population BMI were reduced by 5%, 816 deaths per 100,000 population would be avoided by 2030. [43]

The World Health Organisation (WHO) has conducted modelling work across the EU, and reported on likely future stroke trends at an aggregate level. They predict that even if stroke incidence rates remain constant, demographic changes “will lead to a substantial increase in the number of stroke events, from approximately 1.1m per year in 2000 to more than 1.5m per year in 2025” – i.e. a steady stroke incidence rate could combine with an increase in the absolute numbers of stroke. [44] These figures refer to the European region as a whole, but an increase could also be seen in the UK.

A study of stroke in Oxfordshire from 1981 to 2004 found that age-specific incidence of major stroke fell by 40%, despite an expected increase of 28% due to demographic change. The study found associated “substantial reductions” in risk factors such as tobacco smoking, high cholesterol and hypertension, and also “major increases in premorbid treatment with antiplatelet, lipid-lowering, and blood pressure lowering drugs”, which may have explained the significant reductions in incidence. [45] Any future projections at a national or local level should therefore take into account a range of potential risk factors, including behavioural and medical, as well as demographic change.

4 Causes and risk factors

Key Points

- There are a range of risk factors for stroke, some of which (such as smoking) are modifiable and others which are not (such as age).
- Stroke risk factors interact, with some increasing the likelihood of others.
- Haemorrhagic stroke and ischaemic stroke have many common risk factors.
- Socio-demographic risk factors that increase the risk of stroke include:
 - age - those over 75 have a nine-fold higher risk of stroke than those aged 45-64
 - sex - men have a slightly higher risk of stroke than women
 - ethnicity – members of Asian, African and African Caribbean communities have, on average, a higher risk of stroke
 - socioeconomic status - those of lower socio-economic status or living in more deprived areas have a higher risk of stroke
 - those who have a family history of stroke
- Lifestyle and behaviour are important risk factors for stroke, including:
 - smoking - the more someone smokes, the greater their risk of stroke
 - physical inactivity
 - unhealthy diet – not enough fruit, vegetables and wholegrains, and too much saturated and trans fats or salt can increase risk
 - alcohol – excessive alcohol consumption can significantly increase stroke risk
 - illegal drug use - mixed evidence, but cocaine and amphetamine use likely increase risk of stroke
- Existing medical conditions can also act as risk factors for stroke, including:
 - hypertension –thought to be the single biggest modifiable risk factor for stroke
 - AF – found in 15% of all stroke patients
 - diabetes – estimated to more than double the risk of stroke.
 - raised cholesterol – mixed evidence in this area, but likely increases risk of ischaemic stroke
 - obesity – clear link with risk of ischaemic stroke
 - previous stroke/TIA
 - sickle cell disease – estimates suggest that one quarter of those with sickle cell disease will have a stroke by the age of 45
 - mental illness – some evidence that depressive disorder and bipolar disorder are risk factors for stroke

There are clear risk factors for stroke that determine patterns of mortality, incidence and prevalence (these terms are defined in Section 3.2.3). In this Chapter, we report on each of these where data are available – for some risk factors, evidence is lacking on one or more of these indicators.

The evidence is presented for three broad types of stroke risk factors – firstly, demographics such as age or ethnicity; secondly, lifestyle factors such as physical inactivity; and finally, existing medical conditions such as hypertension. More recently, evidence has started to emerge of the role of air pollution as a risk factor for stroke in specific groups (including older people and those with pre-existing medical conditions such as **CVD**, hypertension and diabetes), but this is not covered in detail in this chapter. [46]

The various risk factors interact in a way that some are likely to increase the likelihood of others. For example, socio-economic status can influence physical inactivity, which in turn can increase the likelihood of hypertension.²

Since ischaemic and haemorrhagic stroke have different immediate causes, they have their own sets of risk factors, although there is significant overlap.

The risk factors discussed in this Chapter are summarised in Table 3, which classifies them according to two key characteristics.

- Firstly, whether they are modifiable or not – which signifies if they are amenable to intervention. Those that are modifiable such as smoking and obesity, show a clear role for preventive public health action in reducing the risk of stroke. The importance of clinical risk factors (described in Section 4.3) also highlight the importance of secondary prevention, for example through primary care prescribing.
- Secondly, the risk factors are classified by the strength of the evidence, and their likely impact on stroke risk. Those factors that have mixed evidence of effect, or good evidence of a weak effect, are separated from those that have good evidence of a significant effect. This classification is based on our assessment of the evidence cited in this Chapter, rather than on any formal measure.

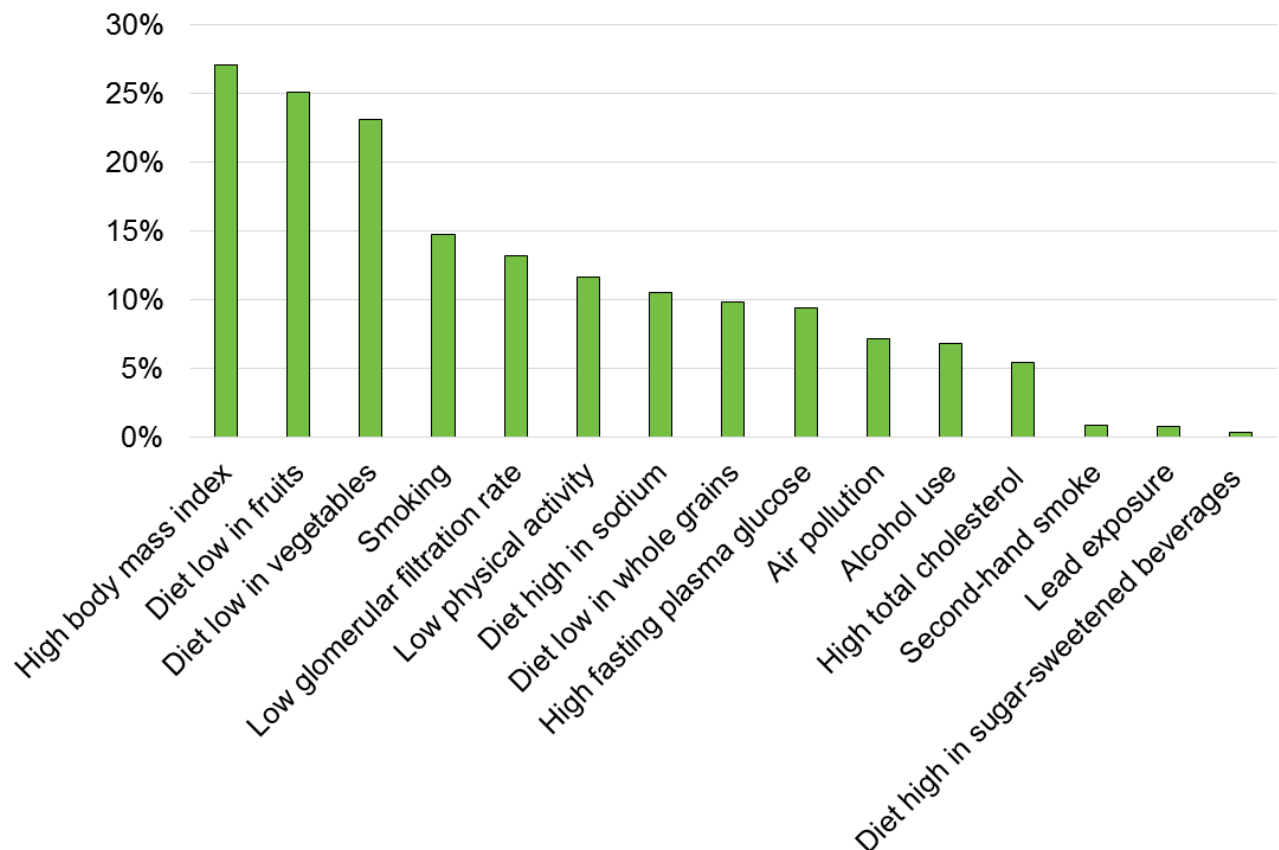
Table 3: Summary of risk factors covered in this report

	Good evidence of significant effect	Mixed evidence, or good evidence but weak effect
Modifiable	Socio-economic status/deprivation Smoking Physical inactivity Unhealthy diet Excessive alcohol consumption Hypertension Diabetes Obesity Atrial fibrillation Sickle cell disease	Illegal drug use Raised cholesterol Mental illness
Non Modifiable	Age Ethnicity Family history Previous stroke/TIA	Sex

² More information on hypertension causes and risk factors is available in the Hypertension Needs Assessment (forthcoming).

The Global Burden of Disease Study published a range of data in 2013 exploring key diseases and their risk factors. Figure 4 shows the study's estimations of the proportion of total Disability Adjusted Life Years (DALYs) lost to stroke in the UK that can be attributed to various risk factors. So, according to this data set, over a quarter of the burden of stroke is due to high BMI and the next two most important risk factors are diet-related.

Figure 4: Estimated percentage of DALYs³ lost to stroke that are attributable to various risk factors, UK (2013)



Source: [47]

Stroke in children has a different set of risk factors – including sickle cell disease (see Section 4.3.7), recent illness (such as cold and flu), an incomplete vaccination record (children with some, few or no routine vaccinations have a seven fold increased risk of stroke compared to those who have had most or all of their vaccinations) and heart disorders. [11] [48]

³ DALYs provide a measure of overall disease burden, which includes mortality and morbidity in a single measure. One DALY is equivalent to one year of 'healthy' life lost as a result of a particular cause – in this case, stroke.

4.1 Demographics

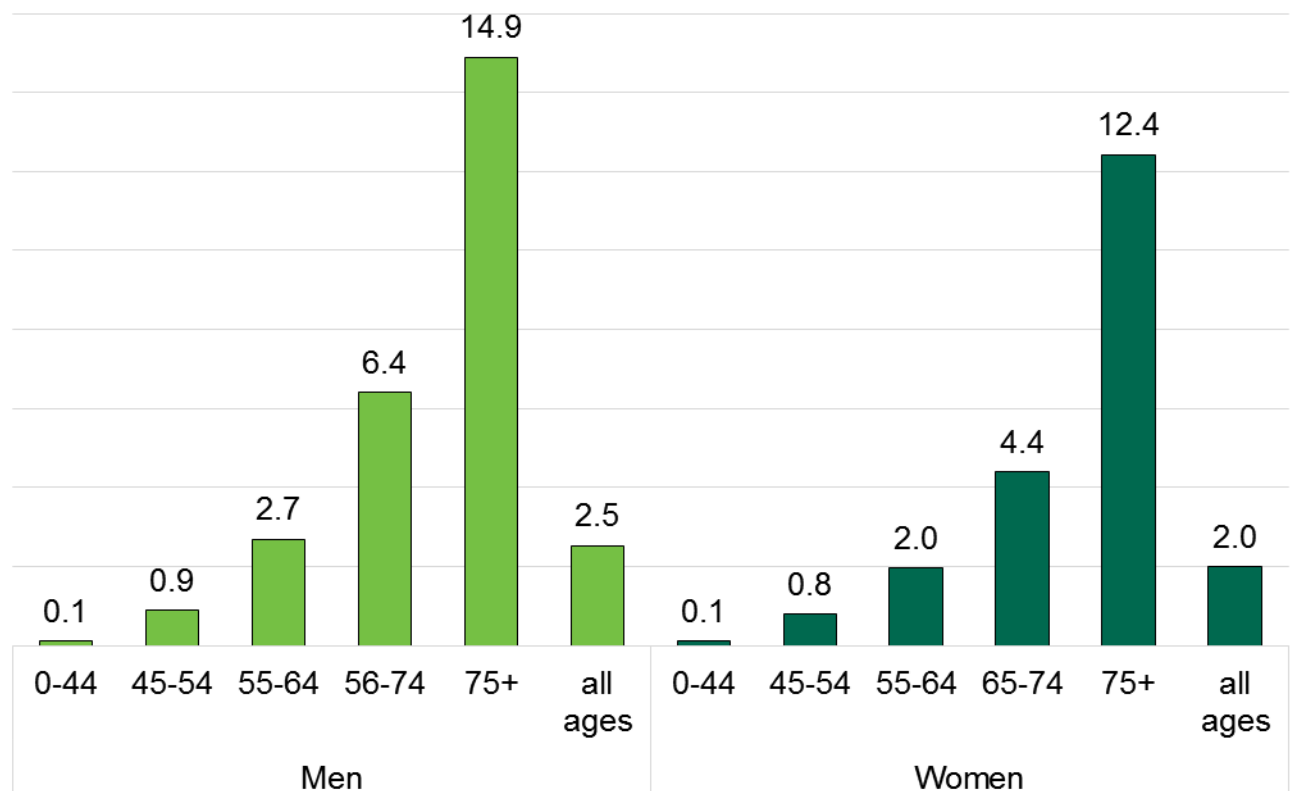
4.1.1 Age

Age is the single most important risk factor for stroke. Two-thirds of strokes occur in over 65s and those over 75 have a nine fold higher risk of stroke and recurrent stroke than those aged 45–64. [49] However, 25% of strokes occur in people under 65 years old. [49]

Figure 5 shows relatively recent data on stroke prevalence in the UK by age and sex. According to this study, which was based on GP practice data, 15% of men and 12% of women over 75 are estimated to have ever experienced a stroke.

The primary reason for an increased risk of stroke in older ages is due to a natural narrowing of the arteries that occurs with age

Figure 5: Estimated prevalence of stroke, % of male and female population by age group, UK 2013



Source: [33]

4.1.2 Sex

There is a small observable difference between men and women in both prevalence and mortality from stroke. Stroke mortality rates at all ages are higher among men than women (70 per 100,000 compared to 68 per 100,000 for women). Data on premature stroke mortality – death rates in under 75s – shows a more significant difference (15 per 100,000 for men compared to 11 per 100,000 for women). [32]

The gap between mortality in men and women has been reducing over time, as has the overall death rate.

Prevalence by sex can be seen in Figure 5– women have slightly lower prevalence at every age over 45, and at all ages (2% compared to 2.5% among men).

There is some evidence that oestrogen may be a vasoprotective hormone, and that hormone replacement therapy reduces cardiovascular morbidity and mortality, which may in part explain the gender differences. [49] However, there is also likely to be a difference in lifestyle risk factors, especially smoking, which could explain the differential rates currently observed (see Section 4.2.1).

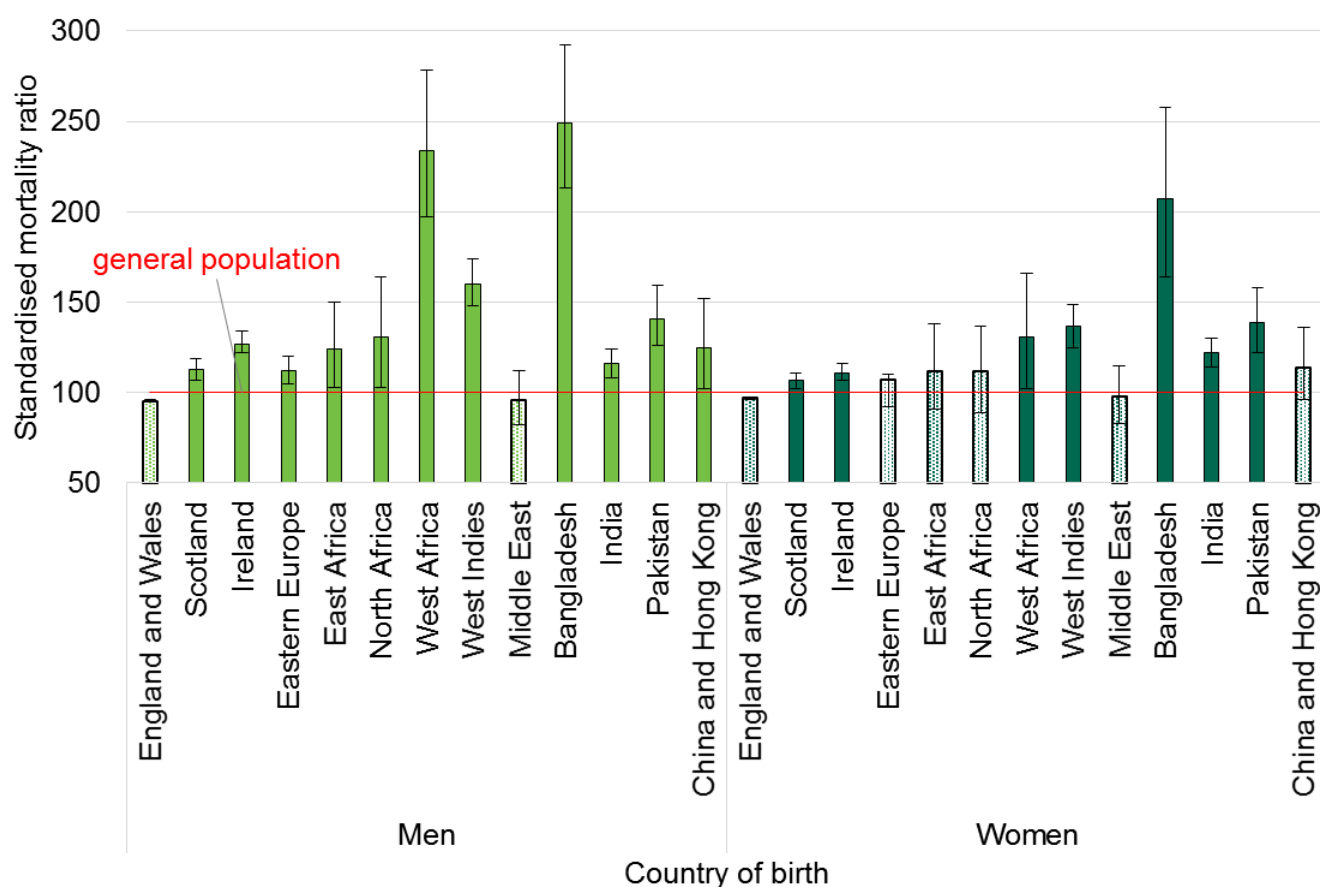
4.1.3 Ethnicity

As with other CVDs, people from Asian, African and African-Caribbean communities are more likely to have a stroke, and more likely to have a stroke at a younger age. [37] [50]

A 2013 study examined data from a south London stroke register from 1995 to 2010. The study found that while overall incidence of stroke reduced by 40% during the 16 year period, this was not the case for all ethnic groups. For example, there was a 41% reduction in incidence in the White ethnic group, but no significant changes in the black group. There was a consistently higher rate of incidence in those of Black origin throughout the study period. [37]

Figure 6 shows results from a different study, which examined mortality rather than incidence, and stratified this by country of birth. This should not be seen as a proxy for ethnicity, as it fails to capture non-white ethnic groups who were born in the UK, but it can still add to our understanding of ethnic and cultural differences in stroke risk. The study showed a higher mortality rate for many groups not born in England and Wales. In particular, men from West Africa and Bangladesh and women from Bangladesh appear to have over double the mortality rate of the general population.

Figure 6: Stroke standardised mortality ratios by sex and country of birth, people 20+ years old, England and Wales 2001-03



Data Source: [51] Note: Darker colours show countries where there is a statistically significant increased standardised mortality ratio (SMR) compared to the general population.

The ethnic differences in stroke incidence and mortality do not appear to be explained by differences in age, sex or social class. It seems more likely that the increased risk in these groups is due to a higher rate of cardiovascular risk factors such as hypertension, diabetes and high cholesterol. [37] [50] [52] For some ethnic groups, a higher rate of sickle cell disease (SCD) is also likely to increase stroke rates (see Section 4.3.7). [53] [54]

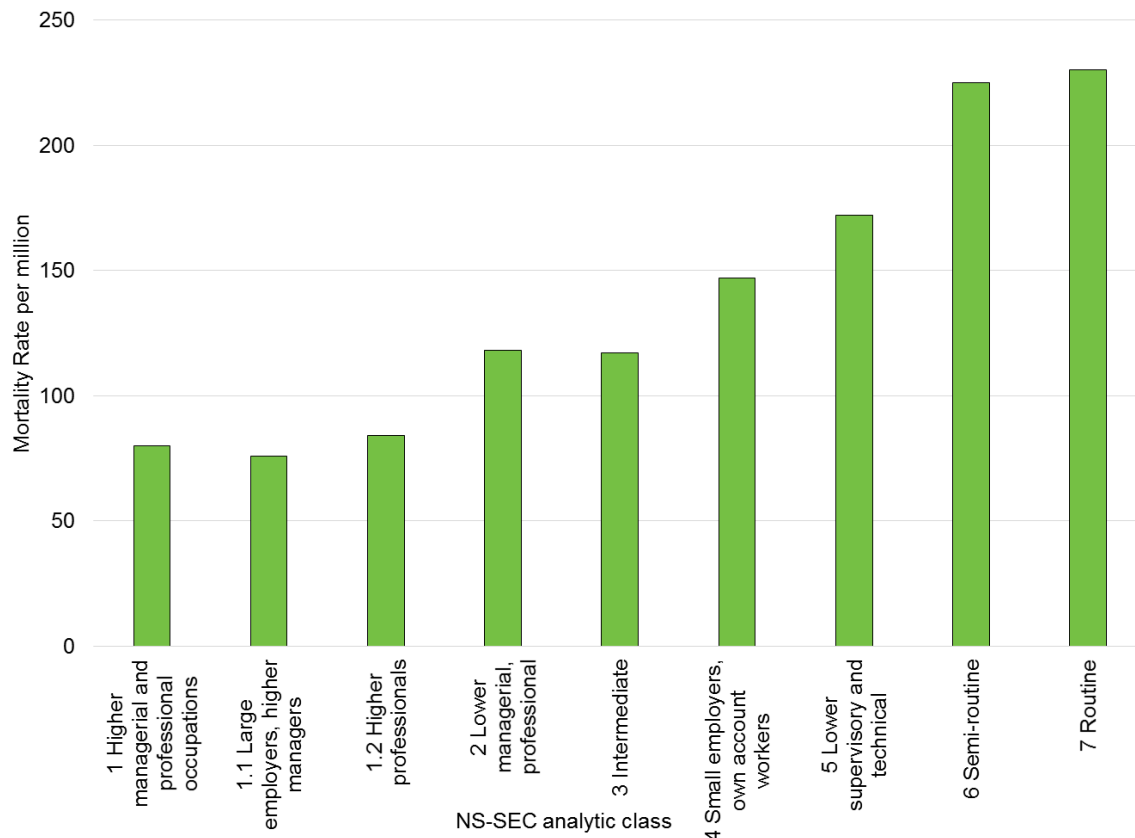
4.1.4 Socio-economic status and deprivation

A range of studies have shown clear socio-economic differences in stroke incidence and mortality, with those from lower socio-economic groups at a higher risk of both. [55] [56] A 2012 review of the evidence on stroke and socio-economic status reported “a generally increased impact of stroke among lower socioeconomic groups in different populations with a 30% higher incidence, more severe deficits in the acute phase, and higher case-fatality.” [57] This has been supported by recent evidence from 11 European countries (including Scotland and Northern Ireland), which found “widespread” social inequalities in stroke incidence. [58] NICE has also

recommended that socioeconomic status should be considered “an additional factor that contributes to CVD risk.” [59]

Figure 7 shows the gradient in premature mortality (under 65) in stroke, by socio-economic class. There is a clear inequality - those from the lowest social class (routine) have a mortality rate 2.9 times higher than those from the higher managerial and professional occupations.

Figure 7: Age-standardised mortality rates from stroke by socio-economic classification, men aged 25 – 64, 2001-03, England and Wales



Source: [60]

There is some similar evidence around area deprivation - people living in the most deprived areas of the UK are approximately twice as likely than those from the least deprived areas to have a stroke, and three times more likely to die from a stroke. [11]

A study of stroke registers in South London has also found evidence of deprivation related inequalities in survival and recovery rates among those who have a stroke. This includes a “weak but significant association” of socio-economic deprivation with reduced survival after stroke (both at 3 months and 17 years) [61] and evidence of significant inequalities in short- and long-term functional recovery after stroke. For example, compared with the least deprived, those in the most deprived quartile⁴ had a 78% higher risk of functional impairment at three months after stroke. [61]

⁴ Those living in the most deprived quarter of areas when ranked by deprivation.

The reasons for this relationship are complex. It does seem that a greater incidence of established risk factors (such as those listed in this document) in lower socio-economic groups, is part, but not all, of the explanation. For example, a review of the evidence in this area published in 2006 stated that “the mechanisms through which socioeconomic status affects stroke risk and outcomes are unclear but some studies report that differences in risk-factor prevalence could account for some of the variation.” [62] An update of this review, published in 2012, found that the relationship cannot be completely explained by differences in incidence of risk factors, or access to care. [57] A European study showed that “less than half of the gap is explained by major risk factors.” [58]

An analysis of the Health Survey for England using data from 1994 to 2004, which found that lower socioeconomic status was associated with higher mortality rates from stroke, reported that this relationship held even after adjusting for age, sex, smoking, BMI and diabetes (but not hypertension, due to incomplete data). The study conducted further analysis which suggested that one of the reasons for this relationship may be a greater impact of psychological distress on those from lower socio-economic groups. They find that “low socio-economic status operates as an amplifier of the noxious effect of psychological distress on mortality from coronary heart disease (CHD) and stroke.” [55]

4.1.5 Family history

Those who have a family history of stroke have an increased risk of developing stroke themselves. One study found a 69% higher risk of stroke where there was a family history of stroke under 65 years, compared to no family history of stroke. Adjusting for age, sex, and risk factors reduced this to a 38% higher risk, but it remained significant. [63] A different study found double the risk of stroke incidence where there was a paternal history of stroke, and an increase of 41% in the case of a maternal history. These figures were adjusted to take account of the influence of age, ethnicity, sex, cholesterol level, cigarette smoking status, history of CHD, hypertension and diabetes. [64]

While in some cases this may be due to similar exposure to environmental or behavioural risk factors, some studies have also shown a genetic influence on stroke risk. [65] [66] [67] [68]. Genetic conditions which may pre-dispose an individual to a stroke include mitochondrial diseases, Ehlers Danlos syndrome and CADASIL syndrome.

4.2 Lifestyle and behavioural risk factors

Lifestyle risk factors have a clear influence on stroke risk. The WHO estimates that approximately 80% of heart diseases, stroke and type 2 diabetes could be prevented by eliminating the shared risk factors of tobacco smoking, unhealthy diet, lack of physical activity and alcohol use. [69]

4.2.1 Smoking

Smoking cigarettes increases the risk of stroke – estimates range from doubling the risk to raising it to four times the rate in non-smokers. [70] [71] [72] There is also evidence that this is a dose-response relationship, meaning that the risk of stroke increases the more cigarettes someone smokes. [72] As one example, a study of young women found a strong dose-response relationship – those who smoked 1–10 cigarettes a day had an odds ratio (OR) of 2.2 for stroke, rising to 2.5 for 11–20 cigarettes per day, 4.3 for 21-39, and 9.1 for 40 or more cigarettes a day. [73]

The risk of stroke at a younger age may also be significantly increased by smoking. A study of people under the age of 45 who have had a stroke found that 52% of them were active smokers. [74] In addition, there is significant evidence of the increased stroke risk posed by exposure to second hand smoke. [72] One meta-analysis on this topic published in 2011 found a “strong, consistent and dose-dependent” association, and also suggested that the disproportionately high risks associated with relatively low levels of exposure might mean that there is no ‘safe lower limit’ of exposure to second hand smoke. [75]

However, evidence has also shown that five years after giving up smoking, the risk of stroke for ex-smokers is the same as non-smokers, regardless of how many cigarettes they smoked per day or age at which they started smoking. [71]

Smoking increases stroke risk primarily through contributing to atherosclerosis, and by increasing cholesterol. [76] Smoking also increases blood pressure, although smokers generally have lower blood pressure than non-smokers, which is related to a lower body weight, on average. [77]

Smoking prevalence among women has historically been significantly lower than rates among men. For example, in 1948, 82% of men smoked tobacco, compared to 41%. [78] Data since then continues to show higher rates among men, although the difference has significantly reduced. [79] This, alongside other gender differences in risk factors, may partly explain the higher prevalence of stroke among men.

4.2.2 Illegal drug use

There is some (limited) evidence for the role of illegal drug use as a stroke risk factor. For example, one case control study of women aged 15 to 44 years found that there was a seven times higher risk of stroke among women who admitted to using cocaine and/or amphetamines. [80] Another study of hospital data in America from 2000 to 2003 found a significant increased risk of haemorrhagic stroke associated with amphetamine abuse, and both main types of stroke associated with cocaine abuse. Amphetamine abuse was also associated with a higher risk of death in the case of haemorrhagic stroke. [81]

Cocaine and amphetamine use both cause a sudden and dramatic spike in blood pressure – thereby increasing the risks of stroke. [82] In one study, in the 24 hours following cocaine use, there was a six to seven times higher risk of ischaemic stroke. [83]

However, the evidence is mixed. For example, other studies have found no significant association between ischaemic stroke and crack cocaine use, and no association between cocaine use and stroke. [84] [85]

4.2.3 Physical inactivity

Physical inactivity is an important risk factor for stroke – evidence suggests that physical inactivity and a sedentary lifestyle increase the risk of an ischaemic stroke by 50%, and undertaking moderate physical activity has been estimated to reduce the risk of stroke by up to 27%. [86] [87]

Physical inactivity increases the risk of stroke in part as it can contribute to obesity, (see Section 4.3.5), but it also has a separate impact by increasing blood pressure and the risk of Type 2 diabetes (see Section 4.3.3). [88]

4.2.4 Unhealthy diet

An unhealthy diet – i.e. one that is high in saturated or trans fats or sodium (salt), or low in fruit and vegetables - can increase the risk of stroke. [32] [89] A meta-analysis of fruit and vegetable consumption and stroke published in 2006 found that eating at least three servings of fruit and vegetables per day significantly reduced the risk of stroke compared to those who ate less than three servings. Those who ate more than five servings had a 26% lower risk of stroke. The study concludes that consuming “more than five servings of fruit and vegetables a day... is likely to cause a major reduction in strokes.” [90] Eating more wholegrain foods has also been shown to be associated with a lower risk of stroke among women. [91]

A diet high in saturated and trans fats can contribute to the build-up of plaque in the arteries (atherosclerosis), and a high sodium diet increases the risk of hypertension. [32] There is also evidence of a direct effect of high sodium diets on stroke risk, aside from an increase in blood pressure. Estimates suggest that if adults reduced their salt intake to the WHO recommendations of 5g per day, the risk of stroke could be reduced by 23%. [92] Current UK recommended levels are 6g per day.

4.2.5 Alcohol

There is evidence that excessive alcohol consumption can increase stroke risk. For example, men who drink over 35 units a week have double the risk of mortality from stroke than non-drinkers. [93] A meta-analysis of alcohol consumption and risk of stroke published in 2003 found that heavy alcohol consumption increases the risk of all types of stroke, compared to alcohol abstinence. In the case of haemorrhagic stroke, consumption of more than 60g of alcohol per day⁵ more than doubled the risk. [94] Excessive alcohol use could also act as a ‘trigger’ for a stroke. A systematic

⁵ The study used a conversion of 0.785g = 1mL. Therefore 60g is equivalent to 76.2mL, or just over 7 units.

review of ischaemic stroke triggers found a two to three-fold increased risk of stroke after alcohol abuse⁶, both within 24 hours and within 1 week. [95]

It does not appear that this is a dose-response relationship at the lower levels – the meta-analysis, for example, found that light alcohol consumption of less than 12g per day⁷ was associated with a reduced risk of stroke compared to abstinence. [94]

Excessive alcohol consumption increases the risk of stroke by contributing to increased blood pressure and levels of triglycerides, which increase the risk of atherosclerosis. [96]

4.3 Existing medical conditions

Those with existing medical conditions such as hypertension, diabetes or raised cholesterol have a significantly increased risk of stroke. These medical conditions are themselves often a product of the demographic and lifestyle stroke risk factors listed in Sections 4.1 and 4.2.

4.3.1 Hypertension

Hypertension (high blood pressure) is the single biggest risk factor for stroke that can be prevented and/or treated. People with hypertension are four times more likely to have a stroke than those with normal blood pressure [97] and high blood pressure is a contributing factor to 54% of strokes in England, Wales and Northern Ireland. [98]

Hypertension is a result of other risk factors – unhealthy diet is estimated to be accountable for half of the observed hypertension burden whereas physical inactivity and obesity are accountable for 20% each. [99]

4.3.2 Atrial fibrillation

Atrial fibrillation (AF) is an irregular beat of the heart, which increases the risk of stroke as it can cause blood clots in the heart that then become lodged in the arteries supplying the brain. AF is found in at least 15% of all stroke patients, [100] [101] and the risk of stroke increases five-fold for people with AF. [102]

There is also evidence that when strokes do occur, they tend to be more severe for those patients with AF. These patients have higher 30 day and one year mortality, and higher recurrence rates at one year (23% compared to 8% in those without AF). [103]

Incidence of AF increases with age – it doubles every decade over 55 years. [104] Men also have a 1.5 times greater risk of developing AF than women [104], but AF-related strokes in women are more likely to lead to death than in men – the reasons why are not currently known. [105]

⁶ Defined in this study as 40 – 60g (roughly 5 – 7 units) consumption in the preceding 24 hours, or up to 150g (roughly 19 units) in the previous week.

⁷ This is equal to 15mL, or 1 and a half units.

It is estimated that over a third of people with AF are undiagnosed. [101]

4.3.3 Diabetes

Diabetes is a condition that causes blood sugar levels in the body to become too high. Type 1 diabetes occurs when the immune system attacks the cells that produce insulin (a hormone that controls the amount of sugar in the blood), and Type 2 diabetes (which is much more common in UK adults) occurs when the body doesn't produce enough insulin, or cells in the body don't react to insulin. Diabetes increases the risk of stroke – estimates range from doubling to tripling the risk compared to those without diabetes. [98] [106] Diabetes has been estimated to be a contributing factor in approximately 20% of strokes in England, Wales and Northern Ireland. [98] [106] It appears that women with diabetes are at a higher risk of stroke than men with diabetes. [107]

A large scale American study of over 100,000 women over a 25 year period found that the incidence of stroke was fourfold higher in those with type 1 diabetes, and twofold higher in those with type 2 diabetes, compared to non-diabetic women. Type 1 diabetes appeared to be significantly associated with risk of ischaemic stroke (OR 6.3) and haemorrhagic stroke, (OR 3.8). Type 2 diabetes was significantly associated with ischaemic stroke (OR 2.3) but not with haemorrhagic stroke. [108]

There is some evidence that diabetes also increases the risk of recurrent stroke, especially in the case of ischaemic strokes. [109]

Diabetes increases the risk of stroke as high levels of glucose in the blood can contribute to atherosclerosis, which increases the risk of stroke.

4.3.4 Raised total cholesterol levels

Cholesterol is a fatty substance in the blood. There are two main types of cholesterol – high-density lipoprotein (HDL) and low-density lipoprotein (LDL). HDL is referred to as 'good' cholesterol and higher levels are better. LDL is known as 'bad' cholesterol and high levels can lead to atherosclerosis, an important risk factor for stroke.

A meta-analysis of randomised trials which included over 150,000 individuals, showed that reducing LDL cholesterol by 1mmol/L reduces the risk of stroke by more than 21%. [110] The use of statins has also been estimated to reduce the risk of stroke by 25% among those with a high risk of cardiovascular events. [111] However, it appears that the association between cholesterol and stroke only holds for ischaemic stroke – for haemorrhagic stroke, high cholesterol levels may reduce the risk. [112]

Raised blood cholesterol can be caused by eating a diet that is high in saturated fat, smoking, physical inactivity, high alcohol intake, liver and/or kidney disease, or genetic factors.

4.3.5 Obesity

A 2010 meta-analysis of international studies, which included results for two million participants, found clear evidence that overweight and obesity increased the risk of stroke. Overweight participants had a 22% higher risk of ischaemic stroke, and obese participants had a 64% higher risk. For haemorrhagic stroke, there was no relationship with being overweight, but a 24% higher risk in obese participants. Analysis showed that this relationship is still present independently of the effects of gender, age and blood pressure. [113]

4.3.6 Previous stroke/TIA

Having already had a stroke or a TIA significantly increases the risk of having a subsequent stroke. For example, there is evidence that those who have had a TIA are approximately six times more likely to have a stroke than those who have not. [8]

The risk of a recurrent stroke is highest in the immediate aftermath of a stroke or TIA. A meta-analysis of international studies found that the risk of experiencing recurrent stroke was 3% in the first 30 days, 11% at 1 year, 26% at 5 years, and 39% at 10 years after an initial stroke. [114]

4.3.7 Sickle cell disease

Sickle cell disease (SCD) is a group of conditions that affect the shape of red blood cells, which can increase the chance of blood clots. One quarter (24%) of people with SCD will have a stroke by the age of 45 and 7-13% of children with SCD will have a stroke – their risk of stroke is 333 times higher than children without SCD. [115] [116]

Around 10,000 people in the UK have SCD – those of African, African-Caribbean, Asian and Mediterranean heritage are at greater risk. [53] [54] This contributes to the observed ethnic inequalities in stroke risk described in Section 4.1.3.

4.3.8 Mental illness

There is clear evidence that experiencing a stroke has a range of mental health impacts on an individual. However there is also some (limited) evidence that mental illness can act as a risk factor for stroke.

A Taiwanese study compared those with bipolar disorder who had been hospitalised for an acute mood episode to a control group who had been hospitalised for an appendectomy. Over six years follow-up, those in the bipolar group were twice as likely to have a stroke as those in the control group, even after controlling for demographic characteristics, co-morbid medical disorder, and substance or alcohol dependence. [117] An American study found that over 13 years, those with a history of depressive disorder were 2.6 times more likely to report a stroke than those without, after controlling for heart disease, hypertension, diabetes, and smoking. [118]

It has been recommended that the Global Burden of Disease study increase the evidence available on mental disorders as risk factors for disease, including in the case of stroke. [119] More evidence is needed on whether mental illness is an independent risk factor for stroke, or whether the association is due to the higher prevalence of lifestyle risk factors such as smoking among those who have mental illness.

4.4 Multiple risk factors

Evidence suggests that the likelihood of stroke (and other cardiovascular conditions) increases with the number of risk factors present. [120] [121]

A population-based study in South American women showed that those who reported four to five risk factors⁸ were seven times more likely to have CVD than those who reported one or no risk factors. The largest difference in risk of CVD was found for people who reported having both hypertension and diabetes – a nine-fold increase in CVD risk. [121]

The most common clusters of behavioural risk factors in the population in England are diet (low fruit and vegetable intake) and physical inactivity – the age-adjusted prevalence of both risk factors combined is estimated to be 30% in women and 22% in men. [122]

⁸ The risk factors considered in this study were hypertension, diabetes, obesity, low fruit/vegetable intake, lack of physical activity and smoking

5 Incidence, prevalence and outcomes of stroke in Hackney and the City

Key Points

- Recorded prevalence of stroke/TIA (using GP data) in City and Hackney is much lower than modelled estimates would imply – 0.9% vs. 2.3% (age standardised rates). However, neither of these sources are likely to be an accurate representation of underlying trends and so it is difficult to determine the level of unmet need locally. There is significant variation across GP practices in the age-adjusted recorded stroke/TIA prevalence (from less than 1% to over 3%).
- There is also some uncertainty about local incidence of stroke, estimated on the basis of stroke-related hospital admissions. Published data (aggregated over a 10 year period) suggests that incidence of stroke in City and Hackney is broadly in line with most of its statistical peers (220 per 100,000 population), but higher than the national average.
- The vast majority of strokes locally are ischaemic in nature.
- An estimated 7% of deaths in City and Hackney are caused by stroke (77 deaths each year), one third of which are deemed to be avoidable.
- More stroke patients are moderately impaired, and fewer have a minor impairment, than nationally. Most stroke survivors in Hackney and the City require occupational therapy, physiotherapy or speech and language therapy.
- Analysis by socio-demographic characteristics reveals the following for City and Hackney:
 - 64% of prevalent stroke patients are over the age of 65 and 41% are age 75+; stroke is much more likely to be fatal in older adults (age 75+)
 - as nationally, women have slightly lower prevalence of stroke/TIA at most ages
 - the highest recorded prevalence of stroke/TIA is in GP patients of Black Caribbean ethnic origin
 - there is only a very weak association between local area deprivation and recorded stroke prevalence
- A higher proportion of local stroke/TIA survivors are recorded to be non-smokers and non-drinkers than average, which is likely to reflect behavior modification following stroke (as well the older age profile of stroke patients).
- As nationally, prevalence of hypertension, AF, diabetes and obesity are substantially higher in stroke patients than average. Conversely, a much lower proportion of stroke patients in City and Hackney are recorded to have high cholesterol, which reflects successful treatment following stroke.
- The additional risk of stroke in patients with diabetes is significantly higher locally than some comparable areas and the England average.
- Patients with SMI are twice as likely to have experienced stroke/TIA, according to City and Hackney GP records.

5.1 Introduction

This chapter provides estimates of stroke prevalence and incidence in the City and Hackney, using a range of sources to describe the impact of stroke on the health and wellbeing of the population. It also provides an overview of the prevalence of the main risk factors for stroke in Hackney and the City and how these relate to local prevalence of stroke/TIA.

5.2 Estimated stroke prevalence

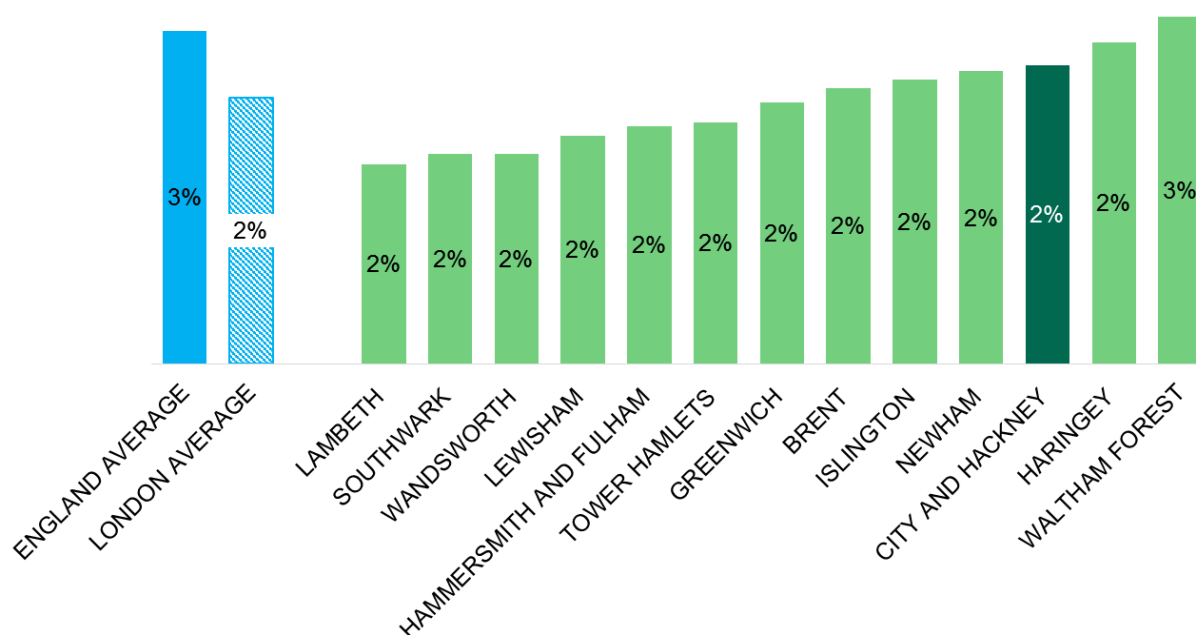
Section 3.2.3 of this report describes the difficulties in obtaining reliable estimates of stroke prevalence (and incidence) in a population. Reliable estimates of TIA prevalence (or incidence) are even more difficult to come by, as this is less likely to be diagnosed in practice. This section covers estimated stroke *prevalence* only.

One source that can be used to estimate local stroke prevalence is a model developed by Imperial College London and the Association of Public Health Observatories (APHO) in 2011, based on self-reported data from the 2003-4 Health Surveys for England. [3] While it is important to exercise caution in the interpretation of estimates from population surveys such as this (see Section 3.2.3 for more detail), especially with data that is over 10 years old, they may be regarded as a reasonably reliable source for comparing estimated stroke prevalence across similar areas.

The APHO model produces a stroke prevalence estimate of 2.3% among the adult (age 16+) population of Hackney and the City. Applying this prevalence rate to the latest population estimates suggests that as many as 5,118 adults (age 16+) may have experienced stroke in the local population. [3] [4]

Figure 8 shows that estimated stroke prevalence in Hackney and the City, using the APHO model, is towards the upper end of estimates of its statistical peers, and broadly in line with the London average. However, it is not possible from the available data to conclude whether or not the local estimate is statistically different from other areas.

Figure 8: Estimated prevalence of stroke, age 16+ (2011)



Source: Association of Public Health Observatories [3]

Note: Confidence intervals not provided

Data from a UK sample of GP records (again excluding TIA) suggest that, nationally, actual stroke prevalence may be quite close to these modelled estimates – although the data cover different periods (2014 and 2003-4, respectively). [123] However, **advice from PHE suggests that the APHO model is likely to produce an over-estimate of stroke prevalence in areas with a young age profile, such as Hackney and the City** (see section 5.6.1). Section 3.3.1 of this report highlighted the lower QOF recorded stroke prevalence in London compared with England, likely attributed to the younger age profile in the capital.

5.3 Recorded prevalence and incidence (i.e. known to local services)

This section summarises local data on prevalence of stroke/TIA (from GP patient records) and incidence of stroke/TIA (from hospital admission records). Data on repeat or recurrent strokes were not able to be compiled for the purpose of this needs assessment.

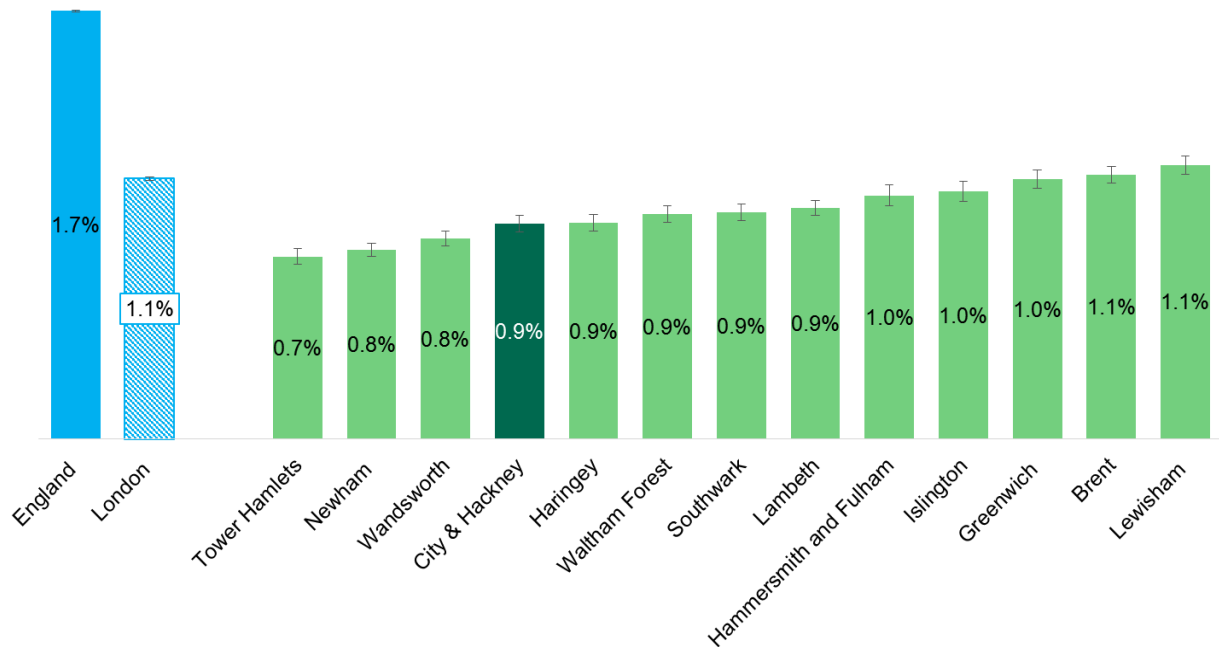
5.3.1 Prevalence – primary care (GP) data

GP patients who have experienced a stroke or TIA are recorded using the national QOF system. As mentioned previously, these data are likely to provide underestimates of true prevalence. Moreover, they are not age adjusted.

The percentage of patients (all ages) recorded with stroke or TIA in the City and Hackney is 0.9%, which is lower than London as a whole and around average for similar CCG areas (Figure 9).

A snapshot of local GP records in 2016 shows 2,622 patients within the City and Hackney recorded with stroke/TIA – again, this represents a prevalence of 0.9% (all ages).

Figure 9: GP (QOF) recorded prevalence of stroke and TIA (all ages, 2014/15)

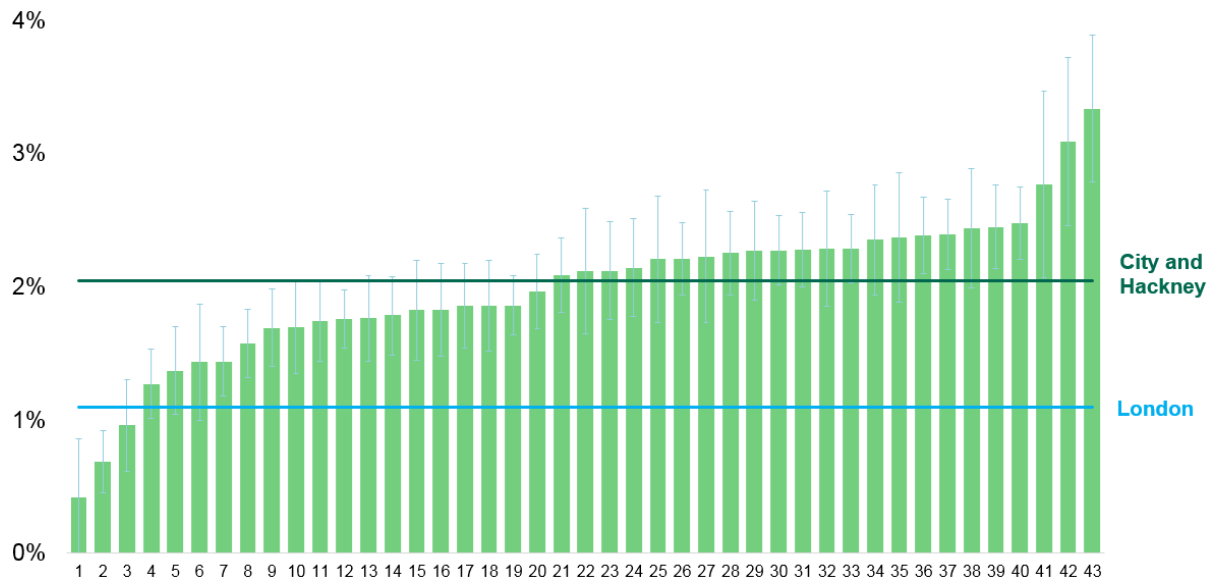


Source: PHE Fingertips tool [2]

Note: PHE Fingertips uses QOF data for the basis of these statistics (which includes patients who have experienced either stroke or TIA)

Figure 10 shows how the age-standardised prevalence of stroke/TIA by GP practice varies in Hackney and the City - from less than 1% to over 3%. This indicates that age alone does not explain the variation in stroke prevalence between practices.

Figure 10: Age standardised GP recorded stroke/TIA prevalence (all ages) in Hackney and the City, by GP practice (2016)

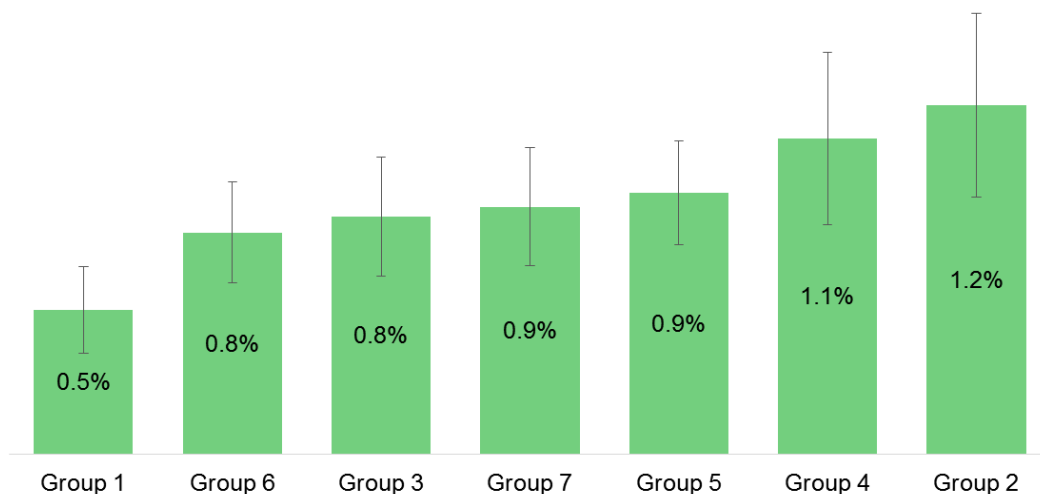


Source: CEG [124]

Note: Each number on the x-axis relates to a GP practice (see Appendix B for the GP practice name that coincides with each number)

Figure 11 below shows the prevalence of stroke by GP practice groupings (based on common demographic features of their registered patient population). There are no significant differences between practices, except in group 1 which has a significantly lower recorded stroke prevalence (in line with a larger comparative proportion of the registered population who are children).

Figure 11: Recorded stroke/TIA prevalence by practice groups (2016)



Source: CEG [124]

Notes: Description of practice groupings below (see Appendix C for list of practices within each group)

- Group 1: Relatively more children, fewer >65s, high % Charedi population, med/low deprivation

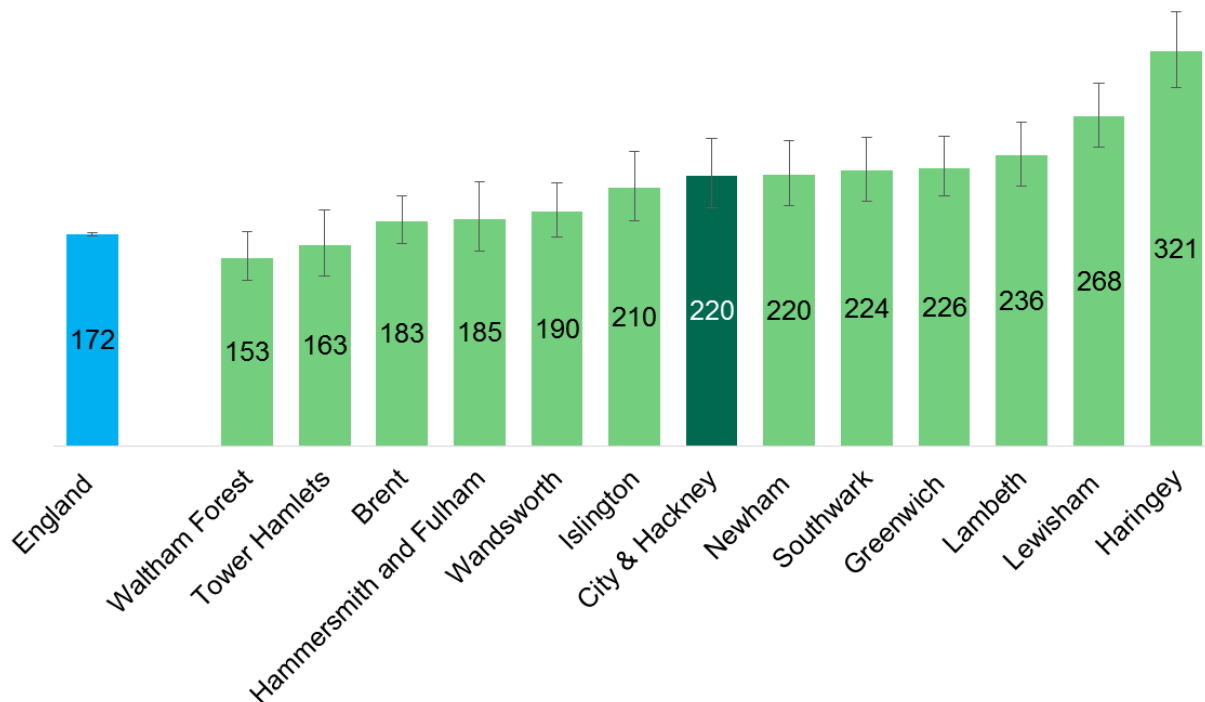
- Group 2: Med/high proportion children and med/high >65s, low % British and high Black ethnic groups, med/high deprivation, medium patient turnover
- Group 3: Med/low proportion children, med/high >65s, med/high % British ethnic group, med/low deprivation
- Group 4: Relatively low proportion children, med/high >65s, high % Black ethnic group, high deprivation
- Group 5: Med children, med/low >65s, med/high % British and Black ethnic groups, med/high deprivation, med patient turnover
- Group 6: Med children, med/low >65s, med/high % British and med/low % Black ethnic groups, med/high deprivation, med/high patient turnover
- Group 7: Med children, med/low >65s, med/low % British ethnic group, med/high deprivation, med/high patient turnover

5.3.2 Incidence - secondary care (hospital) data

In total, 186 patients (all ages) from Hackney were admitted to a stroke unit in London in 2014/15 according to SSNAP (no patients were admitted outside of London). The vast majority (81%) of these patients were admitted to the Royal London Hospital and 13% were admitted to University College Hospital. A small number (2.7%) of City and Hackney patients have an onset of stroke symptoms while they are already in hospital. [1]

Figure 12 reveals that the age adjusted hospital admission *rate* for stroke in the City and Hackney population over the past 10 years is broadly in line with most statistical peers, but higher than the national average. Trends in age standardised admissions rates over this period are shown in Figure 13, for City and Hackney, London and England. More recent local data suggest that stroke admissions may have be increasing.

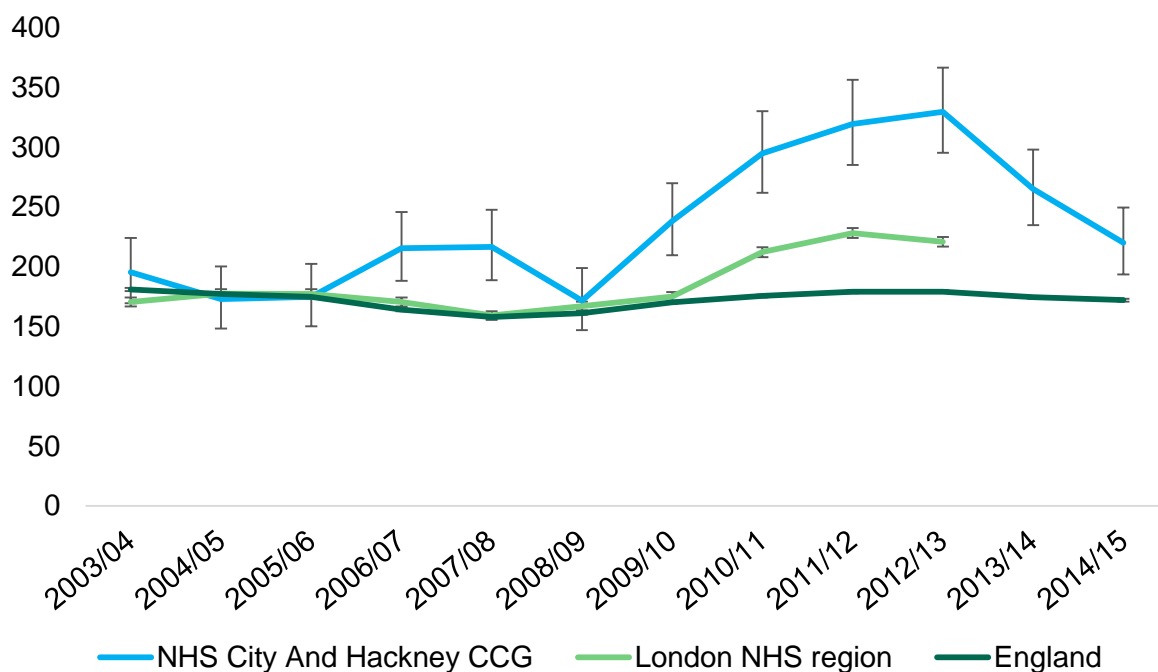
Figure 12: Age standardised rate of admission to hospital for stroke per 100,000 population (2004/05 to 2014/15)



Source: PHE Fingertips tool [2]

Note: PHE Fingertips uses Hospital Episode Statistics, which includes ICD-10 codes I61, I63, I64 from the 'Cerebrovascular diseases' group of conditions. This does not specifically capture patients with TIA.

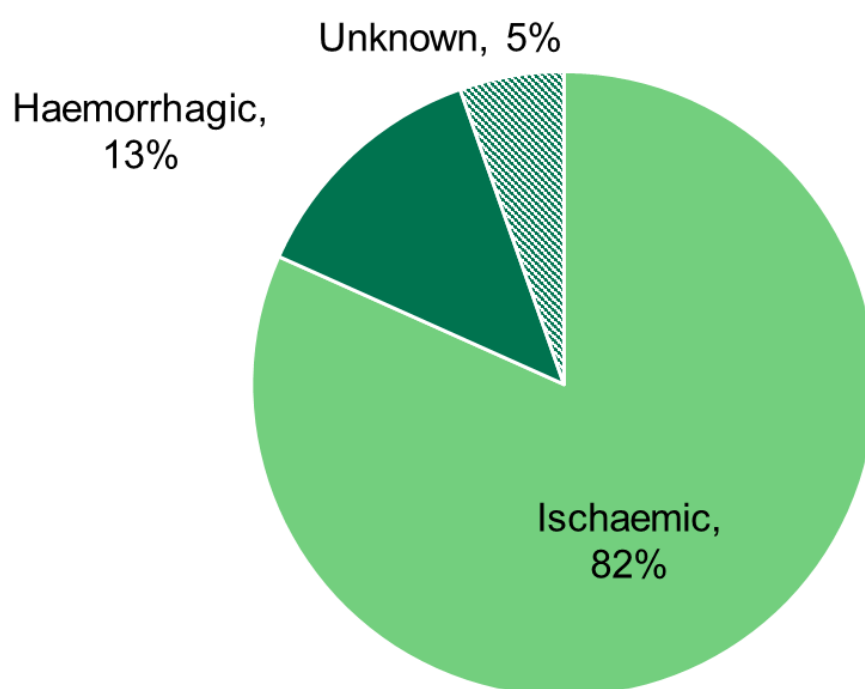
Figure 13: Trends in age standardised rate of admission to hospital for stroke per 100,000 population (2004/05 to 2014/15)



Source: PHE Fingertips tool [2]. Note: See Figure 12.

In line with evidence from the literature (see Section 3.1), the vast majority of strokes in City and Hackney residents (82%) are ischaemic (i.e. caused by a blockage of the blood flow to the brain). Figure 14 also shows that 13% of strokes in 2014/15 were haemorrhagic (i.e. caused by bleeding in or around the brain). A small proportion (5%) were of unknown cause.

Figure 14: Stroke admissions in City and Hackney patients by type of stroke (2014/15)



Source: SSNAP [1]

5.4 Unmet need

Section 3.2.3 of this report noted that health service data, such as that reported from GP practice and hospital records, are likely to underestimate the true or underlying population prevalence of stroke (and TIA). However, given the limitations of available modelled estimates (see Section 5.3), **it is not possible to reliably determine the scale of undiagnosed stroke/TIA, and therefore unmet need, in the City and Hackney population.**

5.5 Outcomes from stroke

5.5.1 Mortality

Stroke is estimated to cause 7% of all deaths in Hackney and the City – an estimated 77 deaths each year. One third (34%) of these deaths are estimated to be avoidable. [125]

Locally, deaths are reported using ONS mortality data. The age-standardised rate of mortality in the City and Hackney shows there are 18 deaths from stroke for every 100,000 people (all ages). [124] This calculation has been based upon a stroke being mentioned in 'underlying cause of death' in their mortality records between the years of 2013-15.

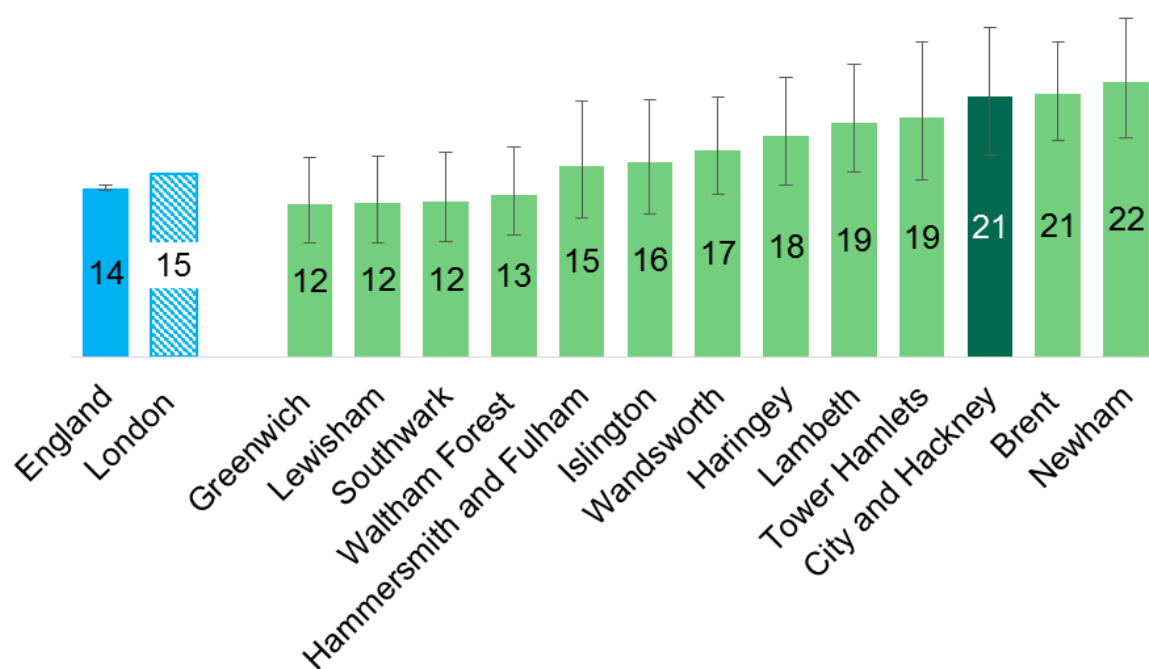
The mortality rates displayed below use age standardised measures that help to account for variation in population age structures in different areas.

Figure 15 and Figure 16 show that age standardised stroke mortality rates are much higher in those aged 75 and above than in under 75s.

For the under 75 population, the City and Hackney have a higher stroke mortality rate than the England average. However, as shown in Figure 15, the wide confidence intervals mean that local mortality rates are not significantly different from most comparable areas (despite being at the higher end of the range).

Stroke mortality rates for people aged 75 and over in the City and Hackney are similar to comparable areas and lower than the England average (Figure 16).

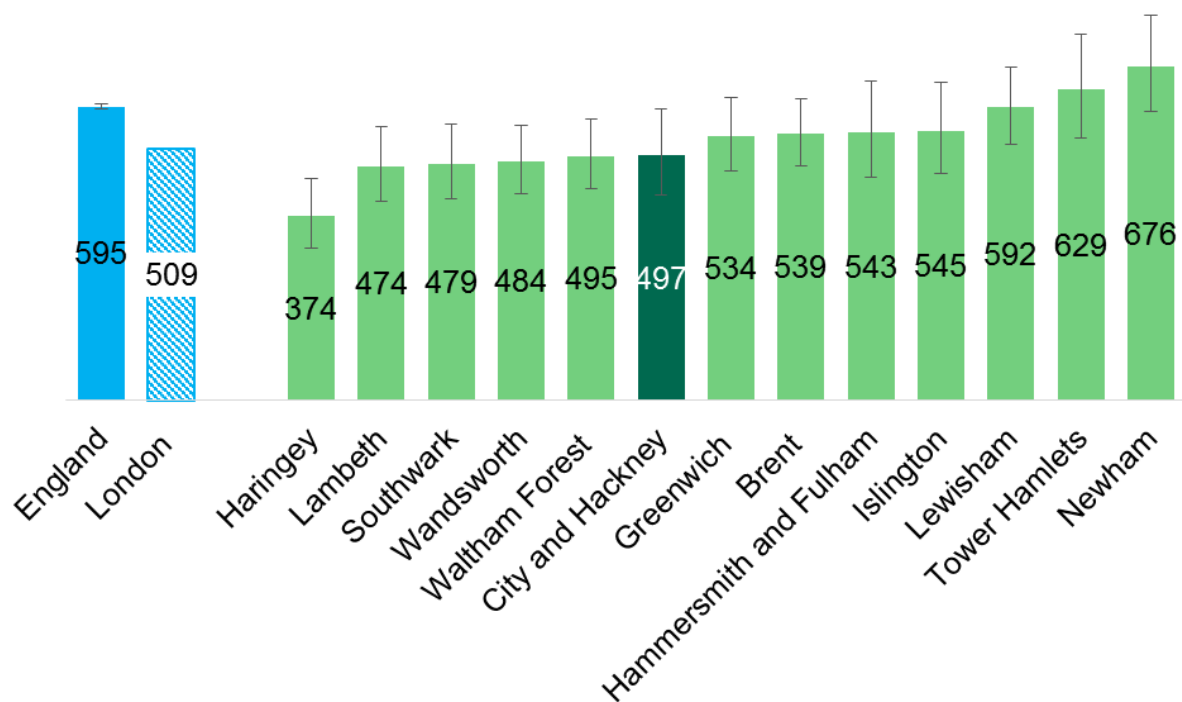
Figure 15: Age-standardised stroke mortality rates in adults under 75 years (2013-15)



Source: PHE Fingertips tool [2]

Note: London value calculated using mean average of all areas within NHS London Region, confidence intervals not available

Figure 16: Age-standardised stroke mortality rates in adults age 75+ (2013-15)



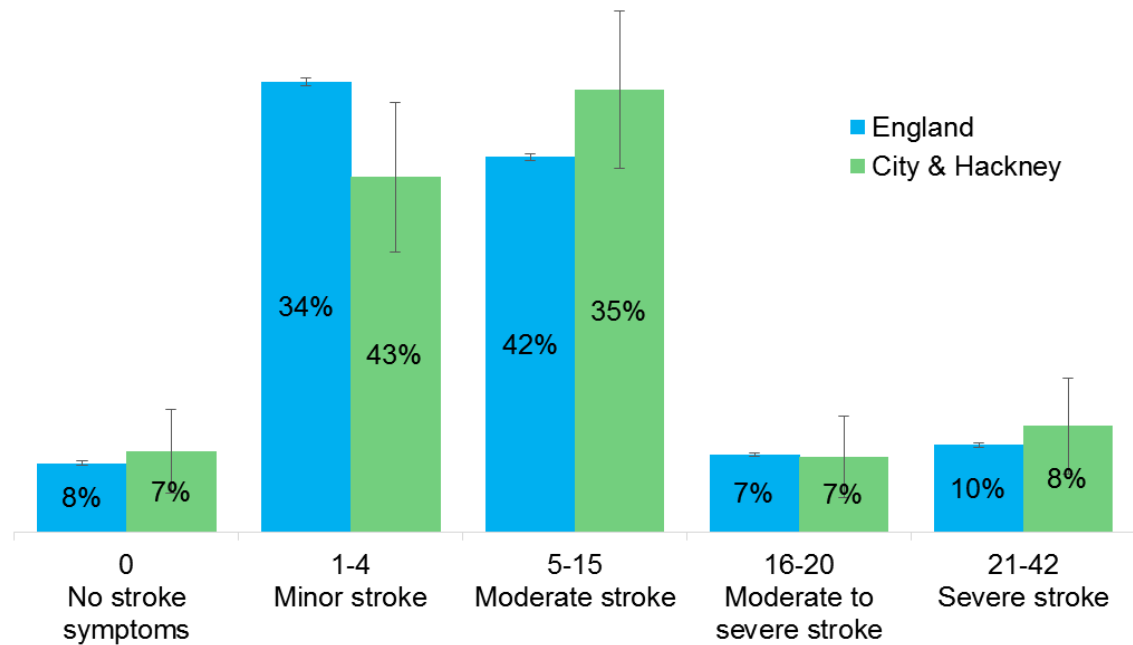
Source: PHE Fingertips tool [2]

Note: London value calculated using mean average of all areas within NHS London Region, confidence intervals not available

5.5.2 Morbidity

The level of impairment experienced as a result of stroke is similar in the City and Hackney to the national picture (Figure 17). However, locally stroke patients are more likely to be moderately impaired as a result and less likely to have a minor impairment than nationally.

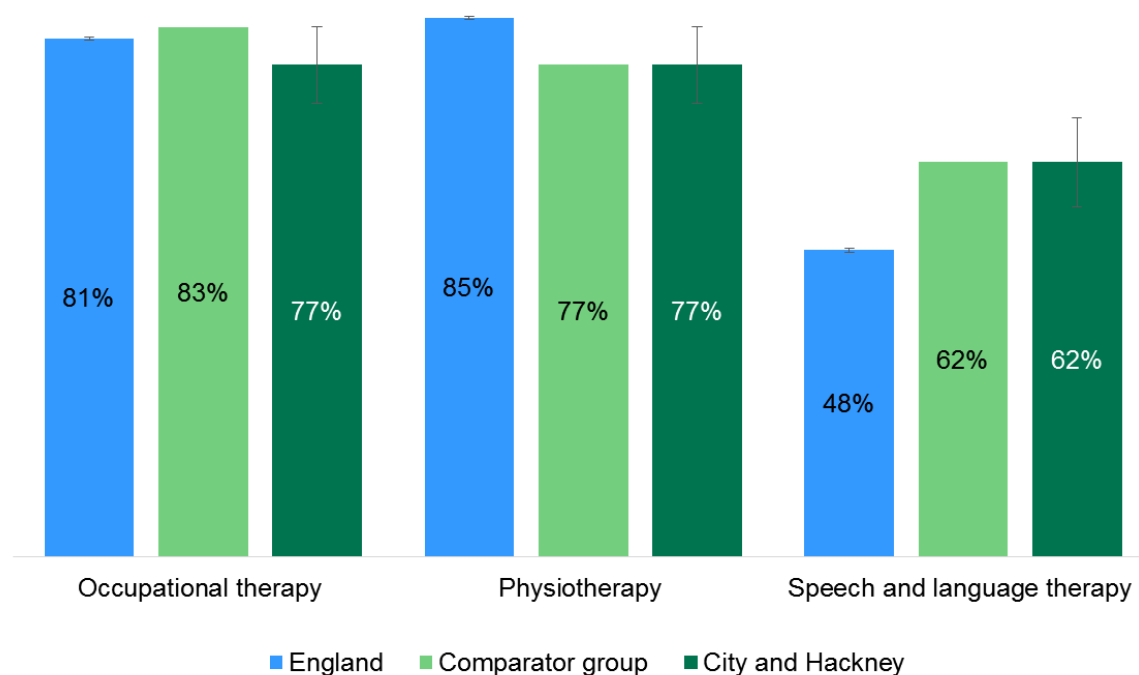
Figure 17: National Institute of Health Stroke Scale (NIHSS) score for City and Hackney SSNAP patients (2014/15)



Source: SSNAP. [1]

Of the patients identified through SSNAP, the majority are reported as requiring some level of rehabilitation therapy (speech and language, occupational therapy or physiotherapy) as shown in Figure 18 below. The proportion of patients requiring rehabilitation post-stroke is broadly similar to that of comparable areas in London. In total, 144 City and Hackney patients required occupational therapy in 2014/15, 111 required physiotherapy and 69 required speech and language therapy.

Figure 18: Percentage of stroke patients requiring physiotherapy, occupational therapy and speech and language therapy following stroke (2014/15, all ages)



Source: SSNAP. [1]

Notes: Confidence intervals not reported. London value not available for this indicator. Comparable areas include; City and Hackney, Brent, Greenwich, Hammersmith and Fulham, Haringey, Islington, Lambeth, Lewisham, Newham, Tower Hamlets, Waltham Forest, Southwark, Wandsworth

5.6 Causes and risk factors

5.6.1 Demographics

As described in Chapter 2, this report uses similar areas in London for comparing data found in the City and Hackney. As such, on the whole, the local demographic profile is broadly similar to this statistical peer group, with the exception of deprivation – local levels of deprivation (especially in Hackney) tend to be higher on average.

5.6.1.1 Age and gender

As described in Section 4.1 of this report, age is the single most important risk factor for stroke.

Hackney is a young borough with around a quarter of its population under the age of 20, similar to the London average (Figure 19). [126] The Greater London Authority (GLA) predict a rise in the number of working aged adults (18-64) over the next 25 years, especially in the 40-64 year old population. A steady increase in those over the age of 65 is also projected, particularly in the years from mid-2020's onwards.

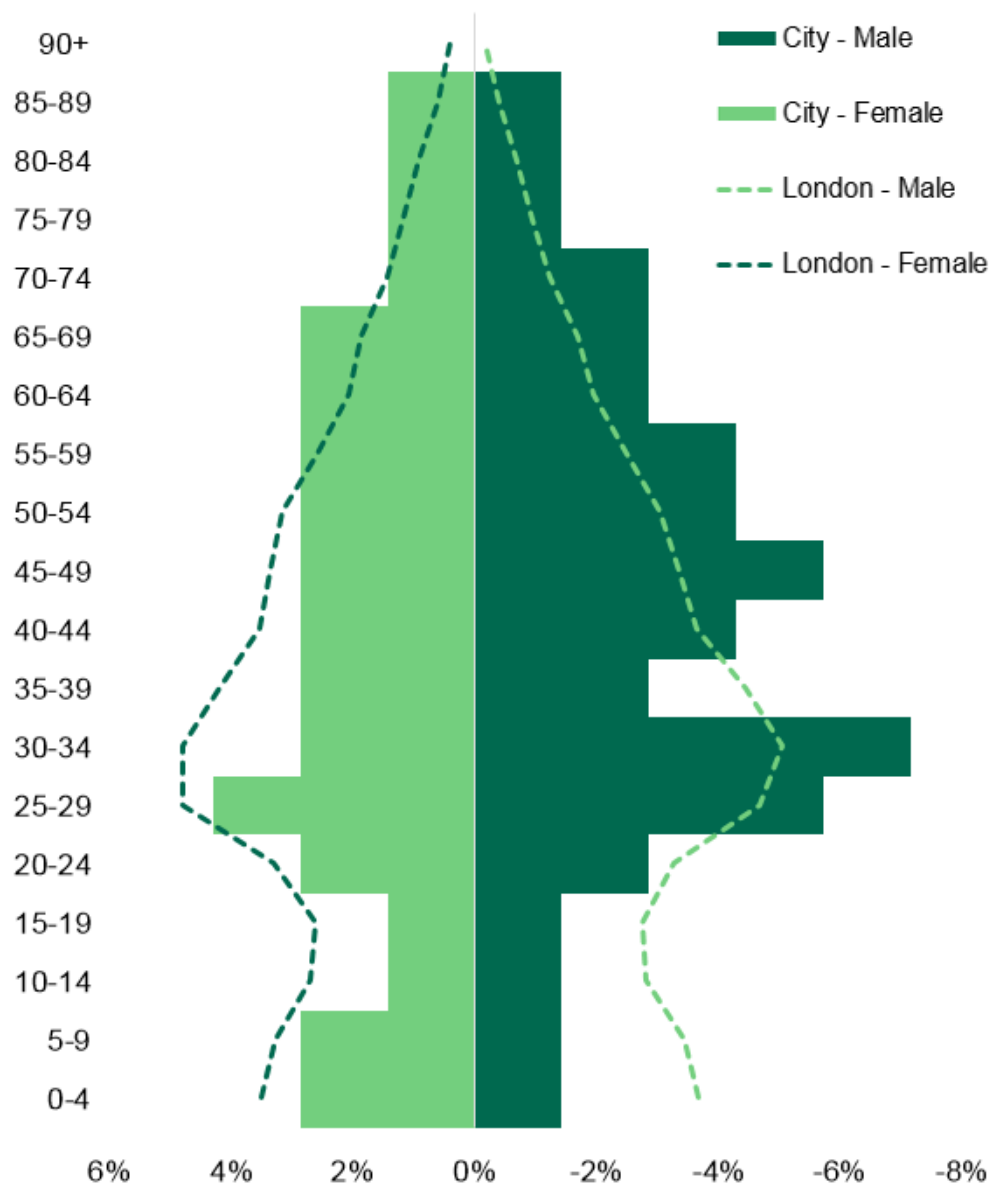
Figure 19: Population of Hackney, by five-year age group and gender (2016)



Source: GLA. [4]

The City of London's resident population is much smaller (at just under 7,200) and the age profile is different to Hackney (and other comparable areas), as there are relatively few children and young people. Conversely, almost 20% of the population are over the age of 65 (London average is 12%, Hackney is 7%).

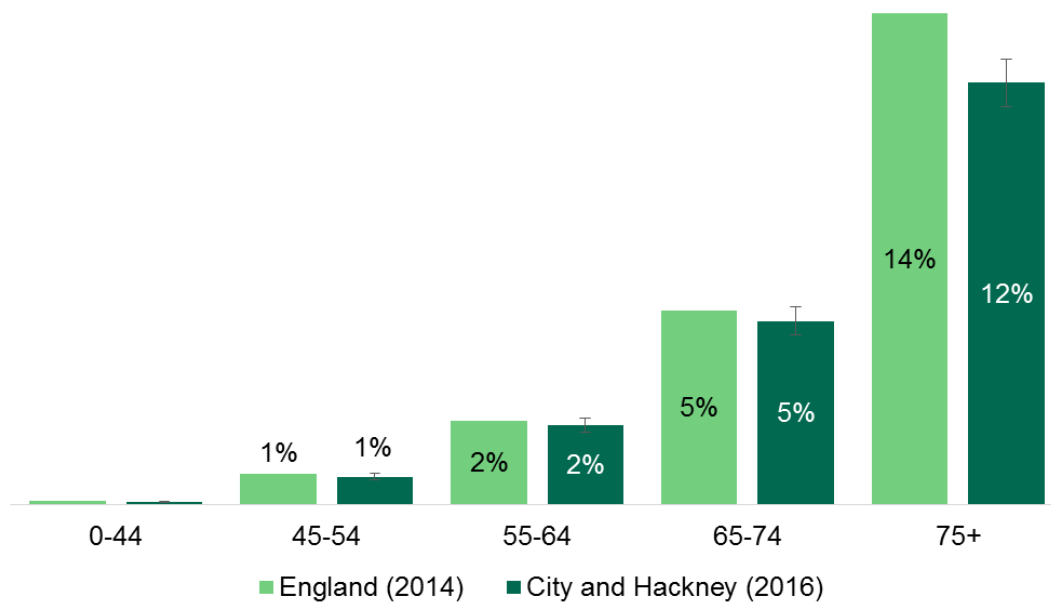
Figure 20: Comparison of the resident City of London population with London by age band and gender (2016)



Source: GLA. [4]

Reflecting national trends (see section 2.1.1 of this report), Figure 21 shows the increasing prevalence of stroke/TIA by age in Hackney and the City. The local prevalence by age group is similar to recorded prevalence of stroke across England. Locally, 64% of prevalent stroke/TIA patients are over the age of 65, and 41% are aged 75+.

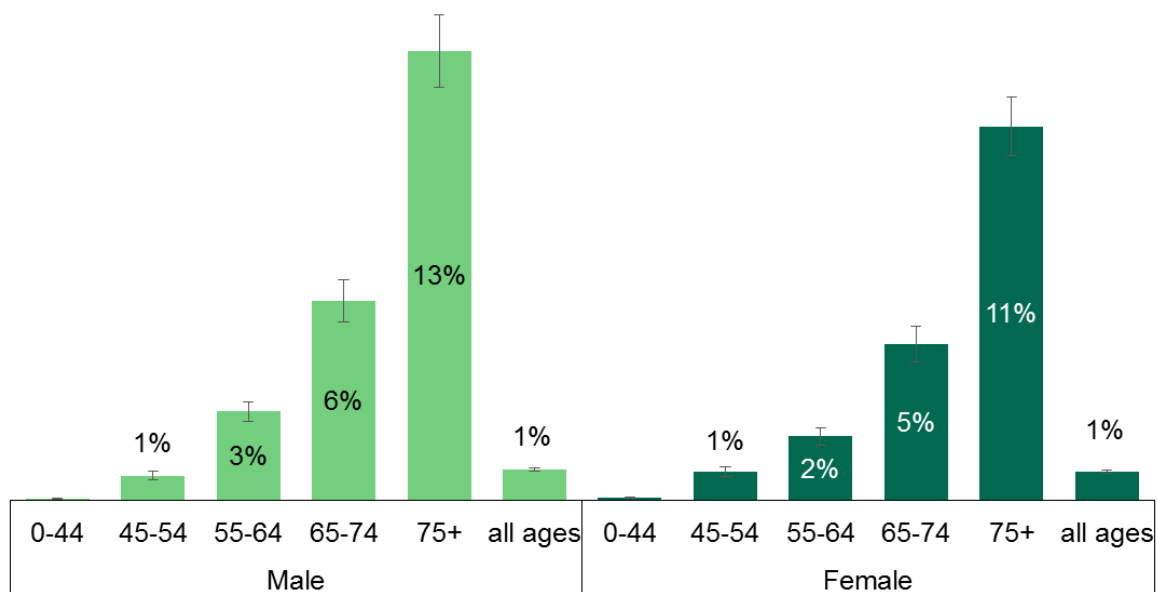
Figure 21: Percentage of GP patients (all ages) recorded with stroke/TIA, by age group in England (2014) and City and Hackney (2016)



Sources: The epidemiology of cardiovascular disease in the UK 2014; [123] CEG. [124]
 Note: Numerator used for this calculation is the number of total patients per age group.

There is a broadly similar distribution of male and female stroke/TIA patients by age group (Figure 22).

Figure 22: Percentage of City and Hackney GP patients recorded with stroke/TIA, by age group and gender (2016)

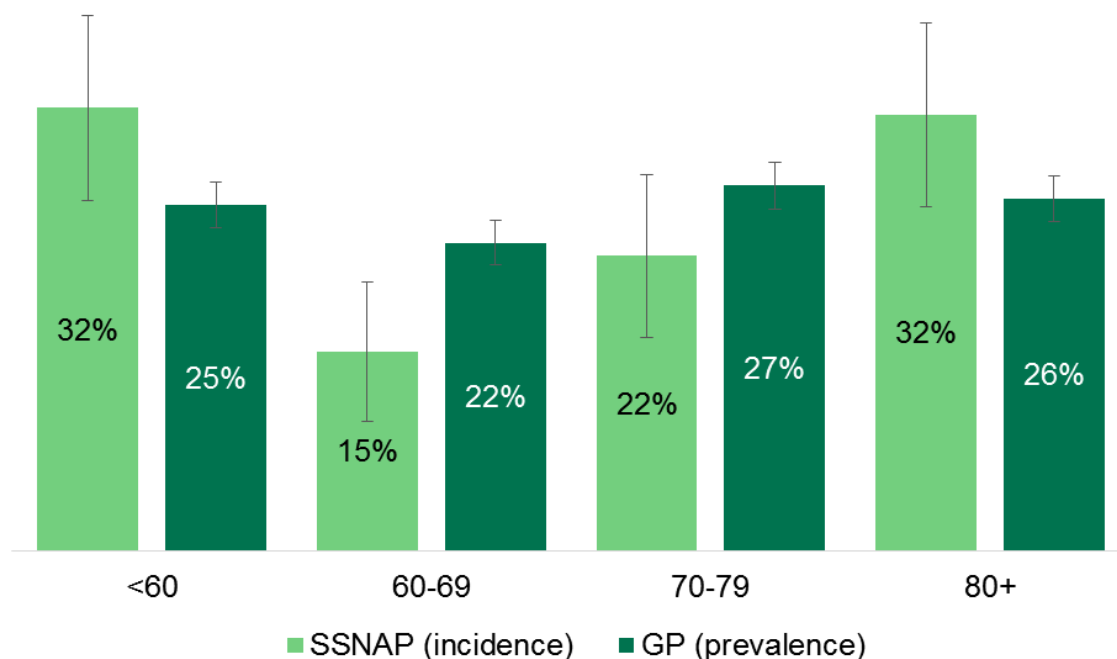


Sources: CEG. [124]

Note: Numerator used for this calculation is the number of stroke/TIA patients in total

Figure 23 shows a slightly different age distribution of GP patients known to have ever experienced stroke (prevalence measure) and patients admitted to hospital with stroke (incidence measure) – the latter are more likely to be aged under 60 or 80+ compared to the former, although these differences are not statistically significant.

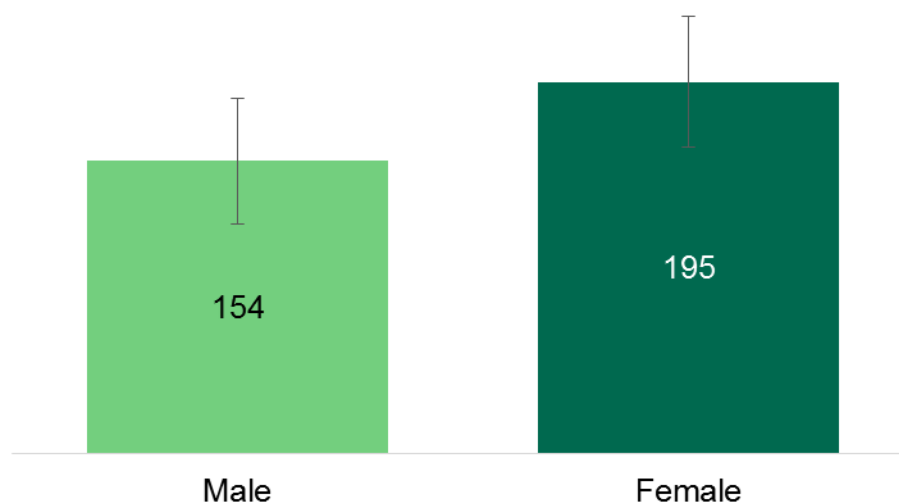
Figure 23: Age distribution of incident (2014/15) and prevalent (2016) stroke cases in Hackney and the City



Sources: SSNAP. [1] CEG. [124]

Age-adjusted stroke mortality rates are similar (i.e. not statistically different) for males and females in Hackney and the City (Figure 24).

Figure 24: Age-standardised stroke mortality rate (per 100,000) by gender (2013-15)



Source: PCMD, 2016. [127]

5.6.1.2 Ethnicity

Section 4.1.3 of this report highlighted the fact that people from Asian, African and African-Caribbean origin are at increased risk of stroke, and are more likely to experience stroke at a younger age.

Table 4 shows that over a third (36%) of the Hackney population were White British in 2016. The next largest group is Other White (18%), followed by Black African (10%). Hackney is also home to a number of smaller, but significant, national and cultural communities. For example, the borough houses the second largest Orthodox (Charedi) Jewish community in Europe, who predominately live in the North East of the borough (representing an estimated 7% of the borough's overall population). Hackney also has a well-established Turkish and Kurdish community – at least 4.5% of the Hackney population is Turkish. These populations are not captured neatly in any of the standard ethnic categories described in Table 4. [128]

Other significant communities in Hackney include Chinese, Vietnamese and Eastern Europeans (especially Polish), Western Europeans (particularly Spanish and French people), Australasians and people from North and Latin America. [128]

The City of London is also home to a diverse range of ethnicities and religious faiths. Forty-one percent of the total City of London population is White British. The second largest ethnic group is the 'other white' population. [129]

Table 4: Ethnic group projection breakdown of the City of London and Hackney's resident population (2016).

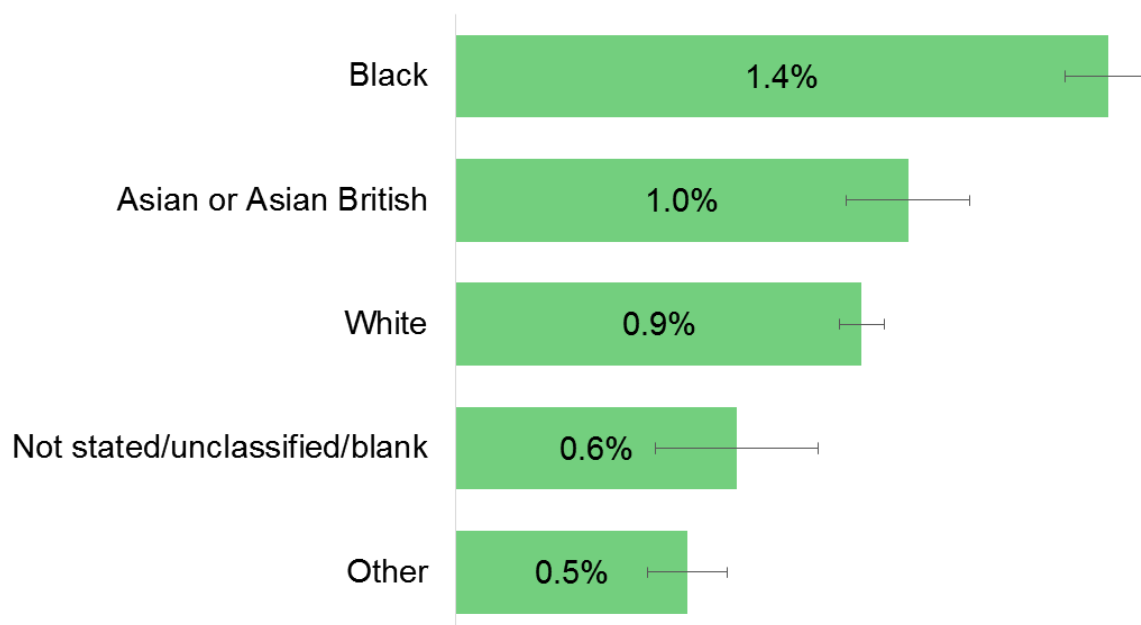
Ethnic group	City of London	Hackney	London
White British	42%	36%	41%
White Irish	2%	2%	2%
Other White	28%	18%	15%
Black African	2%	10%	7%
Black Caribbean	1%	7%	4%
Other Black	1%	4%	2%
White & Black Caribbean	0%	2%	2%
White & Black African	1%	1%	1%
Indian	3%	3%	7%
Pakistani	1%	1%	3%
Bangladeshi	2%	2%	3%
Chinese	2%	1%	2%
White & Asian	2%	2%	1%
Other Asian	4%	3%	2%
Other Mixed	2%	2%	5%
Arab	4%	1%	1%
Other Ethnic Group	3%	5%	2%

Source: GLA 2015. [5]

Figure 25 shows variation in local recorded stroke/TIA prevalence by broad ethnic group, revealing the highest recorded prevalence among City and Hackney GP

registered patients of Black origin - 1.4% compared with 0.9% overall. One in three stroke patients in the City and Hackney are in this broad ethnic group.

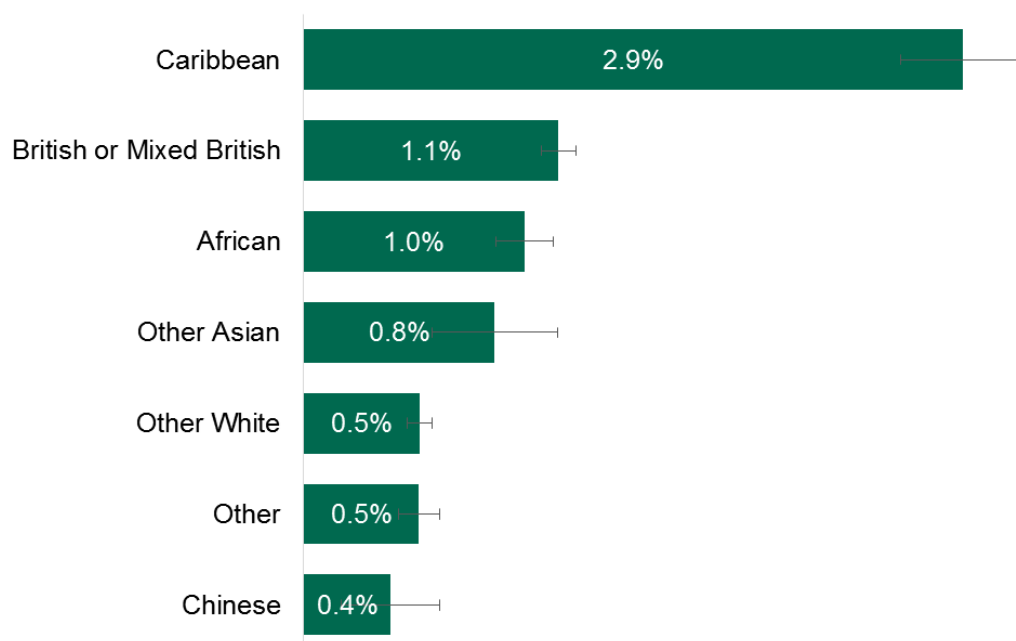
Figure 25. GP recorded prevalence of stroke and TIA, by broad ethnic group (all ages, 2016)



Source: CEG [124]

Looking at prevalence by more detail ethnic groups used in primary care (taken from ONS categories) reveals a greater variation in recorded stroke prevalence – see Figure 26. Patients of Caribbean origin are significantly more likely to have a recorded stroke/TIA than any other group (2.9%); while patients of Chinese origin have significantly lower rates of recorded stroke/TIA than most other ethnic groups (0.4%).

Figure 26. City and Hackney GP patient population by detailed ethnic group (all ages, 2016)



Source: CEG [124]

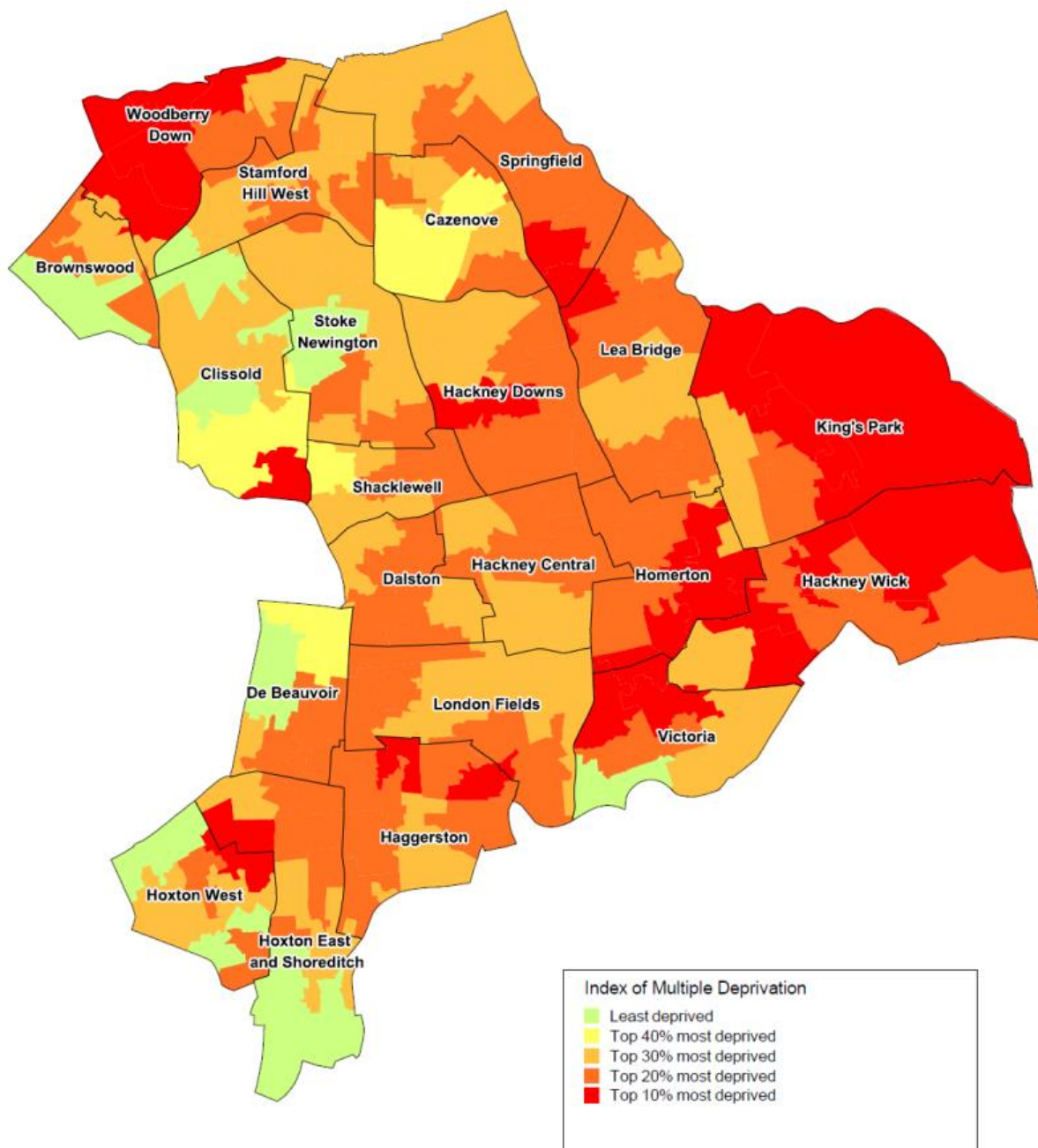
5.6.1.3 Socio-demographic status and deprivation

There is a clear social gradient in stroke incidence and mortality – those from lower socio-economic groups, or living in more deprived areas, are at increased risk of stroke and have higher stroke mortality rates (see Section 4.1 of this report for further details). This gradient is apparent even after controlling for age, sex, lifestyle and medical risk factors.

Local area deprivation in England is measured using the Index of Multiple Deprivation, last updated in 2015 (IMD 2015). IMD 2015 is derived from 37 separate indicators across seven ‘domains’, which are combined to produce summary measure of deprivation at neighbourhood level (specifically Lower Layer Super Output Areas (LSOAs), which contain an average population of 1,500 people). As it is an area based measure, not everyone living in a ‘deprived’ LSOA as measured by IMD2015 will themselves be deprived.

According to IMD2015, Hackney was the 11th (out of 326) most deprived local authority in England, which is an improvement since 2010 when it was ranked 2nd. Figure 27 shows how area deprivation varies across different parts of the borough, with some of the most deprived neighbourhoods in the North West and east of Hackney.

Figure 27: Area deprivation in Hackney (2015)



Source: IMD 2015. [6]

In contrast, the City of London is among the 40% *least* deprived areas in the country (ranked 226 out of 326 on IMD2015). In London, only Kingston-upon-Thames and Richmond are less deprived. However, there are pockets of deprivation for example in the east of the borough. [130]

Analysis of GP data shows that only a very weak association exists between local area deprivation and recorded stroke prevalence in City and Hackney.

5.6.2 Lifestyle and behavioural risk factors

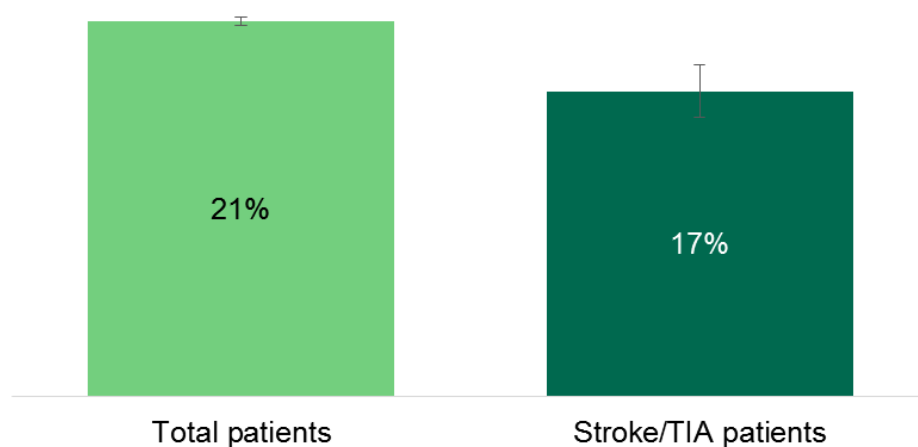
Tobacco smoking, an unhealthy diet, lack of physical activity and alcohol use all increase the risk of stroke (see Section 4.2 of this report for more detail). By addressing these risk factors, the WHO estimates that most cases of heart disease, stroke and type 2 diabetes could be prevented. There is also some evidence to suggest that illegal drug use may be a risk factor for stroke.

5.6.2.1 Smoking

In 2015/16, over 47,000 Hackney adult residents and just over 600 City of London adult residents were recorded as current smokers by their GP. Hackney has a higher proportion of current adult smokers than London or England (based on the 'official' measure of smoking prevalence from the Annual Population Survey), and is at the higher end of its statistical peers. No comparable data on the 'official' measure of smoking prevalence are available for the City. [130]

Figure 28 shows that a *lower* percentage of stroke/TIA patients (aged 45+) in Hackney and the City were recorded as smokers by their GP than people in the total patient population (aged 45+). This is likely due to a combination of patient behaviour modification following a stroke/TIA and reduced smoking prevalence with age (where stroke/TIA is more likely to occur in older people).

Figure 28: Percentage of City and Hackney GP patients aged 45+ recorded as current smokers (2016)



Source: CEG [124]

Note: People aged under 45 have been excluded from this analysis due to low numbers of stroke patients and higher smoking rates which skews the figures.

5.6.2.2 Illegal drug use

In Hackney in 2014/15, 1,674 adult residents received treatment for substance misuse that included drug use, comprising 78% of all those receiving substance misuse treatment. [131]

In the City, 40 adult residents received treatment for substance misuse in 2014/15. Of these, 20 received treatment for alcohol only, and the other 20 received treatment for drugs (and possibly also alcohol).

5.6.2.3 Physical inactivity

In 2015/16, 21% of Hackney adults (aged 16+) and 16% of adults in the City were estimated to be 'physically inactive' (i.e. performing less than 30 minutes of moderate intensity physical activity per week). [132] Due to the methodological limitations and small sample sizes used to derive these estimates, we are unable to conclude whether these figures are statistically different to other areas.

In total, around 53,000 adult Hackney residents, and between 1,000 and 2,000 adult City residents, are estimated to be inactive. [130]

5.6.2.4 Unhealthy diet

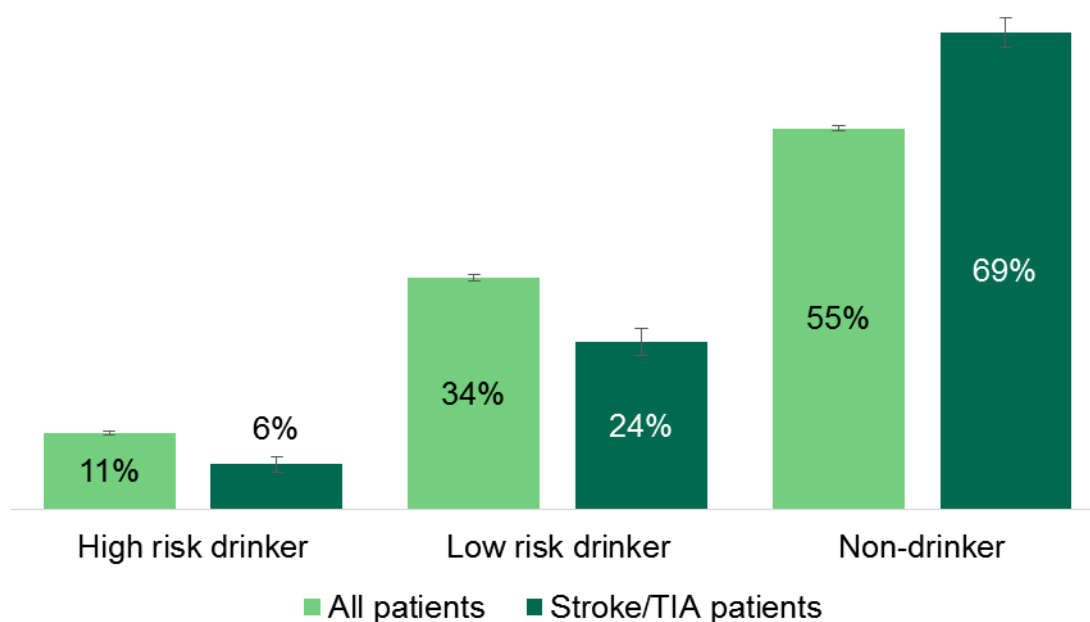
In 2015, Ipsos MORI was commissioned by Hackney Council to carry out a survey of the health and wellbeing of local adult (age 16+) residents. This survey (based on a sample size of 1,009) included questions on dietary behaviours, as well as knowledge of and attitudes to a healthy diet. Virtually all respondents to this survey (89%) were aware of the recommendation to eat at least five portions of fruit and vegetables each day, but only a third (35%) said they achieve this in practice. [130] There are no reliable sources of data on the dietary habits of City residents.

5.6.2.5 Alcohol

Based on the results of the Hackney resident health and wellbeing survey mentioned previously, 40% of Hackney residents say they do not drink, a third (33%) of residents are estimated to be low risk drinkers and a quarter (27%) to be high risk drinkers. A separate survey in the City of London found that over a third (35%) of respondents (including residents, workers and visitors) reported levels of drinking classified as 'increasing risk' and 13% were classified at higher risk. [130]

City and Hackney patients who have experienced stroke or TIA are more likely to have been asked about their alcohol consumption (according to GP records) than the total patient population - 77% and 58%, respectively. Figure 29 shows that, of those who have been asked (i.e. have an AUDIT-C score recorded), a greater percentage of stroke/TIA patients are classified as non-drinkers and a lower percentage as high risk drinkers. These patterns are observed across all age groups. This may be due to behaviour modification following stroke.

Figure 29: Reported drinking behaviour of City and Hackney patients (based on AUDIT-C score, patients aged 45+, 2016)



Source: CEG. [124]

5.6.3 Existing medical conditions

5.6.3.1 Hypertension

Hypertension is the single most important preventable risk factor for stroke (see Section 4.3) and is strongly linked to other risk factors - such as increasing age, ethnicity, physical inactivity, unhealthy diet and obesity.

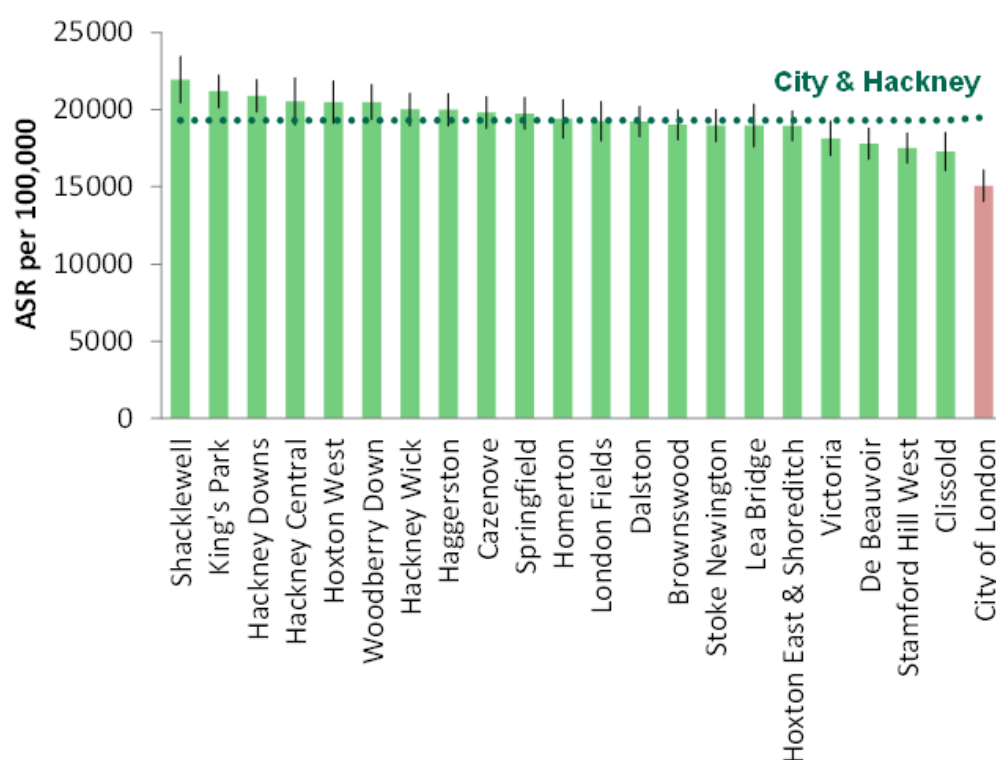
Table 5 shows that recorded hypertension prevalence in Hackney and the City was 9.6% in 2014/15, while estimated prevalence was 17.7% (the relatively low case finding rate is likely due at least in part to the young age profile of the local population). [133] Age standardised rates of recorded hypertension are lower in the City compared to most areas of Hackney (Figure 30).

Table 5: Recorded and estimated prevalence of hypertension and case finding rate (2016)

	Recorded prevalence, 2014/15		Estimated prevalence, 2014		Estimated undiagnosed, 2014		Case finding rate
City and Hackney	28,200	9.6%	51,500	17.7%	23,300	8.0%	54.8%
London	1 million	11.1%	1.8 million	19.9%	800,000	8.7%	55.6%
England	7.8 million	13.8%	13.4 million	23.6%	5.6 million	9.8%	58.2%

Source: Hypertension prevalence in England, 2014. [134]

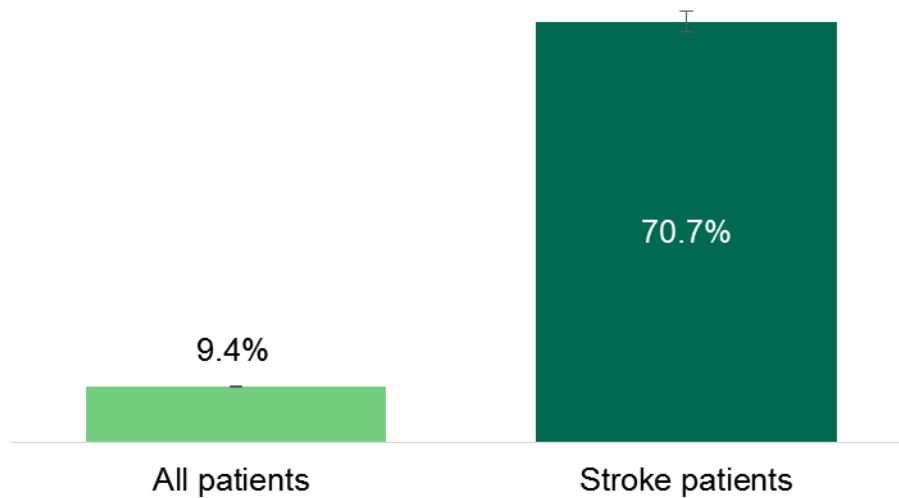
Figure 30. Age standardised rate of hypertension (per 100,000) in the City of London and by ward in Hackney (2016)



Source: CEG [124]

Almost three quarters (71%) of GP patients in the City and Hackney who have experienced stroke also have a diagnosis of hypertension (n=1,854). This is substantially higher than recorded hypertension prevalence in the wider patient population (Figure 31), which could be due to a number of factors (e.g. older age profile, more regular testing following stroke).

Figure 31: Local GP patients (all ages) recorded with hypertension (2016)



Source: CEG. [124]

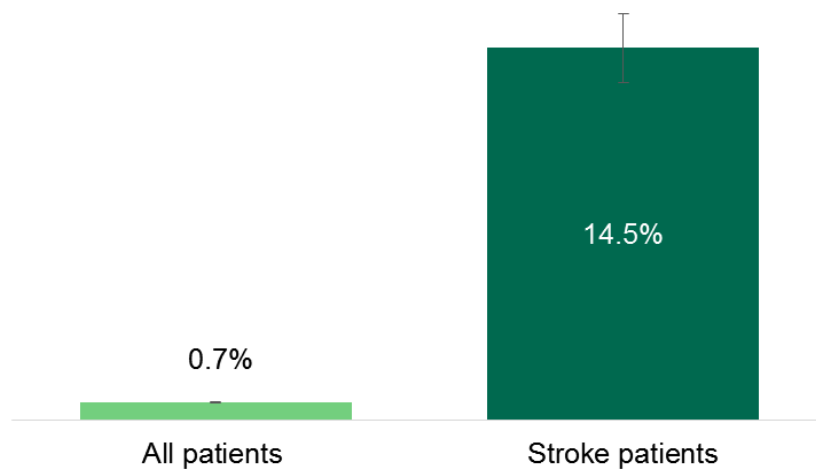
Note: Hypertension is defined as clinical blood pressure of 140/90 mmHg or higher along with subsequent ambulatory blood pressure monitor average of 135/85 mmHg or higher. [135]

5.6.3.2 Atrial fibrillation (AF)

AF is a major risk factor for stroke and people with AF tend to have more severe strokes than other patients (see Section 4.3 of this report).

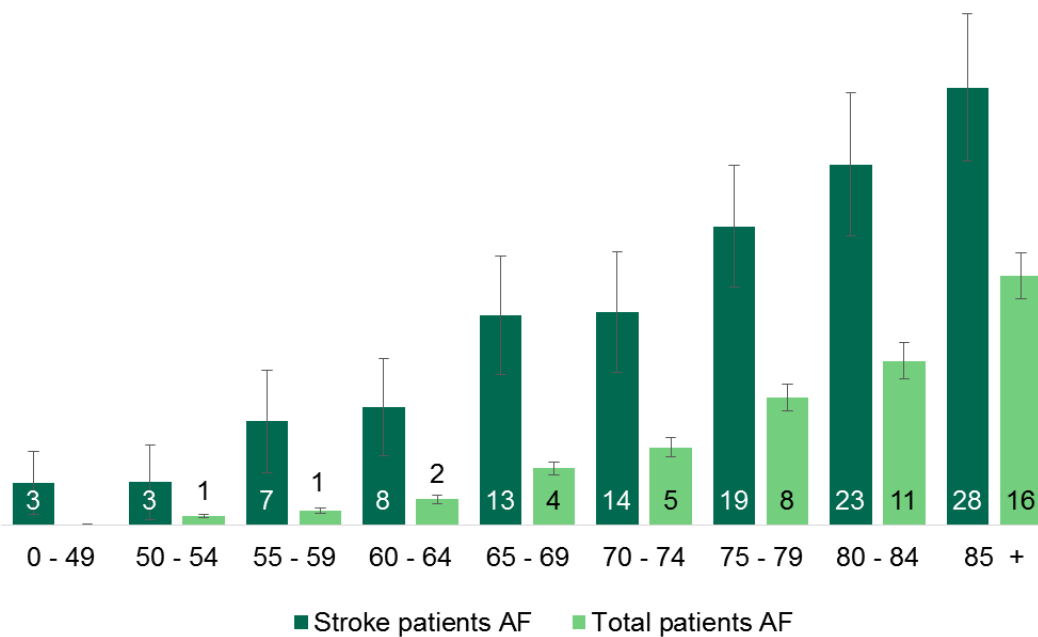
In 2016, 0.7% of all GP patients in City and Hackney were recorded as having AF, compared with 14.5% of stroke patients (Figure 32). This significantly higher recorded AF prevalence in stroke patients is observed across all age groups (Figure 33).

Figure 32: City and Hackney GP patients recorded with AF (all ages, 2016)



Source: CEG. [124]

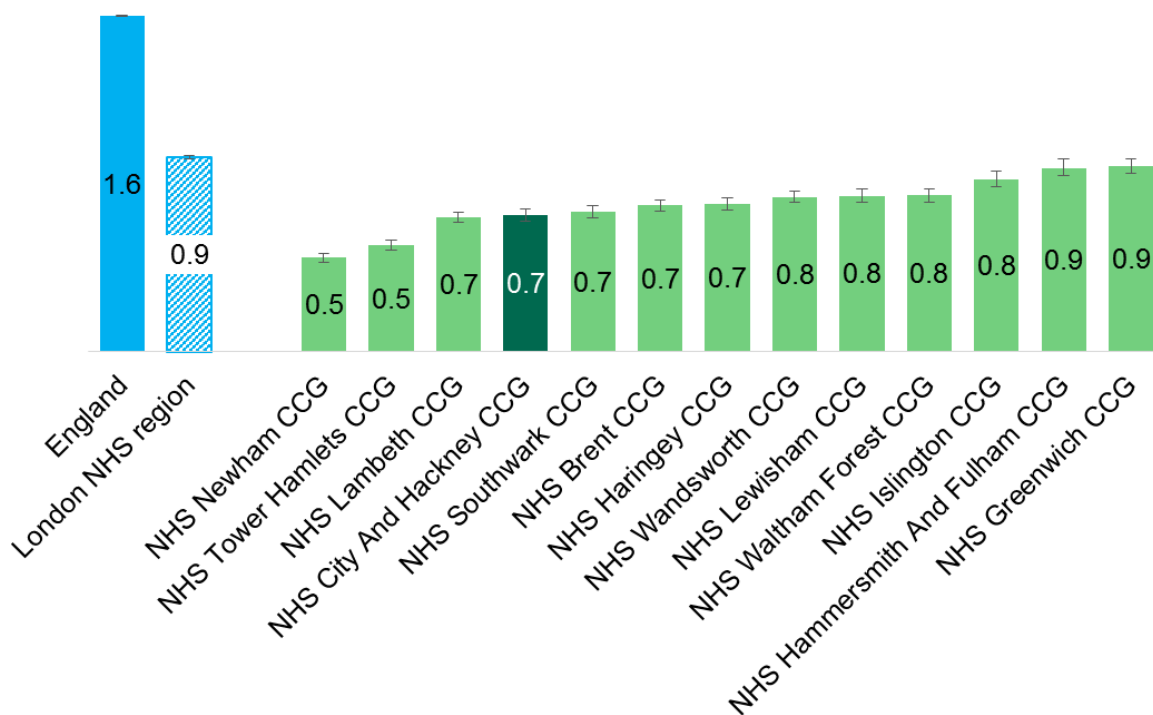
Figure 33: City and Hackney GP patients recorded with AF, by age group (2016)



Source: CEG. [124]

According to QOF, GP patients in the City and Hackney have a recorded prevalence of AF (0.7%) at the lower end of the scale compared with statistical peers, and lower than the London and England averages. The estimated prevalence of AF in the local population is 1.2%. [2] On one estimate, there are around 1,500 undiagnosed cases of AF in Hackney and the City. [136]

Figure 34: Recorded prevalence of AF (2014/15, all ages)



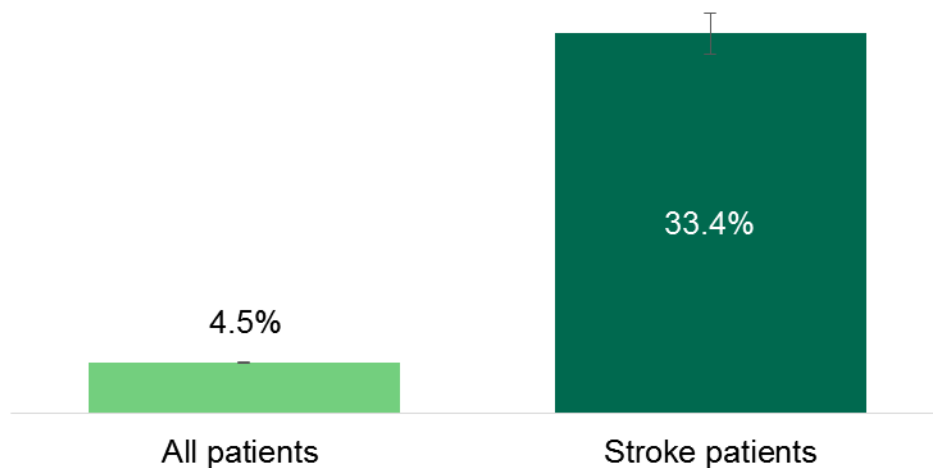
Source: PHE Fingertips tool [2]

5.6.3.3 Diabetes

Section 4.3.3 of this report explains how diabetes increases the risk of stroke, especially for women.

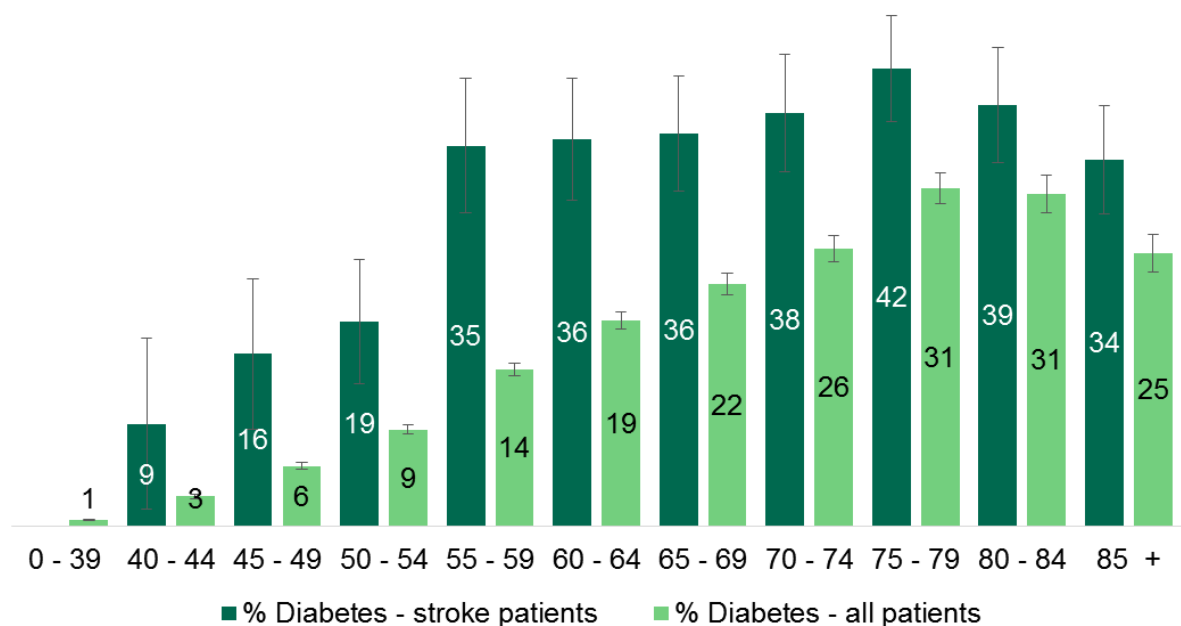
One third (33%) of GP patients in the City and Hackney who have experienced a stroke also have a diagnosis of diabetes (Figure 35). This compares with a recorded diabetes prevalence of 5% in the total adult GP population. These patterns are observed across all age groups (Figure 36).

Figure 35: Local GP patients (all ages) recorded with diabetes (all types) (2016)



Source: CEG. [124]

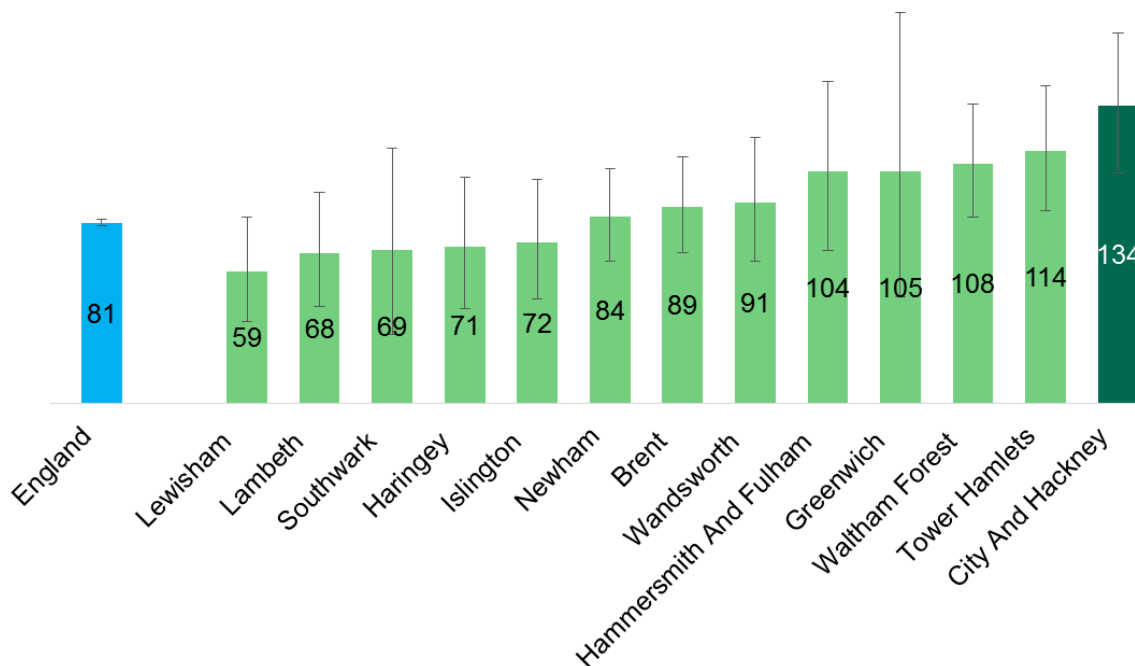
Figure 36: Local GP patients recorded with diabetes (all types), by age group (2016)



Source: CEG. [124]

PHE have calculated the additional risk of experiencing stroke in patients with diabetes compared to those without diabetes. Figure 37 presents these data for Hackney and the City as well as comparable CCG areas, London and England. Locally, the additional risk of stroke in patients with diabetes is significantly higher than a number of comparable areas and the England average.

Figure 37: Estimated additional risk of stroke among people with diabetes (2010/11 – 2012/13)



Source: PHE Fingertips tool [2]

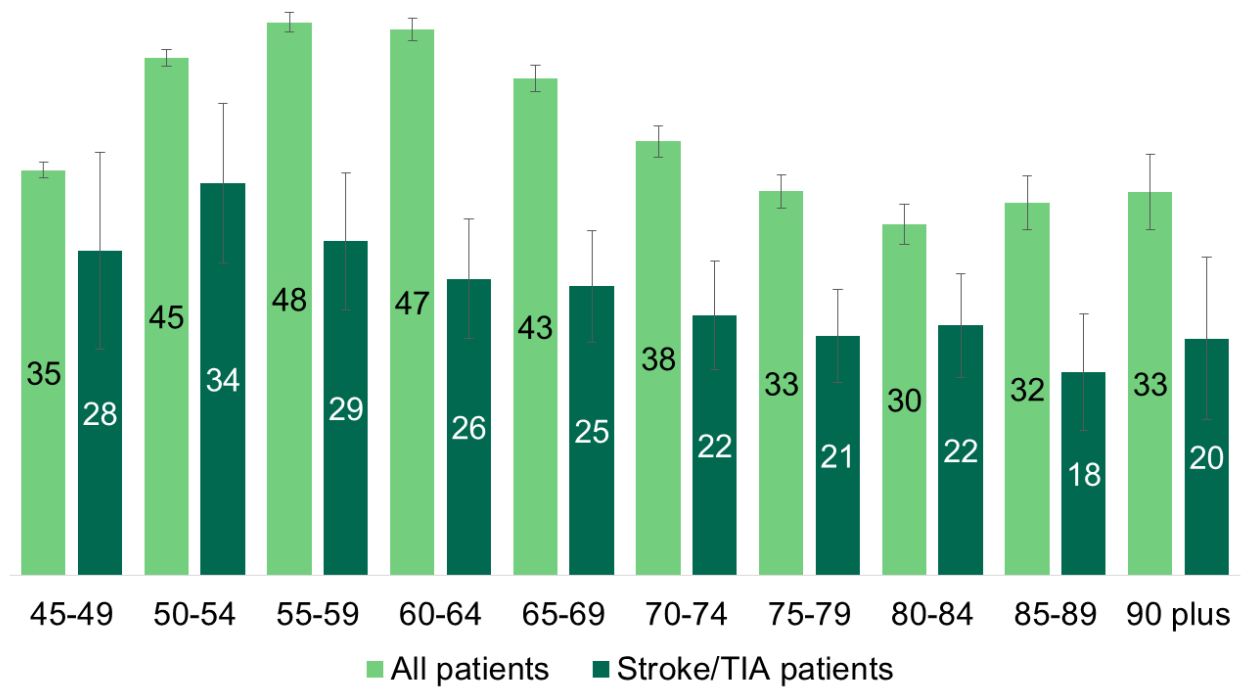
Notes: London value not available for this indicator. 'Additional' risk is measure by comparing the number of people with diabetes who experience stroke in the prior 3 year period with the number who would have experienced stroke if they had the same age and sex specific rates as the general population.

5.6.3.4 Raised cholesterol

Patients who have had a stroke are more likely to have been given a cholesterol test than the general patient population. This reflects national guidelines for the management of stroke in primary care (see Section 4.3.4). Locally, 97% of stroke patients (all ages) have had a cholesterol test (within the past 5 years) in comparison to 33% of the total patient population.

Local GP data shows that, of those tested, 25% of stroke patients (all ages) have a high total cholesterol level (≥ 5.0 mmol/L). This is significantly lower than the percentage of the total patient population with recorded high total cholesterol (47%), which may be expected as a result of treatment for stroke. These patterns are observed across all age bands from 50 upwards (Figure 38).

Figure 38: Local GP patients recorded with a total cholesterol reading of 5.0mmol/L or more, by five year age band (2016)



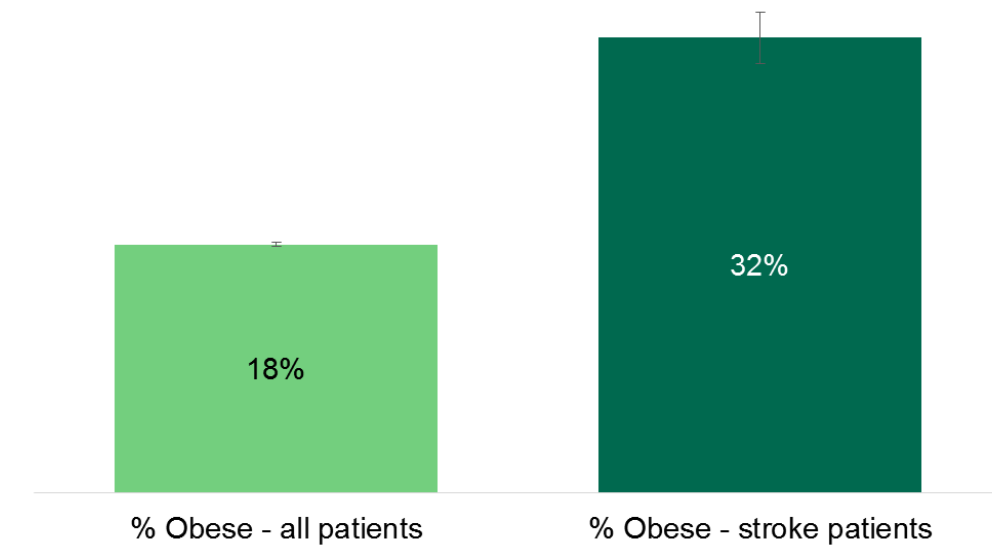
Source: CEG. [124]

5.6.3.5 Obesity

A clear link has been identified between obesity and stroke, independent of the effects of other risk factors such as gender, age and blood pressure (see Section 4.3.5 of this report for details).

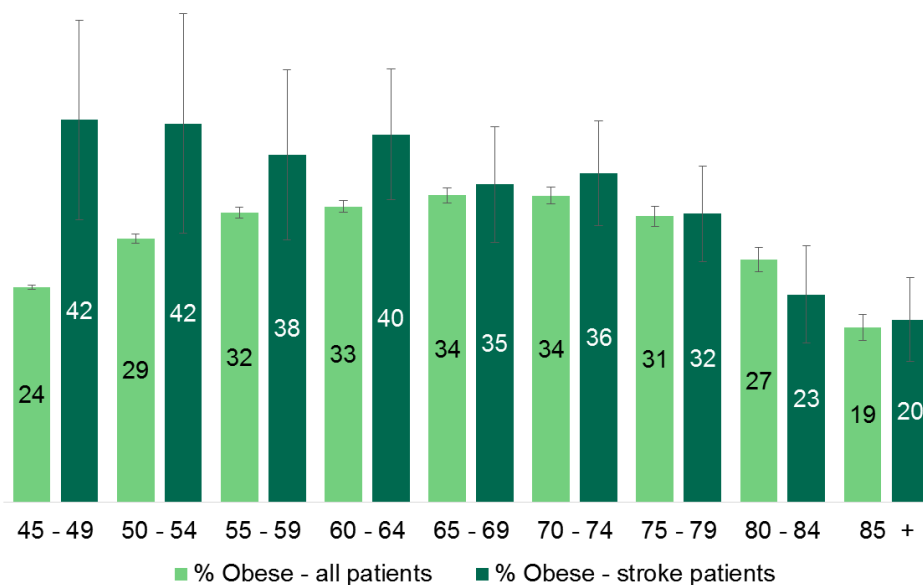
In the City and Hackney GP patient population, more than a third of stroke patients are recorded as obese, which is almost double the level of obesity observed in the total patient population (Figure 39). These higher rates of obesity in stroke patients are mostly only observed in the under 65 age group (Figure 40).

Figure 39: Local GP patients recorded as obese (defined as a BMI of 30 or above) (age 18+, 2016)⁹



Source: CEG. [124]

Figure 40: Local GP patients recorded as obese (defined as a BMI of 30 or above), by age group (2016)



Source: CEG. [124]

⁹ Please note that these figures do not account for the lower BMI threshold (27.5) which is recommended to be used to classify obesity in Black and Asian adults. As such, these figures represent an under-estimate of local obesity prevalence, and could under-estimate the difference between stroke patients and all patients (given the higher risk of stroke in Black and Asian groups).

5.6.3.6 Previous stroke/TIA

Data on recurrent strokes in Hackney and the City were not available for the purposes of this needs assessment.

5.6.3.7 Sickle cell disease (SCD)

As of April 2016, there were 510 GP patients in the City and Hackney recorded with SCD (0.2% of the patient population), almost all of whom are of Black ethnicity. The majority (58%) of these patients are under the age of 30.

Of those patients recorded with SCD, 4% have also had a stroke or TIA recorded by their GP (n=21). Again, most of these patients are under the age of 30. Due to the low numbers, reliable further analysis of the characteristic of this population is not possible.

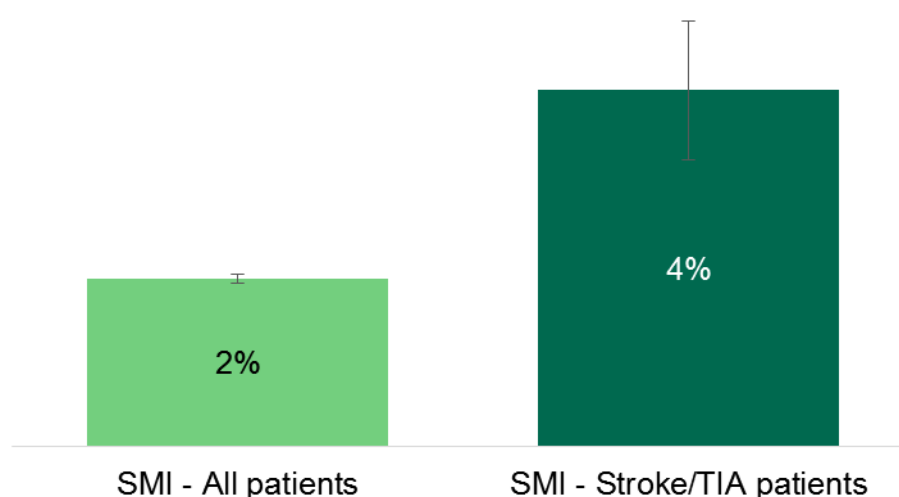
5.6.3.8 Mental illness

Section 4.3.8 of this report described the increased risk of stroke in people with serious mental illness (SMI), but highlighted the fact that this may be due to higher prevalence of lifestyle risk factors (such as smoking) in this population.

Based on local GP data, 2% of the adult (age 18+) population in Hackney and the City are recorded as having SMI – this is half the rate of recorded SMI in patients who have experienced stroke/TIA (Figure 41 below). Of note, smoking is twice as prevalent locally in patients with SMI compared to average. [137]

Figure 42 shows that the pattern of higher recorded SMI prevalence in stroke/TIA patients generally holds true across all ages, but due to small numbers it is not possible to conclude that the differences are significant for every age group (i.e. the confidence intervals are very wide).

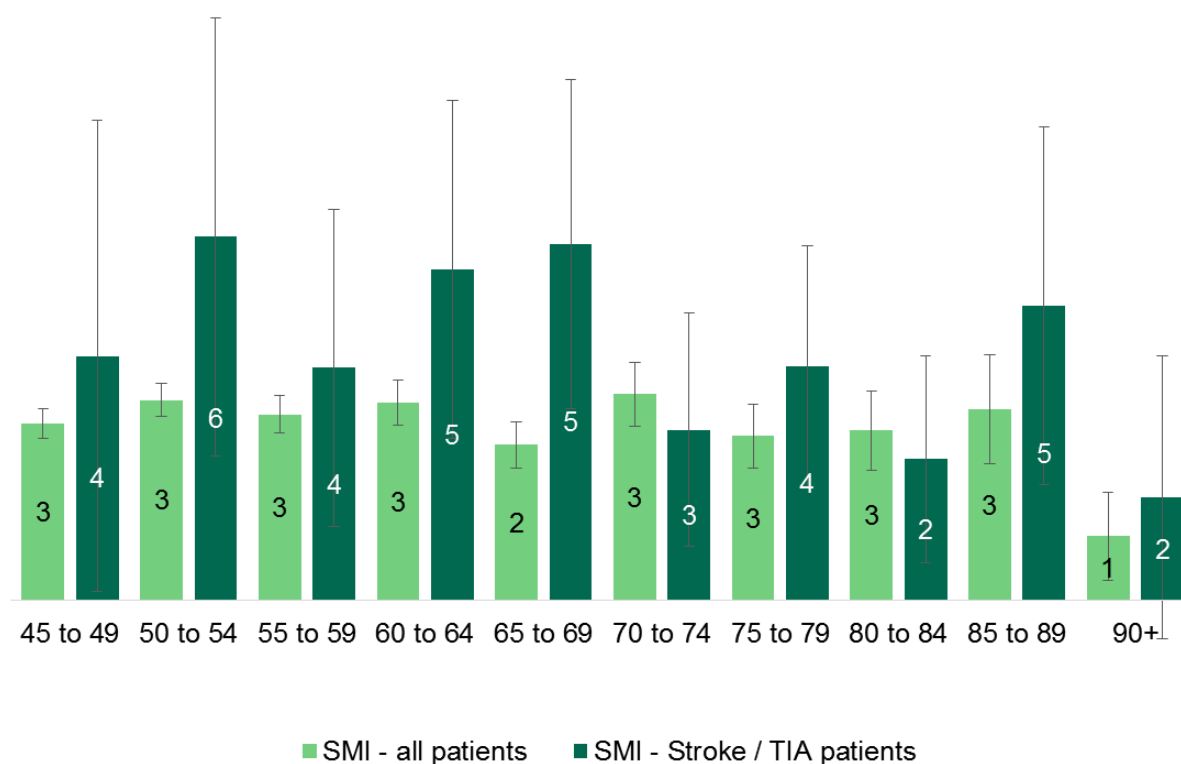
Figure 41: Local GP patients recorded with SMI (age 18+, 2016)



Source: CEG [124]

Notes: The QOF definition of SMI is used here - this includes bipolar disorder, schizophrenia and other psychoses.

Figure 42: Local GP patients recorded with SMI, by five year age band (2016)



Source: CEG [124]

Notes: The QOF definition of SMI is used here - this includes bipolar disorder, schizophrenia and other psychoses.

6 Review of evidence-based interventions for stroke

Key Points

- Stroke can be prevented by assessing people for their level of risk. Opportunistic screening in primary care and systematic screening such as the NHS Health Check programme can both help to identify those at risk.
- For those at risk of stroke, tackling lifestyle risk factors such as smoking and diet can help to reduce risk. This can be done by:
 - helping people to adapt their behaviours
 - changing the physical and social environment
 - working with other organisations such as food outlets and schools.
- Stroke prevention should also seek to tackle medical risk factors such as hypertension and diabetes. This can be achieved through:
 - prevention activity – primarily to act on lifestyle risk factors
 - increasing diagnosis rates of medical conditions
 - providing treatment for or management of conditions.
- Effective acute care of stroke relies on fast recognition of stroke, and a timely response, including providing brain scanning, thrombolysis, addressing the short-term risk of recurrent stroke, and enabling essential functions such as hydration and movement.
- It is recommended that people who have had a stroke are admitted to a specialist acute stroke unit for the entirety of their acute care.
- There are guidelines that set out how to deliver good quality rehabilitation for those who have had a stroke, including:
 - ensuring they are cared for by a multidisciplinary team providing specialist care
 - setting and reviewing rehabilitation goals
 - providing minimum therapy requirements, both in terms of type and amount of therapy received.
- Discharging someone from secondary care into the community should be preceded by effective planning and assessment, and accompanied by key information and a joint health and social care plan for the individual.
- Early supported discharge has been shown to be effective in improving outcomes and reducing costs, and therefore should be offered where suitable.
- Ongoing support and care should be provided for someone following discharge from hospital, including regular follow-up assessments and return to work support when required.
- Carers should be included in key decisions about a patient's ongoing care, and supported throughout acute treatment, rehabilitation and following discharge.

6.1 Introduction and overview

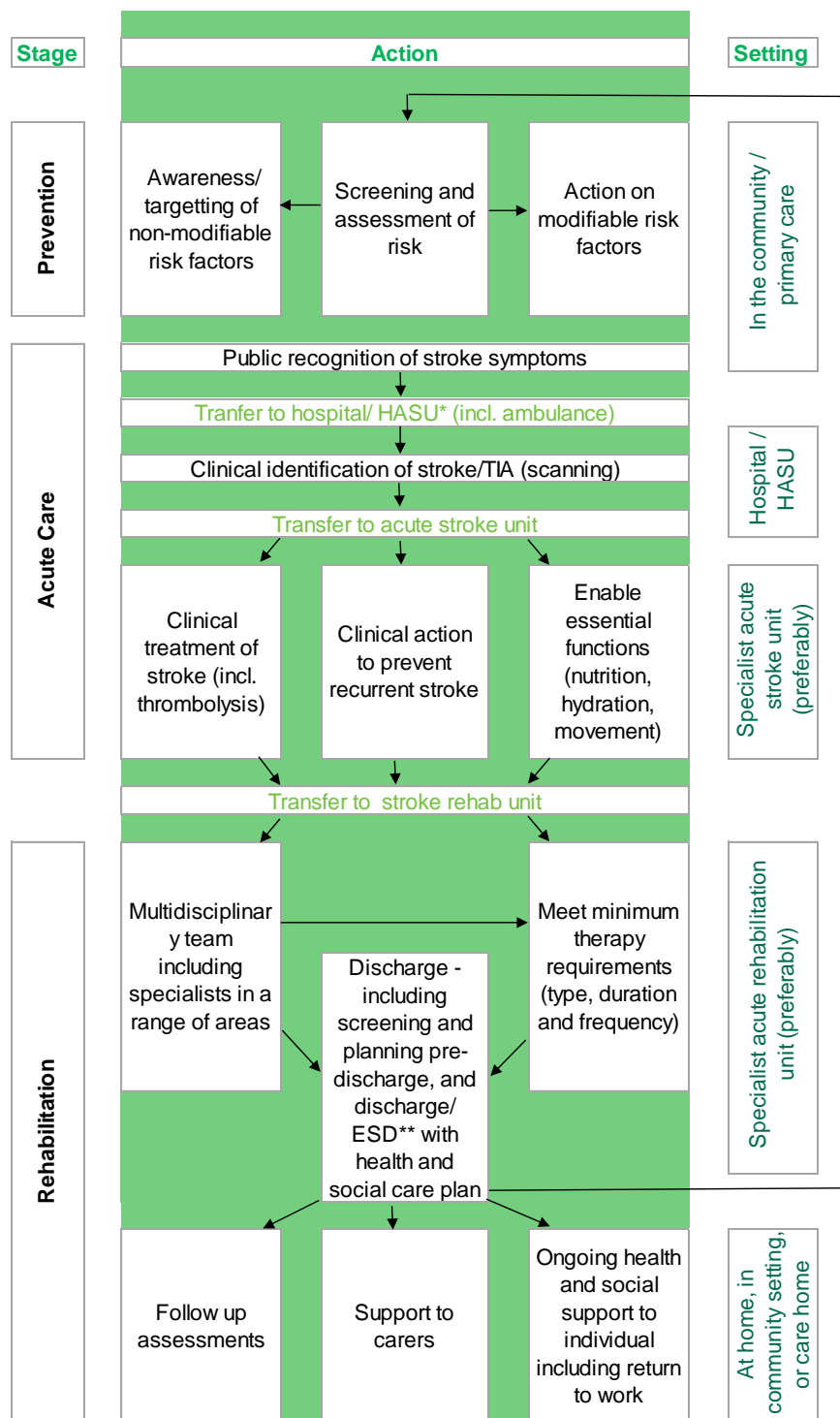
There is a large evidence base on what works to prevent stroke, how to provide a high quality acute response when a stroke occurs, and the best way to provide rehabilitation for stroke patients. This section summarises the evidence across each of these three areas, with particular reference to official national guidance.

Figure 43 shows the main actions that are discussed in this section, displayed in a pathway diagram. This diagram refers to a generic pathway – local service provision may vary; for example in some places acute and rehabilitation care is provided in the same hospital unit. Each box in the ‘action’ column of this diagram (against a green background), refers to a sub-section in this chapter, where a more detailed explanation and supporting information can be found.

Much of the evidence used for Figure 43 has been drawn from national guidance. Section 6.5 summarises the recommendations from each of the key guidance documents reviewed, presented according to the part of the stroke pathway they refer to. The key recommendations in the UK National Guideline for Stroke are listed in full in Appendix A.

This section does not cover end-of-life care in any detail, as there is very little evidence on specific interventions for stroke patients, with most of the research in the field of cancer. However, the latest national clinical guidelines emphasise that “more people with stroke should benefit from end-of-life care, and collaboration between palliative care and stroke teams at an earlier stage could improve patient care”. [7]

Figure 43: Key actions in the stroke pathway of prevention, acute care and rehabilitation



* HASU - hyper acute stroke unit. If a patient is transferred to a HASU, this unit will undertake some of the acute care functions normally performed by the acute stroke unit.

** ESD - early supported discharge. This includes ongoing rehabilitation activities (occupational therapy, physiotherapy, speech and language therapy) at home

Source: Summarised from relevant NICE documents and the UK national clinical guidelines on stroke [7] [138] [139] [140] [141] [142] [143] [144] [145] [146] [147] [148] [149] [150] [151] [152] [59]

The boxes under the 'settings' column in Figure 43 highlight that actions are required by a variety of organisations at local, regional and national level. This section primarily focuses on what can be done locally - for example, CCGs have a clear role relevant to the treatment and rehabilitation of those who have had a stroke. The CCG Outcomes Indicator Set includes a number of indicators that relate specifically to stroke, as listed in. More detail on local indicators, including outturns for City and Hackney, can be found in Chapter 5 and 6 of this needs assessment

Table 6: CCG Outcomes Indicator Set 2015/16, NHS England

Area	Indicator Content
1 – Preventing People from dying prematurely	Myocardial infarction, stroke and stage 5 chronic kidney disease in people with diabetes Mortality within 30 days of hospital admission for stroke
3 – Helping people to recover from episodes of ill health or following injury	People who have had a stroke who <ul style="list-style-type: none"> • are admitted to an acute stroke unit within four hours of arrival to hospital • receive thrombolysis following an acute stroke • are discharged from hospital with a joint health and social care plan • receive a follow-up assessment between 4-8 months after initial admission • spend more than 90% of their stay on an acute stroke unit

Source: NHS England [153]

The NICE Quality Standard for Stroke in Adults provides a useful overview of the recommendations around stroke care and rehabilitation, and is reproduced in Table 7. This table also shows which section of this Chapter each Quality Standard refers to. The body of this Chapter refers to this Quality Standard where appropriate, as well as other NICE guidance.

Table 7: Stroke in Adults, NICE Quality Standard (QS2)

Quality Statement	Statement Content	Section Reference
Statement 1	Adults presenting at an accident and emergency (A&E) department with suspected stroke are admitted to a specialist acute stroke unit within 4 hours of arrival	6.3
Statement 2	Adults having stroke rehabilitation in hospital or in the community are offered at least 45 minutes of each relevant therapy for a minimum of 5 days a week	6.4.2
Statement 3	Adults who have had a stroke have access to a clinical psychologist with expertise in stroke rehabilitation who is part of the core multidisciplinary stroke rehabilitation team	6.4.1, 6.4.2
Statement 4	Adults who have had a stroke are offered early supported discharge if the core multidisciplinary stroke team assess that it is suitable for them	6.4.3
Statement 5	Adults who have had a stroke are offered active management to return to work if they wish to do so	6.4.6
Statement 6	Adults who have had a stroke have their rehabilitation goals reviewed at regular intervals	6.4
Statement 7	Adults who have had a stroke have a structured health and social care review at 6 months and 1 year after the stroke, and then annually	6.4.4

Source: NICE [138]

6.2 Prevention of stroke

Preventing the occurrence of stroke is both possible and necessary. Significant improvements in the acute response to stroke (see Section 6.3) have helped to reduce stroke-related mortality and morbidity. However, a significant proportion of people who experience stroke still die or do not fully recover (see Chapter 3). The most effective way to reduce the health burden of strokes is to prevent them from occurring in the first place – this could also result in significant financial savings within the health and social care system.

Studies of the potential impact of primary prevention have found that up to 80% of all strokes could be prevented through action on key modifiable risk factors. [154] [155] A WHO study modelled likely future stroke rates across Europe, finding that even “slight decreases in stroke incidence rates” - as a result of “better control of major stroke risk factors such as level of blood pressure, tobacco smoking, diabetes, body mass index, and level of physical activity” - could result in a decrease of 150,000 stroke events per year, across Europe. The study concludes that “these numbers strongly advocate for intensified primary prevention on stroke.” [44]

6.2.1 Screening and assessment of risk

There is good evidence on the main risk factors for stroke (Chapter 4). Population screening for stroke risk factors can, therefore, help to identify those who are at high risk so that appropriate preventative action can be taken.

Screening and assessing individuals for their risk of stroke can take place on an opportunistic basis – for example if a patient mentions known risk factors in consultations with their GP or other primary care provider. In these cases, the health professional could use a tool such as QRISK2, which calculates the risk of heart disease or stroke in the next 10 years based on demographic, lifestyle and clinical information. [156] NICE recommends that primary care use a systematic strategy to identify those who are likely to be at risk of CVD, and sets out the circumstances where QRISK2 should be used for a full formal risk assessment. [59]

PHE has recommended that health professionals increase opportunistic pulse checking especially in the over 65s, and NICE has recommended that GPs screen for AF while measuring blood pressure. [157] [158] For those with diagnosed AF, PHE has also recommended the use of the CHADS-VASC and HASBLED tools to calculate stroke risk. [157]

On a more systematic level, the NHS Health Check programme provides opportunities to detect risk factors - such as high blood pressure, smoking, cholesterol, obesity, poor diet, physical inactivity and alcohol consumption - among those aged 40-74 who do not have an existing CV condition. The Department of Health Strategy ‘Living Well for Longer’ states that the Health Check programme “has the potential to... prevent 1,600 heart attacks and strokes” each year. [159] However, the value of CV risk factor screening in improving outcomes has been questioned in recent studies. For example, an international study of stroke epidemiology suggested that screening may offer “false reassurance to people

classified as low to moderate risk – the group in which approximately 80 per cent of all strokes occur”. [160]

For screening to be effective, it is important that all groups in the target population are reached, especially those known to be at a higher risk of stroke due to their demographic profile. It is also essential that identification of risk is followed up by effective action on risk reduction, including evidence-based approaches to address lifestyle factors (see Section 6.2.3.1).

6.2.2 Non-modifiable risk factors

The non-modifiable risk factors relevant to stroke are listed in Chapter 4 as age, sex, ethnicity, family history of stroke/TIA, and previous stroke/TIA. These are, by definition, not amenable to intervention. However, understanding the prevalence and distribution of these risk factors can help us to target interventions and detect those at high risk.

This risk assessment can take place at an individual level – for example, undertaken in a GP consultation with a patient aged 75 or over with a family history of stroke. (NICE recommends that assessment of CVD risk should take into account a range of factors including age.) [59] Risk assessment can also be carried out at population level to inform the delivery of public health interventions – for example, ensuring that an exercise programme is reaching the local Bangladeshi community.

Awareness raising campaigns, which provide information on how to prevent and recognise a stroke, can be delivered universally, but with a particular focus on geographical areas where there is known to be a higher incidence of known non-modifiable risk factors.

Socio-economic status has been classified in this needs assessment as a modifiable risk factor, due to the possibility of national policy strategies to reduce poverty or the detrimental impacts of poverty on health. However, in the short term, it is also useful to consider the likely higher burden of stroke incidence in lower socioeconomic groups, and to target interventions or outreach accordingly. A review of socio-economic status and stroke recommends that “innovative prevention strategies targeting people in low socioeconomic groups are required along with effective measures to promote access to effective stroke interventions in lower socioeconomic groups”. [57]

6.2.3 Modifiable risk factors

Action on modifiable risk factors is key to reducing the burden of stroke. There is a wealth of evidence on how to address unhealthy lifestyle ‘choices’ and the most effective behavioural or pharmaceutical responses to medical risk factors. This section provides a brief snapshot of this evidence.

6.2.3.1 Lifestyle and behaviour

The author of a recent study into prevention of stroke concluded that “stroke is largely a lifestyle disease. With better strategies in place, we could prevent three

quarters of all strokes and heart attacks, and extend our stroke, heart attack, dementia and diabetes-free lives by 20-30 years.” [160] Prevention strategies must take action on the leading lifestyle risk factors for stroke – smoking, physical inactivity, unhealthy diet and excessive alcohol consumption. Action to reduce the prevalence of these behaviours is also likely to have a range of other benefits, including reducing the risk of other poor health outcomes such as heart disease and cancer.

Smoking

The government’s 2011 tobacco control plan set out recommendations for action in six main areas:

1. “stopping the promotion of tobacco
2. making tobacco less affordable
3. effective regulation of tobacco products
4. helping tobacco users to quit
5. reducing exposure to second-hand smoke
6. effective communication for tobacco control.” [161]

Local action often tends to focus on smoking cessation services (SSS), thereby addressing the fourth of the government’s action areas. Local SSS should aim to reduce smoking rates, particularly in those groups most at risk of poor health outcomes, and communities where smoking prevalence is higher (for example, those with mental health problems).

NICE guidance on assessing and reducing CVD risk also includes recommendations to “advise all people who smoke to stop... offer people who want to stop smoking support and advice, and referral to an intensive support service... If a person is unable or unwilling to accept a referral to an intensive support service, offer them pharmacotherapy.” [59]

As well as providing or commissioning SSS, there is also a role for local authorities to reduce exposure to second-hand smoke, reduce illicit and illegal tobacco sales, increase education and awareness of smoking-relating harm in order to prevent people from starting (for example, in schools), and reduce non-cigarette tobacco use (for example shisha smoking).

NICE provides a range of detailed guidance on recommended local tobacco control strategies, including:

- Smokeless tobacco: South Asian communities - PH 39 [162]
- Smoking prevention in schools - PH23 [163]
- Smoking: acute, maternity and mental health services - PH48 [164]
- Smoking: brief interventions and referrals - PH1 [165]
- Smoking: harm reduction - PH45 [166]
- Smoking: preventing uptake in children and young people - PH14 [167]
- Smoking: stopping in pregnancy and after childbirth - PH26 [168]
- Smoking: workplace interventions - PH5 [169]
- Stop smoking services - PH10. [170]

Physical activity

Studies have found that taking part in moderate exercise can reduce the risk of stroke by up to 27%, and that regular exercise can be as important as medication in preventing stroke. [87] [171]

NICE guidance on reducing CVD risk recommends the following:

- “advise people at high risk of or with CVD to do the following every week:
 - at least 150 minutes of moderate intensity aerobic activity
 - or*
 - 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- advise people to do muscle-strengthening activities on two or more days a week that work all major muscle groups...
- encourage people who are unable to perform moderate-intensity physical activity because of comorbidity, medical conditions or personal circumstances to exercise at their maximum safe capacity...
- advice about physical activity should take into account the person’s needs, preferences and circumstances. Agree goals and provide the person with written information about the benefits of activity and local opportunities to be active.” [59]

Further NICE guidance on CVD prevention at a local level also includes recommendations to promote physical activity locally through policies that adapt the local physical environment, provide services such as exercise classes, and support physically active modes of travel. [150]

Unhealthy diet

Action on dietary improvements to reduce the risk of stroke includes providing information and support to help people modify their diets, as well as more systematic action to reduce the availability of unhealthy foods. This latter action can involve the targeting of food products (for example, by encouraging those who make and sell food to reduce salt or fat content) or targeting of settings (for example, by limiting the number of fast food takeaways near schools through the local authority planning function).

In terms of providing advice to the public, NICE recommends a ‘cardioprotective’ diet for those with or at high risk of CVD – defined as “a diet in which total fat intake is 30% or less of total energy intake, saturated fats are 7% or less of total energy intake, intake of dietary cholesterol is less than 300mg/day and, where possible, saturated fats are replaced by mono-unsaturated and polyunsaturated fats.” This guidance also recommends that high CVD risk groups: [59]

- increase their consumption of wholegrains
- reduce sugar consumption
- eat at least five portions of fruit and vegetables per day and two portions of fish (including one portion of oily fish) per week

- consume four to five portions of unsalted nuts, seeds and legumes¹⁰ per week.

More detailed guidance is also provided by NICE on how to take systematic action on unhealthy diets, including circumstances where it is advised to restrict planning permission for some food outlets, and by ensuring that all food provided by or for the public sector is healthy and balanced, and contributes to a reduction in CVD risk. [150]

Alcohol

Excessive alcohol consumption is a clear risk factor for stroke (see Section 4.2.5). The government's strategy 'Living Well for Longer' recommends targeted local action to address harmful alcohol consumption, including: [159]

- an alcohol risk assessment within the NHS Health Check
- brief alcohol advice in GP surgeries and other settings, including community pharmacy
- alcohol care teams in hospital settings to coordinate community care and services
- an alcohol service for those who frequently attend hospital for alcohol-related reasons
- specialist alcohol treatment to encourage recovery.

In addition, PHE recommends the following actions take place at a local level, alongside a range of community and individual level actions: [172]

- Health and Wellbeing Boards include alcohol in their Joint Strategic Needs Assessment and services are commissioned to address the needs of the population, which adhere to relevant standards for alcohol services
- health and public health concerns are represented in alcohol licensing processes and decisions
- providers collect data on patients experiencing alcohol problems
- appropriate data is shared between health, social care and community safety organisations in order to target preventative actions and co-ordinate care.

6.2.3.2 Existing medical conditions

As was described in Chapter 4, medical risk factors for stroke are often the result of the lifestyle risk factors described above, in Section 4.2. Therefore, taking effective action on behaviours such as physical inactivity is likely to be effective in reducing the prevalence of medical risk factors such as hypertension. In addition to prevention, the recommended actions on medical risk factors tend to focus on firstly detecting and diagnosing these conditions, and then on enabling treatment or management in order to reduce the associate risk of stroke.

¹⁰ Legumes include peas, beans and lentils

Hypertension

For a detailed analysis of local hypertension prevalence and available support, please see separate hypertension needs assessment report also produced by City and Hackney Public Health team (2017).

PHE have produced evidence-based advice on how local government, the health system and other partners can take effective action on hypertension. This action plan provides recommendations on prevention, detection and management, which are summarised in Table 8.

The first of the PHE recommended areas for action is addressed in the preceding section on lifestyle risk factors. Early detection has been a focus of action as it is estimated that many people do not realise they have hypertension. The Stroke Association states that there are just over nine million people in the UK registered as hypertensive, and there could be another 6.8 million undiagnosed. [11] Further estimates suggest that almost 30% of adults in England have high blood pressure, of which over five million are undiagnosed. [157] High blood pressure is usually symptomless, so cannot be identified without testing. [159] Table 8 outlines some key strategies to increase detection of hypertension.

Once hypertension is diagnosed, treatment is very effective at lowering blood pressure and improving outcomes. [157] Lifestyle changes - especially weight loss, physical activity and dietary improvements - can effectively reduce blood pressure in many cases. NICE guidance on hypertension in adults states that “lifestyle advice should be offered initially and then periodically to people undergoing assessment or treatment for hypertension.” The guidance also sets out the situations in which antihypertensive drug treatment should be offered, including where the individual has a 10-year cardiovascular risk over 20%. [173]

Table 8: Key Recommendations from 'Tackling high blood pressure: From Evidence into Action', PHE 2014

Area of Action	Summary Content
Prevention	<p>In ten years, 45,000 years of life could be saved and £850m not spent on related health and social care if we achieve a reduction in the average population blood pressure. Key approaches are:</p> <ul style="list-style-type: none"> • reducing salt consumption and improving overall nutrition at population-level • improving calorie balance to reduce excess body weight at population-level • personal behaviour change on diet, physical activity, alcohol and smoking, particularly prompted through individuals' regular contacts with healthcare and other institutions
Detection	<p>In ten years, 7,000 years of life could be saved and £120m not spent on related health and social care if we achieve an improvement in the diagnosis of high blood pressure. Key approaches are:</p> <ul style="list-style-type: none"> • more frequent opportunistic testing in primary care, achieved through using wider staff (nurses, pharmacy etc.), and integrating testing into the management of long term conditions • improving take-up of the NHS Health Check, a systematic testing and risk assessment offer for 40-74 year olds • targeting high-risk and deprived groups, particularly through general practice records audit and outreach testing
Management	<p>In ten years, 7,000 years of life could be saved and £120m not spent on related health and social care if we achieve (via lifestyle and/or drug therapy) better control of blood pressure levels among those on treatment. Key approaches are:</p> <ul style="list-style-type: none"> • local leadership and action planning for system change, to tackle particular areas of local variation, and achieve models of person-centric care • health professional support (communication, tools and incentives) to bring practice nearer to treatment guidelines where this falls short • support adherence to drug therapy and lifestyle change, particularly through self-monitoring of blood pressure and pharmacy medicine support

Source: PHE [174]

Atrial Fibrillation

There are a range of causes of atrial fibrillation (AF). High blood pressure is the most common cause, which is itself often preventable (see above). Therefore, taking action on behavioural risk factors such as those listed in Section 6.2.1 above may help to prevent AF, and therefore reduce the risk of stroke.

Beyond prevention, key priorities are to increase diagnosis and treatment of AF. Estimates suggest that up to a third of those with AF are unaware that they have the condition. [157] A tool is available for GPs to improve detection of AF, called GRASP-AF. This tool can help identify patients presenting with AF symptoms, and also provides an audit tool to compare their current management of AF with NICE guidelines. [159]

The risk of stroke in individuals who have been diagnosed with AF can be significantly lowered through the use of anticoagulants – medication that thins the blood and therefore reduces the chances of clots forming. However, even where AF has been diagnosed and the patient meets the criteria for anticoagulant prescription, they are often not prescribed, particularly in those over 80 years old. [175]

In England, an estimated 31% of patients who are eligible for anticoagulation medication are not receiving it. [11] It has been predicted that 7,000 strokes could be prevented each year, and 2,100 lives saved, if AF was adequately treated. [11]

Further data shows that only 41% of stroke patients with known AF are taking anticoagulants when admitted to hospital. [98]

The NICE Guidance on AF includes recommendations on diagnosis, management, personalised care packages, assessment for stroke, interventions to prevent stroke, and heart rate and heart rhythm control. [176] There are also a number of NICE technology appraisals which refer to specific anticoagulation drugs (Apixaban, Dabigatran etexilate, Edoxaban and Rivaroxaban) for the prevention of stroke in people with AF. [140] [141] [142] [143]

Diabetes

Type 2 diabetes is often caused by lifestyle factors, and is therefore amenable to preventative interventions. PHE recommend that the NHS Health Check programme is used to identify those at high risk of developing Type 2 diabetes. They estimate that 30-60% of diabetes cases could be prevented through appropriate behaviour change support. [157]

In terms of detection, primary care professionals are well placed to identify diabetes in their patients – either through the NHS Health Check or opportunistically. Diabetes UK estimates that there are 590,000 people in the UK who have diabetes but have not been diagnosed. [177]

For those with diagnosed diabetes, the risk of complication can be significantly reduced through adherence to relevant NICE Quality Standards (which also cover diabetes prevention - see Table 9) and the three treatment targets for HbA1c (glucose control), blood pressure and serum cholesterol (see Table 10).

PHE also recommends that: [157]

- all practices should take part in the National Diabetes Audit, and their results should be benchmarked and variations explored
- patient education and shared management should receive increased support from local organisations
- uptake of the national NHS Diabetes Prevention Programme should be maximised. [178]

Table 9: Diabetes in Adults, NICE Quality Standard (QS6)

Quality Statement	Statement Content
Statement 1	Adults at high risk of type 2 diabetes are offered a referral to an intensive lifestyle-change programme
Statement 2	Adults with type 2 diabetes are offered a structured education programme at diagnosis
Statement 3	Adults with type 1 diabetes are offered a structured education programme 6-12 months after diagnosis
Statement 4	Adults with type 2 diabetes whose HbA1c level is 58 mmol/mol (7.5%) or above after 6 months with single-drug treatment are offered dual therapy
Statement 5	Adults at moderate or high risk of developing a diabetic foot problem are referred to the foot protection service
Statement 6	Adults with a limb-threatening or life-threatening diabetic foot problem are referred immediately for specialist assessment and treatment
Statement 7	Adults with type 1 diabetes in hospital receive advice from a multidisciplinary team with expertise in diabetes.

Source: NICE [179]

Table 10: Diabetes treatment targets

Target	Level	Rationale
HbA1c	≤ 58 mmol/mol	Reduces the risk of all diabetic complications
Blood pressure	≤140/80	Reduces the risk of vascular complications and reduces the progression of eye disease and kidney failure
Total cholesterol	< 5mmol/L	Reduces the risk of vascular complications

Source: National Diabetes Audit [180]

Obesity

On one estimate, being obese increases the risk of stroke by 64%. [113] Local action to reduce the prevalence of obesity relies on a strong preventative effort to address barriers to physical activity and a healthy diet, as described in Section 4.2. For example, the government has recommended the following actions to tackle obesity: [159]

- supporting behaviour change – both in terms of diet and physical activity
- taking action in schools and other public sector bodies
- effective and high quality weight management services
- place-based approach for health improvement – changes to physical and social environments to promote healthier lifestyles
- active travel.

The recent Childhood Obesity Plan for Action, published by government in 2016, also sets out a number of actions that target unhealthy eating across the life course, including: [181]

- introducing a soft drinks industry levy
- taking out 20% of sugar in products
- supporting innovation to help businesses to make their products healthier
- developing a new framework by updating the nutrient profile model
- making healthy options available in the public sector
- continuing to provide support with the cost of healthy food for those who need it most
- clearer food labelling
- harnessing the best new technology
- enabling health professionals to support families.

As well as guidance on obesity prevention, NICE also provides guidance on identification, assessment and management of obesity, which includes recommendations on a range of potential interventions. [182] These include lifestyle interventions (such as weight management programmes that increase people's

physical activity, improve eating behaviour and reduce energy intake), specific recommendations around physical activity and diet, and reference to pharmacological and surgical options.

NICE guidance provides details on how to design and deliver behavioural interventions, and states that pharmacological treatment should only be considered “after dietary, exercise and behavioural approaches have been started and evaluated.” Bariatric surgery should only be considered as a treatment option when “all appropriate non-surgical measures have been tried but the person has not achieved or maintained adequate, clinically beneficial weight loss.” [182]

Different organisations have commissioning responsibility for different interventions across the obesity pathway. Local Authorities are responsible for Tier 1 and 2 services, which include population level interventions to encourage healthy eating and physical activity, and lifestyle related weight management services. Tier 3 services - clinician-led specialist multidisciplinary teams – are the responsibility of CCGs. Tier 4 services, which include bariatric surgery, are currently commissioned by NHS England. [183]

The NICE guidance on CVD risk assessment and reduction also recommends that those at high risk of CVD who are obese are given “appropriate advice and support to work towards achieving and maintaining a healthy weight.” [59]

Sickle cell disease

Sickle cell disease (SCD) is a genetic disease, and therefore cannot be prevented and - in most cases - can't be cured (the only exception is in very limited cases, where stem cell transplant may be able to cure severe SCD).

However, there are evidence-based strategies which can help to reduce the health impact of SCD, including those which reduce the risk of stroke – therefore it is classified as a modifiable risk factor in this document. Staying healthy - by taking a daily antibiotic, receiving all relevant immunisations, taking folic acid, and avoiding smoking and excess alcohol - can help to control the impacts of SCD.

Some factors, such as cold or lack of oxygen or fluid, can trigger sickling (which increases the number of sickle cells in the blood, increasing the chance of complications). Actions which can help prevent or reduce the risk of sickle cell complications include drinking plenty of fluid, taking regular exercise (but avoiding over-exertion), eating a healthy diet, avoiding getting cold and treating infections and fevers promptly.

Regular blood transfusions could help to prevent strokes in children who have sickle disease – the suitability of patients for this procedure can be checked using an ultrasound test called a transcranial Doppler. [184] However, this is only suitable for predicting risk in children.

In May 2016, an article stated that “there are no effective ways to predict stroke risk in adults with SCD at this time.” It also stated the “there is presently no optimal stroke prevention strategy for adults, but if a number of associated comorbid conditions in adults that are known risk factors for stroke, such as hypertension,

hyperlipidemia, renal disease, atrial fibrillation, and coagulopathy, are addressed, the risk for stroke may be reduced.” [185]

6.3 Acute care

For those who have a stroke, fast and effective acute care is essential in order to reduce the risk of long-term serious disability or death. This section summarises the key recommendations on what acute care should be provided, including the need for early recognition of symptoms and fast clinical diagnosis through brain scanning. For example, where a stroke is identified, thrombolysis can ‘dissolve’ clots in certain cases, and reduce harm (see Section 6.3.3). Another early priority is to take measures to avoid a recurrent stroke in the immediate future – this can include reducing blood pressure or increasing oxygenation of the blood (Section 6.3.4). Finally, it is the responsibility of acute stroke teams to ensure essential functions are restored – this includes ensuring the patient is able to receive nutrition and hydration, and enabling movement where possible (Section 6.3.5).

As well as the specific recommendations discussed in this section, there are some over-arching principles underpinning effective acute stroke care, as outlined below.

1. There has been a recent shift to **ensuring that those who experience stroke receive care in the right location**. This tends to be an acute stroke unit, where specialist care is available. This is sometimes combined with a stroke rehabilitation unit, which is discussed further in Section 6.4. In some areas (including London), hyper acute stroke units (HASUs) have been set up, where those who have a stroke are expected to go for the first 48-72 hours of care. [42] There are eight HASUs in London, which receive patients directly from paramedics and discharge to acute stroke units in hospitals across the region.
2. Much of the guidance refers to the need to **ensure that information is transferred successfully when patients move location** or receive care from other specialists or teams. This applies across the stroke care pathway, and therefore includes the stroke rehabilitation stage.
3. There is a growing focus on **ensuring that stroke patients are seen very quickly** by particular specialists in stroke care, and receive certain key assessments.

Acute stroke care is considered to have improved significantly in recent decades. For example, the proportion of stroke patients who die within 30 days of an emergency admission to hospital in London has decreased by 30% from 2005/06 to 2014/15. Similar reductions have been seen across England. [186]

It is thought a significant contributor to these improved outcomes is the introduction of specialist acute stroke units. A Cochrane Review of such units found that “stroke patients who are cared for on stroke wards are more likely to be alive, independent and living at home after one year than if they are cared for on other wards.” [187] Partly as a result of recently improved results, a UK parliament briefing describes urgent admission to a stroke unit as “the most important intervention for stroke.” [42]

SSNAP collects and shares data on stroke performance across the country. [188] The SSNAP indicators provide a good summary of the priority areas for action in acute stroke care, and are therefore referenced throughout this section. For example, in reference to the importance of stroke care being delivered in a stroke unit, SSNAP indicators include:

- proportion of patients directly admitted to a stroke unit within four hours of clock start¹¹
- median time between clock start and arrival on stroke unit
- proportion of patients who spent at least 90% of their stay on a stroke unit.

There are also SSNAP indicators which refer to specialist input in the initial acute phase of stroke care, which include:

- proportion of patients assessed by a stroke specialist consultant physician within 24 hours of clock start
- proportion of patients who were assessed by a nurse trained in stroke management within 24 hours of clock start.

6.3.1 Public awareness

Rapid access to care following symptom onset is key to reducing the impact of stroke. Therefore, it is essential that the public are aware of how to recognise a stroke, and how to respond. PHE manages a public campaign, called 'Act FAST', which encourages the public to check for: [189]

Facial weakness, resulting in the drooping of one side
Arm weakness, leaving the person unable to lift an arm
Speech problems
Time to phone 999.

NICE guidance also states that “a validated tool, such as FAST (Face Arm Speech Test) should be used outside hospital to screen for a diagnosis of stroke or TIA.” [151]

It should also be recognised, however, that the initial presentation of stroke differs depending on the type of stroke that is taking place. For example, 'subarachnoid' haemorrhagic strokes, where the bleed is on the surface of the brain, often include initial symptoms of vomiting and a sudden onset of a severe headache. [7]

6.3.2 Clinical identification of stroke

In order to ascertain if a person has had a stroke, clinical identification is necessary. Initially, it is essential that ambulance staff are able to recognise a stroke. The national guideline on stroke states that “community medical services and ambulance services (including call handlers and primary care reception staff) should be trained

¹¹ 'clock start' refers to the date and time of arrival at the first hospital for newly arrived patients, or to the date and time of symptom onset if the patient is already in hospital at the time of their stroke.

to recognise people with symptoms indicating an acute stroke as an emergency requiring transfer to a hyperacute stroke centre.” [7]

Once a patient arrives in hospital, clinical identification involves a physical examination by a specialist as well as brain scanning. These scans can confirm if a stroke has taken place, and also provide more information on the type and severity of stroke, which can help to inform ongoing treatment.

NICE guidance provides a range of recommendations around brain scanning, including that those with a suspected TIA are referred for urgent brain imaging, and the conditions in which brain imaging should be performed immediately for people with acute stroke – which include a patient being on anticoagulant treatment, a known bleeding tendency, or indicators for thrombolysis. [151]

SSNAP key indicators on brain scanning include:

- proportion of patients scanned within one hour of clock start
- proportion of patients scanned within 12 hours of clock start
- median time between clock start and scan.

6.3.3 Treatment of stroke

Treatment of stroke is essential - 1.9 million neurons are lost every minute a stroke is untreated. [190] Thrombolysis is a treatment to dissolve a blood clot, often by injecting an enzyme into the blood. Guidance often refers to ‘alteplase’, which is a common thrombolysis drug. NICE recommends that this procedure can take place up to 4.5 hours after an acute ischaemic stroke, for people over 18 and under 80 years of age, who have had a brain scan to exclude intracranial haemorrhaging. [139] The use of thrombolysis outside of these circumstances is not recommended, as the benefits are not consistent and there is an associated risk of fatal bleeding.

NICE also recommends that alteplase is only used in facilities that are appropriately equipped and have the necessary staff who are trained in acute stroke and thrombolysis. [151]

Research shows that thrombolysis can have a significant impact on outcomes from stroke, and can make the difference between severe disability and nearly complete recovery. [42] For example, a randomised controlled trial found that “for every 1,000 patients treated with thrombolysis within three hours, about 100 more will be alive and live independently than 1,000 patients not treated with thrombolysis.” [191]

However, approximately 60% of stroke patients cannot have thrombolysis as they either arrive at hospital too long after a stroke to benefit, (i.e. after the 4.5 hour cut-off point) or after having had a stroke in their sleep (meaning that the exact time cannot be calculated). [98] The further restrictions on the use of thrombolysis mean that currently only approximately 15% of stroke patients are eligible for thrombolysis on admission when they arrive in hospital. [98]

For haemorrhagic strokes, where thrombolysis is not an appropriate procedure, treatment depends on the type of haemorrhage. Surgery and medication can help to

reduce re-bleeding in the case of subarachnoid haemorrhage, whereas for intracerebral haemorrhages, “no new drug or surgical treatment has been proven to be routinely beneficial. Any improved outcomes result from establishing Stroke Units with close monitoring and treatment of hypertension.” [42]

SSNAP thrombolysis indicators include:

- proportion of all stroke patients given thrombolysis (all stroke types)
- proportion of eligible patients given thrombolysis
- proportion of patients who were thrombolysed within one hour of clock start
- median time between clock start and thrombolysis.

6.3.4 Preventing recurrent stroke

In some cases, the risk of a recurrent stroke in the short term following a stroke or TIA is very high, and an acute response is needed to address this risk. For example, studies suggest that:

- 15% of ischemic strokes are preceded by a TIA [192]
- one in 12 people will have a stroke within a week of having a TIA [11]
- 10,000 recurrent strokes can be prevented every year in the UK if TIA and minor strokes are treated in time [193]

The short-term risk of stroke after a TIA can be predicted using a tool called ABCD2, which calculates a score based on: [194]

Age
Blood pressure
Clinical symptoms
Duration of symptoms
Diabetes.

Alongside the longer-term prevention strategies outlined in Section 6.2, clinical interventions can reduce the risk of recurrent stroke in high risk patients – as defined by the ABCD2 score. These include prescribing an ‘anti-platelet’ (blood thinning) medication such as aspirin to reduce the risk of another clot, or anticoagulation for those with AF. There may be other options such as taking action to reduce blood pressure or increase oxygenation in the blood. NICE guidance provides further detail on appropriate medications and procedures during the acute phase of stroke treatment, including those concerning anticoagulation, statins, oxygen, blood pressure and blood sugar. [151]

It is recommended that all patients, regardless of the level of risk, should be seen by a specialist within 24 hours (this has changed from the previous guidance that suggested that those with a low risk ABCD2 score should be seen within seven days). At all levels of risk, NICE recommends immediate prescription of aspirin and that “measures for secondary prevention (are) introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors.” [151]

There are also surgical options to reduce the risk of recurrent stroke, in cases where there is moderate to severe artery blockage. This involves widening the arteries where plaques have built up and narrowed the blood flow. These surgical options are described in the relevant NICE guidance. [144] [145] [146] [148] [149]

6.3.5 Enabling essential functions

Effective acute stroke care also involves initial actions to ensure that patients can perform basic functions, wherever possible. This includes conducting swallowing assessments to ascertain whether the patient is able to eat and drink without assistance, and arranging alternative nutrition and hydration if not. There are also recommendations around initiating movement in those who have recently had a stroke, including how best to position and mobilise patients. NICE guidance provides further detail on “assessment of swallowing function ... oral nutrition supplementation... early mobilisation and optimum positioning of people with acute stroke... (and) avoidance of aspiration pneumonia.” [151]

Relevant SSNAP indicators include:

- proportion of patients who were given a swallow screen within four hours of clock start
- proportion of applicable patients who were given a formal swallow assessment within 72 hours of clock start.

6.4 Rehabilitation

This section describes evidence-based approaches to stroke rehabilitation. Rehabilitation is an essential component of the stroke care pathway, and rehabilitation goals should be reviewed on a regular basis. As was described in Chapter 3, strokes have a wide range of physical, mental and emotional impacts.

Various settings and professionals are involved in stroke rehabilitation. Initial rehabilitation, particularly for those with complex or ongoing needs, often takes place in a specialist stroke rehabilitation unit – these are sometimes combined with specialist acute stroke units. Guidelines for this stage of rehabilitation include the need for multidisciplinary teams, including specialists in stroke care from a range of professions (e.g. speech and language therapy, occupational therapy), to work with the patient to address their health and social care needs (Section 6.4.1).

Discharge from secondary care into the community (either home or to a residential social care setting) requires planning and support (Section 6.4.3). For some patients, early supported discharge (ESD) is encouraged – this involves a comprehensive package of rehabilitation care, often for six weeks, being delivered in the community rather than at hospital.

Discharge should also include an assessment of ongoing need, including appropriate equipment in the home to enable independent living, and also practical support to carers. It is recommended that health and social care support plans are provided for all stroke patients at the time of discharge from hospital (Section 6.4.3). Ongoing support and check-ups for all stroke patients are recommended to ensure that they

are recovering both physically and socially, and returning to work where possible (Section 6.4.6). In some cases, stroke will cause long-term disabilities and full recovery will not be possible, in which case long-term health and social care support may be required.

A UK Parliament briefing states that “improvements in acute care have not been matched in post-hospital care, where clinicians and charities consider the existing model struggles to cope with the profound disability experienced by many... Clinicians are concerned that local authority provision is patchy, and rehabilitation is often not prioritised in decisions about resource allocation.” [42]

6.4.1 Multidisciplinary team

Successful rehabilitation requires a multidisciplinary team of experts, who work together to provide a ‘wrap-around’ service to meet the variety of needs experienced by those who have had a stroke. NICE recommends that “a core multidisciplinary stroke rehabilitation team should comprise the following professionals with expertise in stroke rehabilitation:

- consultant physicians
- nurses
- physiotherapists
- occupational therapists
- speech and language therapists
- clinical psychologists
- rehabilitation assistants
- social workers.” [152]

NICE guidance also refers to the importance of the early and ongoing involvement of social care, stating that “health and social care professionals should work collaboratively.” [152]

SSNAP key indicators on multidisciplinary team working include:

- proportion of applicable patients who were assessed by an occupational therapist within 72 hours of clock start
- proportion of applicable patients who were assessed by a physiotherapist within 72 hours of clock start
- proportion of applicable patients who were assessed by a speech and language therapist within 72 hours of clock start.

6.4.2 Therapy requirements

The purpose of a multidisciplinary team is that they are available and able to provide the various specialist care and therapy that stroke patients might require. It is recommended that patients receive specialist therapy such as occupational therapy, physiotherapy, and speech and language therapy where these are required. There are minimum requirements set out for each of these specialist therapy types, for example the SSNAP indicators include:

- compliance (%) against the therapy target of an average of 25.7 minutes of occupational therapy across all patients
- compliance (%) against the therapy target of an average of 27.1 minutes of physiotherapy across all patients
- compliance (%) against the therapy target of an average of 16.1 minutes of speech and language therapy across all patients.

The UK National Guideline for Stroke also sets out minimum requirements for general therapy duration and frequency - these are that “people with stroke should accumulate at least 45 minutes of each appropriate therapy every day, at a frequency that enables them to meet their rehabilitation goals, and for as long as they are willing and capable of participating and showing measurable benefit from treatment.” [7] These therapy requirements are supported by NICE guidance and the NICE Quality Standard on stroke, including access to a stroke skilled clinical psychologist as part of the multi-disciplinary stroke rehabilitation team. [152] [138]

There are also recommendations around the type of deficits that people who have had a stroke should be screened for, and how they should be addressed. These include visual neglect, memory function, attention function, emotional functioning, vision, swallowing, communication, movement, and self-care. [152] In terms of movement, NICE recommends that physiotherapy should be provided, and that people should be encouraged “to participate in physical activity after stroke.” This should be “started by a physiotherapist with the aim that the person continues the programme independently based on the physiotherapist’s instructions” – which should be supported by the provision of information from the physiotherapist to any independent exercise provider, after discharge from hospital. [152]

Finally, there are recommendations around setting rehabilitation goals and assessing progress against these goals. For example, NICE guidance sets out detailed criteria for initial assessment of rehabilitation needs, and recommends that “people with stroke have goals for their rehabilitation that: are meaningful and relevant to them, focus on activity and participation, are challenging but achievable, (and) including both short-term and long-term elements.” [152] The NICE quality standard on stroke in adults also states that “adults who have had a stroke have their rehabilitation goals reviewed at regular intervals.” [138] SSNAP includes the following indicator on rehabilitation goals:

- proportion of applicable patients who have rehabilitation goals agreed within 5 days of clock start.

6.4.3 Discharge from hospital

Recommendations to ensure a successful discharge of stroke patients from hospital to the community cover three broad areas:

- the screening and planning that should take place prior to discharge
- requirements at the point of discharge, including a health and social care plan
- particular requirements around ESD.

Prior to discharge, it is recommended that a number of key assessments take place. This includes ensuring that practical arrangements are made – for example, any equipment needed has been installed in the home; and ensuring that the individual and their carers are physically and emotionally prepared.

Relevant key indicators from SSNAP include:

- proportion of applicable patients screened for nutrition and seen by a dietitian by discharge
- proportion of applicable patients who have mood and cognition screening by discharge.

NICE guidelines recommend that stroke patients should have a joint health and social care plan which sets out the ongoing support services which will be provided for them, and that this is shared with relevant health and social care providers. [152] The CCG Outcomes Indicator Set gathers data on the proportion of people who “are discharged from hospital with a joint health and social care plan.” [153] While the proportion of patients who receive such a plan has increased from 69% in England in 2013/14 to 81% in 2014/15, there is still room for further improvement. [195]

At the time of discharge, it is also recommended that those who have had a stroke should be given the details of a named member of staff they can contact, advice on how to prevent a recurrent stroke and medication to assist this where appropriate, alongside other advice and support – for example, on returning to work or claiming benefits to which they are eligible. [152] However a National Audit Office study found that out of a sample of 760 stroke survivors surveyed, only approximately a quarter were given information about welfare benefits and just under half reported receiving information on recurrent stroke prevention. [196]

Relevant key indicators from SSNAP include:

- proportion of applicable patients receiving a joint health and social care plan on discharge
- proportion of applicable patients in atrial fibrillation on discharge who are discharged on anticoagulants or with a plan to start anticoagulation
- proportion of patients... who are given a named person to contact after discharge.

ESD “is designed for stroke survivors with mild to moderate disability who can be discharged from hospital sooner to receive the necessary therapy at home” – this therapy usually lasts about six weeks. [197] There is some evidence that those who receive ESD have better outcomes. For example, it has been estimated that if stroke units and ESD services were fully implemented nationwide, the 10-year mortality rate would fall from 67% to 62%. [198] Increasing ESD would also help to save money for the NHS, as care provided at home tends to be less expensive than that provided in a stroke unit. The National Audit Office estimated in 2010 that increasing the availability of ESD from 20% to 43% of patients “would be cost-effective over a ten-year timeframe, costing about £5,800 per QALY gained.” [198]

NICE has recommended that ESD is offered to those who are eligible – for example the quality statement “adults who have had a stroke are offered early supported discharge if the core multidisciplinary stroke team assess that it is suitable for them.” [138] However in 2014, only 75% of hospitals had access to ESD services, leading a SSNAP audit report to comment that “the 25% of recalcitrant Clinical Commissioning Groups (CCGs) not commissioning early supported discharge (ESD) have to somehow be persuaded of the hard scientific arguments that such services produce better outcomes at lower cost.” [199] A UK Parliament briefing stated that “only 20% of patients are currently enrolled, but the Department of Health estimate that 43% of patients could benefit from such schemes.” [42] SSNAP includes the following indicator on ESD:

- proportion of patients treated by a stroke skilled early supported discharge team.

6.4.4 Follow up assessments and care

Although most recovery occurs in the initial days and weeks after a stroke, improvement is possible in the longer term. Both to maximise these improvements and to ensure those who have had a stroke are able to cope with the physical and mental health impacts, ongoing support and rehabilitation is often required even after someone has been discharged from hospital.

The Stroke Association estimates that one in four stroke survivors live alone. [200] A 2012 report on the financial impact of stroke found that among those of working age who had experienced a stroke (and their families): [201]

- 69% were unable to return to work and 65% had a reduced household income after stroke
- 58% reported an increase in household expenses, including heating and transport costs, contributions to care services and costs for household adaptation
- 63% were living in fuel poverty
- 40% had cut back on food.

For these practical and financial reasons, it has been recommended that ongoing support for stroke survivors should focus on a range of needs and on a social model of recovery as well as physical health requirements. For example, the UK National Guideline on stroke recommends that rehabilitation services are commissioned to provide support for the health, social and vocational needs of those who have had a stroke. [7]

The national guideline also recommends some ongoing support to address any identified needs, for example – “services for people with stroke should have a comprehensive approach to delivering psychological care that includes specialist clinical neuropsychology/ clinical psychology input within the multi-disciplinary team.” [7]

Similarly, NICE guidance provides a range of recommendations on the support that should be offered to people who've had a stroke after their discharge from hospital, including encouraging "people to focus on life after stroke and help them to achieve their goals. This may include:

- facilitating their participation in community activities, such as shopping, civic engagement, sports and leisure pursuits, visiting their place of worship and stroke support groups
- supporting their social roles, for example, work, education, volunteering, leisure, family and sexual relationships
- providing information about transport and driving." [152]

Evidence-based guidelines also refer to the general requirement for regular follow-up assessments, with the latest NICE Quality Standard on stroke recommending a structured health and social care review at six months, one year and then annually following a stroke. [138]

6.4.5 Carers

Ongoing practical and emotional support for the carers of stroke survivors is essential, both before and after discharge from hospital. It is estimated that one in five dependent stroke survivors in the UK are cared for by family and friends. [98] A study conducted by the Stroke Association which surveyed the carers of those who have had a stroke found that: [27]

- two thirds experienced difficulties in their relationship with the stroke survivor
- nine months after discharge from hospital, 72% reported feel ill-prepared to take on the role of a carer
- up to 56% felt depressed and 79% experienced anxiety
- two-thirds reported that they had not received any information or advice or support to help them with their anxiety or depression

A number of guidelines refer to the need to gain information from, and provide information and support to, carers. For example, the UK National Guideline refers to the participation of carers, who should be "involved in significant decisions as an additional source of information", and the need for educational programmes for carers and assessments of their own needs. [7]

This is reflected in NICE guidance, which refers to the need to work with families and carers, identify their needs, "offer training in care... to family members or carers who are willing and able to be involved in supporting the person after their stroke", and review their training and support needs regularly." [152]

6.4.6 Return to work

In some of the national guidelines on stroke rehabilitation, supporting someone who has had a stroke to return to work is highlighted as a specific priority area. It has been estimated that "although three-quarters of stroke survivors of working age want to return to work, there is little provision of appropriate vocational support, and a

successful return to work is considerably less likely for patients from lower socio-economic groups.” [42]

The NICE Quality Standard on stroke includes return to work as one of its seven quality standards. It recommends that “adults who have had a stroke are offered active management to return to work if they wish to do so.” [138] NICE guidance on stroke rehabilitation provides more details on what should be included as part of ‘active management.’ [152]

6.5 Summary of national guidelines

The Royal College of Physicians (RCP) has published the UK National Guideline for Stroke, prepared by the Intercollegiate Stroke Working Party. The most recent (fifth) edition was published in 2016. [7] The Guideline provides over 300 specific recommendations for stroke care, but selects 30 as ‘key recommendations’, which are summarised in Table 11 below. The full content of each key recommendation is available in Appendix A.

Table 11 also includes key recommendations in the NICE stroke pathway. [202] Other relevant NICE guidance, such as that on smoking cessation, is referred to in the body of the text in Chapter 6. The table includes all the recommendations from each guidance, except for CG181, where only the most relevant recommendations have been included.

The recommendations have been categorised and listed according to which part of this Chapter they refer to, to enable ease of cross-reference. Table 11 is available in larger format, on request, for ease of reference.

			Prevention				Acute care				Rehabilitation						
			screening and assessment	non-modifiable risk factors	lifestyle risk factors	medical risk factors	public awareness	clinical identification	treatment	preventing recurrent stroke	enabling essential functions	multidisciplinary team	therapy requirements	discharge from hospital	follow up assessment and care	carers	return to work
NICE guidance - Stroke and transient ischaemic attack in over 16s: diagnosis and initial management - CG68 (2008)	Rec 1.1.1	Prompt recognition of symptoms of stroke and TIA					x	x									
	Rec 1.1.2	Assessment of people with suspected TIA and identify high risk of stroke						x	x								
	Rec 1.2.1 - 1.2.2	Suspected TIA brain imaging - referral and type						x	x								
	Rec 1.2.3 - 1.2.4	Carotid artery imaging and procedure for those with non-disabling stroke or TIA								x							
	Rec 1.3.1	Admission to specialist acute stroke unit						x	x	x	x						
	Rec 1.3.2	Brain imaging for early assessment of people with stroke						x									
	Rec 1.4.1	Treating stroke with thrombolysis with alteplase							x								
	Rec 1.4.2	Treating stroke with aspirin and anticoagulant treatment							x	x							
	Rec 1.4.3	Treating stroke and other co-morbidities with anticoagulation treatment							x	x							
	Rec 1.4.4	Treating stroke with statins - initiation and those already receiving statins							x	x							
	Rec 1.5.1	Treating stroke with supplemental oxygen therapy							x	x							
	Rec 1.5.2	Treating stroke to ensure blood sugar control							x	x							
	Rec 1.5.3	Treating stroke to ensure blood pressure control							x	x							
	Rec 1.6.1	Screening and, where necessary, further assessment of swallowing function									x						
	Rec 1.6.2	Malnutrition screening and requirements for oral nutritional supplementation									x						
	Rec 1.7.1	Early mobilisation and optimum positioning of people with stroke									x						
	Rec 1.8.1	Measures to avoid aspiration pneumonia in people with dysphagia									x						
Rec 1.9.1 - 1.9.2	Situations where a surgical referral may be required							x									
NICE guidance - stroke rehabilitation in adults - CG162 (2013)	Recs 1.1.1 - 1.1.2	Requirements for specialist stroke rehabilitation units and services										x	x	x		x	
	Recs 1.1.3 - 1.1.5	Staffing requirements for the core multidisciplinary stroke team										x				x	
	Recs 1.1.6 - 1.1.7	Collaborative work between health and social care to assess and support										x		x	x	x	
	Recs 1.1.8 - 1.1.17	Ensuring safe and successful transfer of care from hospital to community												x	x	x	
	Recs 1.2.1 - 1.2.7	Screening and assessment to ascertain rehabilitation needs										x	x			x	
	Recs 1.2.8 - 1.2.12	Setting and reviewing appropriate goals for rehabilitation										x	x			x	
	Recs 1.2.13 - 1.2.15	Developing and reviewing stroke rehabilitation plans										x	x	x		x	
	Recs 1.2.16 - 1.2.18	Minimum requirements for stroke rehabilitation therapy											x				
	Recs 1.3.1 - 1.3.4	Provide support and information to person with stroke and carers												x	x	x	
	Recs 1.4.1 - 1.4.9	Assessment and support for cognitive deficits incl. visual, memory, attention											x	x			
	Recs 1.5.1 - 1.5.4	Assessment and support for emotional functioning and psychological needs											x	x		x	
	Recs 1.6.1 - 1.6.4	Screen and offer treatment or therapy for visual difficulties											x				
	Recs 1.7.1 - 1.7.5	Screen and offer treatment or therapy for those with swallowing difficulties											x				
	Recs 1.8.1 - 1.8.15	Screen and offer treatment, therapy and education for communication difficulties											x			x	
	Recs 1.9.1 - 1.9.31	Provide support for a range of movement difficulties incl. with limbs											x			x	
	Recs 1.10.1 - 1.10.4	Provide support for difficulties with personal activities of daily living											x	x		x	
	Recs 1.10.5 - 1.10.6	Provide active management to support people to return to work after a stroke															x
Recs 1.11.1 - 1.11.7	Provide long term support to meet health, social care and personal needs													x	x		
NICE guidance - cardiovascular disease: risk assessment and reduction, including lipid modification CG181 (2016)	Recs 1.1.1 - 1.1.6	For primary prevention of CVD, identify people for full formal risk assessment	x	x													
	Recs 1.1.7 - 1.1.21	Conduct full formal risk assessment using QRISK2 tool for under 84 yrs	x	x													
	Recs 1.1.22 - 1.1.28	Communication and providing information on risk to patients		x													
	Recs 1.2.1 - 1.2.6	Healthy (cardioprotective) diet for those at high risk of or with CVD			x												
	Recs 1.2.7 - 1.2.10	Physical activity recommendations for those with at high risk of/with CVD			x												
	Rec 1.2.11	Combined diet and physical activity interventions in line with national recs			x												
	Rec 1.2.12	Offer weight management services (advice and support) for obese people				x											
	Rec 1.2.13	Alcohol guidelines and avoidance of binge drinking			x												
	Recs 1.2.14 - 1.2.16	Advise smokers to stop, and provide smoking cessation services			x												
	Recs 1.2.17	Limitations on those who should take plant stanols or sterols for prevention				x											
Recs 1.3.1 - 1.3.51	Guidelines for lipid modification therapy for primary & secondary CVD prevention				x												

Sources: [7] [138] [139] [140] [141] [142] [143] [144] [145] [146] [147] [148] [149] [150] [151] [152] [59]

7 Local services and support to prevent, treat and rehabilitate stroke

Key Points

- Screening and risk assessment for stroke is available in Hackney and the City through the NHS Health Check programme and the Long-Term Conditions contract held by the GP Confederation. Both of these services are performing well and have good reach into high risk patient groups.
- The local pathway for managing patients with a family history of stroke is not clear.
- A number of lifestyle services are commissioned locally which address the main modifiable risk factors for stroke – including stop smoking services, weight management and exercise on referral, diabetes prevention, and community exercise and ‘cook and eat’ sessions. Referrals are incentivised through the LTC contract. There are also local partnerships in place focused on addressing the wider determinants of smoking and obesity-related ill-health. Many/most of these programmes are targeted at communities at increased risk of stroke.
- A possible gap has been identified in the identification of, and support for, increasing risk drinking behavior - a key modifiable risk factor for stroke.
- Local management of hypertension in general, and specifically among stroke patients, is very good. The picture for diabetes management is mixed (but being addressed). For AF there is room for improvement both in terms of case finding and management of diagnosed patients.
- There is currently no clinical service in place locally to manage obesity in patients with complex needs.
- There is limited funded activity to promote awareness of stroke locally (over and above the national ‘Act FAST’ campaign).
- In terms of acute care, most stroke patients locally are seen at the Royal London Hospital HASU and transferred as appropriate to Homerton stroke rehabilitation unit. Data recording issues prevent tracking of patients across the care pathway.
- On the whole, 2014/15 SSNAP indicators for acute stroke care for City and Hackney patients are broadly in line with similar areas.
- The full local stroke pathway includes a specialist (regional) neurological rehabilitation unit, a transitional neurological rehabilitation unit, early supported discharge, community rehabilitation, palliative care and nursing care. A local consensus protocol is currently being developed to guide long-term secondary prevention of stroke. A recent review of the local stroke unit at Homerton hospital assessed the local pathway to be working well.
- This needs assessment has identified a potential risk in the final stage of the community rehabilitation pathway, with one of the core programmes (Fit4Health) relying on short-term grant funding which comes to an end in 2018.

7.1 Introduction

This chapter describes the services and support available in Hackney and the City to prevent and treat stroke/TIA, as well as provision of rehabilitation services. It follows the same structure as Chapter 6, which describes best practice and research evidence for the prevention, treatment and rehabilitation of stroke.

7.2 Prevention of stroke

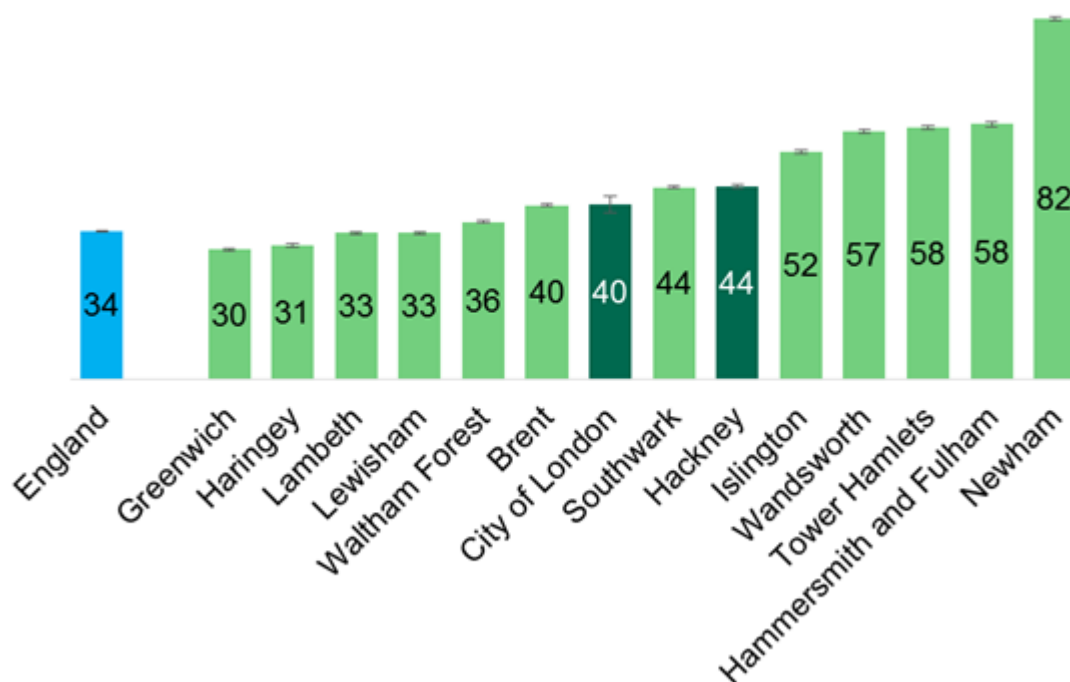
7.2.1 Screening and assessment of risk

Both London Borough of Hackney and City of London Corporation commission an NHS Health Check service, following national best practice guidance. [203] In Hackney, this is delivered by the local GP Confederation. In the City, this is delivered through a lead provider model (led by Reed Momenta) in partnership with the Neaman GP practice. The City service includes provision of the NHS Health Check to low paid City workers as well as a community outreach element.

The Hackney service includes a key performance indicator (KPI) designed to encourage targeting of patients (i.e. Black and Asian adults) who are at increased risk of CVD including stroke (see Section 4.1.3 and 5.6.1). The GP Confederation has also established a payment structure which incentivises the prioritisation of patients with high CVD risk.

Local performance of the local NHS Health Check programmes, in terms of the percentage of eligible people who have taken up the offer, is shown in Figure 44. Local data (Hackney) shows significant improvements in performance on this measure in the final quarter of 2016/17.

Figure 44: Cumulative percentage of eligible people who have received an NHS Health Check (2013/14 Q1 - 2016/17 Q3)



Source: PHE Fingertips tool [2]

In addition, the CCG's 2017/18 Long-Term Conditions contract with the local GP Confederation includes two relevant indicators for stroke risk assessment, as follows:

- patients age 65+ with a long-term condition (including stroke/TIA as well as diabetes, heart failure, hypertension, CKD, AF, peripheral arterial disease, CHD) with a record of pulse rhythm (regular/irregular) within the last 12 months
- patients age 65+ (without any of these long-term conditions) with a record of pulse rhythm (regular/irregular) within the last 5 years (previously 48 months).

On both of these indicators in 2016/17, the GP Confederation exceeded target – 92% achieved for those with long-term conditions (compared with a target of 80%) and 91% for those without (compared with a target of 85%).

Patients (aged 18-74) identified to be at increased risk of CVD or diabetes are placed on a risk register and GPs are incentivised to review them annually. The contract also includes incentives to refer patients at risk of diabetes to the National Diabetes Prevention Programme (see section 7.2.3.1).

7.2.2 Non-modifiable risk factors

As discussed in Chapter 4 of this report, the main non-modifiable risk factors relevant to stroke are age, sex, ethnicity, family history of stroke/TIA and previous stroke/TIA.

There have been no targeted communication campaigns in the City or Hackney to raise awareness of stroke in high risk populations, over and above the national 'Act F.A.S.T.' campaign.

However, many local programmes which address modifiable lifestyle risk factors (see section 7.2.3 below) are designed to target local people at high risk of stroke (including older people and people from Black and minority ethnic (BME) backgrounds), and/or to be inclusive of all genders/ages/backgrounds.

Regarding local interventions to prevent recurrent stroke/TIA, please see Section 7.3.4 below.

The local pathway for managing patients with a family history of stroke is not clear. It is expected that these patients would be managed symptomatically.

7.2.3 Modifiable risk factors

This section describes local support, services and other interventions available to address the main modifiable risk factors for stroke, including lifestyle and behaviour and existing medical conditions.

7.2.3.1 Lifestyle and behaviour

The 'Lifestyle and behaviour' chapter of the City and Hackney JSNA describes a range of strategies, programmes and activities aimed at reducing smoking, increasing physical activity, improving diet and nutrition, and addressing problem drinking. [137] As mentioned previously, many of these local programmes are designed to target people at highest risk of CVD, including people from socially disadvantaged backgrounds.

A brief overview of relevant local support and services is provided below.

Stop smoking services (SSS) and wider tobacco control

A comprehensive programme of tobacco control is in place locally, with smoking remaining a priority in both Hackney's and the City's Joint Health and Wellbeing Strategies.

Evidence-based SSS are in operation across both areas, delivering services from a range of settings in the community. Training on very brief advice (using motivational interviewing techniques) is available to a wide variety of frontline staff, to enable them to help smokers access support to quit. In both Hackney and the City, specialist SSS will be recommissioned over the next couple of years.

City and Hackney CCG's Long-Term Conditions contract with the GP Confederation includes three indicators to incentivise referrals to local SSS in patients with certain conditions (including stroke/TIA) – offer of support to quit, consent to be contacted by a stop smoking advisor, attendance at a local SSS.

A range of wider local tobacco control work is also underway in Hackney, including:

- action to tackle sales of cheap/illegal tobacco and effective regulation of tobacco sales
- implementation of smoke-free policies across the NHS estate (including Homerton Hospital and East London Foundation Trust) and other public spaces
- targeted communication campaigns
- the piloting of innovative projects to prevent smoking uptake in young people.

Work is also ongoing to engage with and support high risk groups to quit - including people with long-term conditions (including mental illness), pregnant women, people who are unemployed or in unskilled occupations, and also communities with high smoking prevalence (who are also at increased risk of stroke).

Supporting people to be more active

There are many programmes and initiatives underway in both Hackney and the City to encourage physical activity among local people. This includes planning policies which promote walking and cycling through infrastructure design, targeted walking and cycling interventions, exercise classes for all ages, as well as local authority-provided leisure centres. Hackney Council's One You programme specifically targets some of the borough's most socially deprived areas, delivering activities in community centres on social housing estates – as such, the programme aims to reach people at increased risk of stroke. Over a third (37%) of One You participants are social housing tenants and 72% are from BME groups; in total, 40 classes a week are currently being run, with around 440 participants each week. While this is an encouraging start, the programme is reaching a tiny proportion of the estimated 50,000+ adults locally who are inactive (i.e. not achieving even 30 minutes of moderate exercise each week). Community provision of physical activity opportunities in Hackney is currently being reviewed.

New 'healthy lifestyle' services for adults in both Hackney and the City of London (which include weight management and exercise on referral) are valuable additions to existing provision to help adults at the highest risk of inactivity-related poor health (including stroke) to become more active. Eligibility criteria for both services include baseline physical activity levels of less than 30 minutes per week ('inactive') in people at risk of inactivity-related disability or disease (including stroke), and targets are included in both contracts to increase levels of activity to at least 150 minutes per week as recommended by the Chief Medical Officer. The Hackney healthy lifestyle service (Healthier Together) is currently being evaluated to inform service development.

Dietary interventions

Hackney's Obesity Strategic Partnership was launched in 2016 to develop a 'whole systems approach' to tackling obesity locally. Membership includes the NHS and a range of other council service areas which can influence aspects of the food (and physical activity) environment. The following priority programmes related to improving the food environment have been progressed so far:

- piloting and rolling out of a 'Healthier Catering Commitment' award to encourage hot food takeaways to reformulate the meals they sell
- action to improve catering in the public sector - including the council's own catering contract, leisure vending machines, schools and early years' settings
- implementation and strengthening of Local Plan policies and decisions to restrict the proliferation of hot food takeaways near schools
- piloting of a community-led pilot project in Haggerston to offer low cost, healthy family meal packs and recipe cards.

Hackney Council also commissions a variety of providers to deliver 'cook and eat' classes at community locations across the borough, including in some of Hackney's most deprived neighbourhoods. These classes raise awareness and develop skills among participants about food buying and cooking healthy meals on a budget. In 2015/16 over 70 'cook and eat' courses (for adults only and families) were delivered on nine estates, and over 700 residents completed a four week programme. The evaluation of this programme showed that at the end of the course:

- 77% of participants (on both adult and family courses) reported feeling more confident reading nutritional labels on food packaging
- 70% of participants said they felt confident preparing and cooking new foods and recipes at home.

In the City of London, access to low-cost fruit and vegetables is provided once a week at the one maintained primary school in the Square Mile (Sir John Cass) for children, families and teachers at the school.

As mentioned previously, the City of London Corporation and Hackney Council have both recently commissioned (separately) a combined 'healthy lifestyle' service which includes a weight management element. This provides a multi-component programme including behaviour change and dietary advice (as well as exercise) - for people who are obese (BMI \geq 30), or overweight (BMI \geq 25) with other risk factors for type 2 diabetes or CVD.

National Diabetes Prevention Programme

City and Hackney are part of a consortium (with Tower Hamlets, Newham and Waltham Forest) participating in the first wave of the NHS Diabetes Prevention Programme (NDPP). Locally, this is being delivered by Reed Momentum with referrals generated via the primary care 'at risk of diabetes' register.

There is some uncertainty about the exact number of referrals from City and Hackney patients into the NDPP, but local data suggests the number is in the region of 450 for the second half of 2016/17 when the service was up and running.

Interventions to address problem drinking

Treatment for alcohol dependence is available in both the City and in Hackney, as part of wider substance misuse treatment services commissioned by each local authority. This includes a substance misuse team based in Homerton Hospital

which, as part of the service, provides support for patients who frequently attend due to alcohol or substance misuse-related reasons.

Alcohol screening (using the AUDIT tool) is available locally in primary care for new patients, as part of the NHS Health Check, and incentivised as part of all CVD (including hypertension) and diabetes annual reviews. However, evidence suggests that currently many increasing risk drinkers may not be identified - and, therefore, not receiving the support that may help them reduce their risk of alcohol-related harm. [131]

The Business Healthy initiative provides support to City businesses to improve the health of their workers, including a range of resources and a number of events on alcohol and wellbeing in the workplace. Hackney Council has now joined the City of London Corporation in being awarded London Healthy Workplace Charter status, which provides a platform to support local businesses to invest in staff health and wellbeing (including around alcohol-related harms).

A range of work is also underway locally to affect the wider alcohol and policy environment – this includes the introduction of a voluntary minimum unit price of alcohol in Hackney, as well as formal Public Health involvement in decisions on new license applications and variations in existing licenses for on and off sales. An innovative pilot project is currently working with local pubs in Hackney to develop effective approaches to support sensible drinking.

A potential gap has been identified in the provision of local support for increasing risk (as opposed to high risk or dependent) drinkers.

7.2.3.2 Existing medical conditions

Cholesterol

It is routine in the primary care management of people who have experienced stroke/TIA to prescribe statins. According to local GP data, 80% of City and Hackney patients with recorded stroke/TIA also have a prescription for statins. [124]

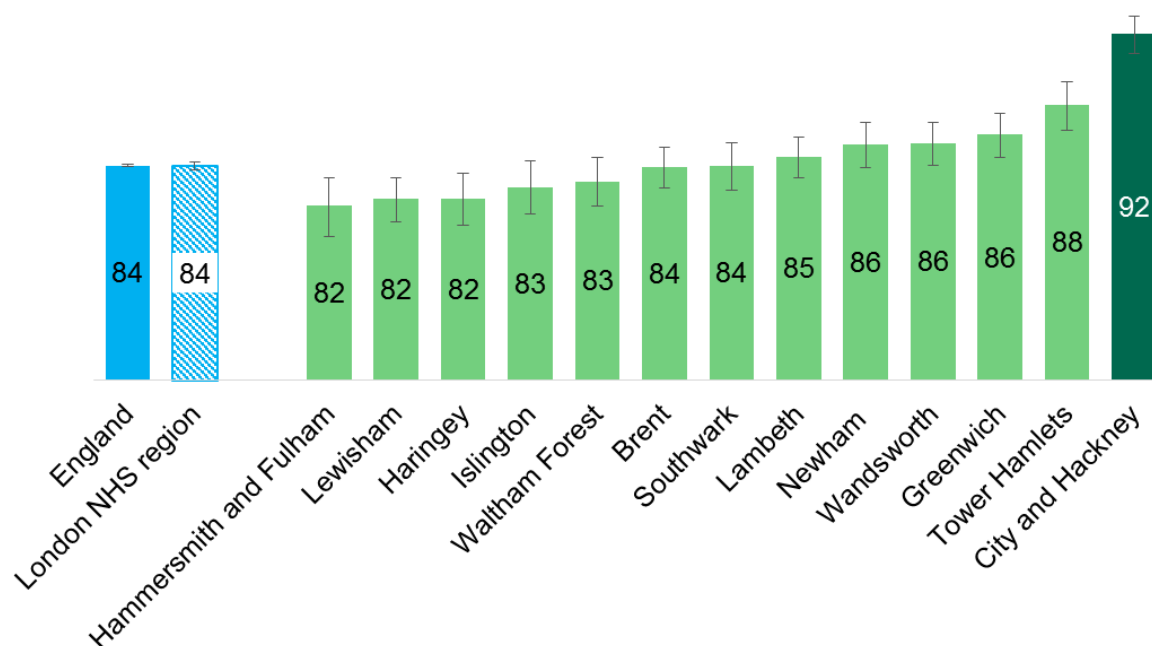
Hypertension

City and Hackney performs consistently very well on blood pressure control in hypertensive patients compared with statistical peer areas and nationally. [133]

Hypertension is assessed as part of the NHS Health Check, and the CCG's Long-Term Conditions contract with the GP Confederation includes incentives for improved blood pressure control in high risk patients (including stroke, TIA, AF and diabetes).

National data shows that the majority (92%) of GP patients with a history of stroke have a blood pressure reading of 150/90 or less, which indicates that their hypertension is being well managed – this is higher than all of City and Hackney's statistical peers, London and England (Figure 45).

Figure 45: Percentage of patients with a history of stroke whose last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less (2014/15)



Source: PHE Fingertips tool [2]

Note: PHE Fingertips uses QOF data for the basis of these statistics (which includes patients who have experienced either stroke or TIA)

Atrial Fibrillation (AF)

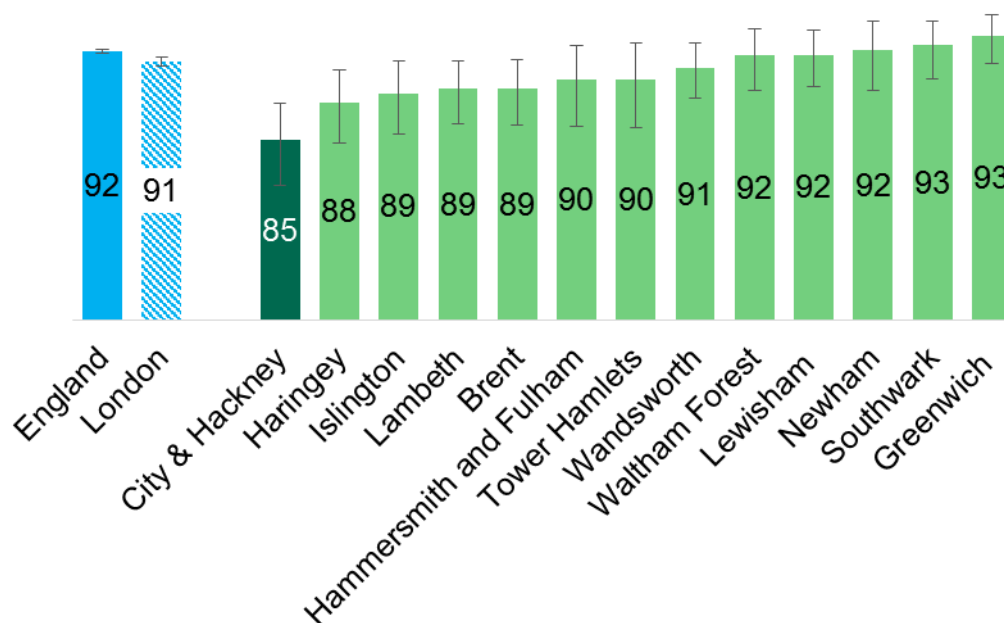
There is significant variation between local GP practices in the proportion of patients with AF who are estimated to be undiagnosed (although the reliability of these estimates for City and Hackney is unknown). According to a report from the Stroke Association, no GP practices in Hackney and the City are using the free GRASP-AF software tool to help identify and improve the management of patients with AF. [204]

Of the total number of patients diagnosed with AF in the City and Hackney (with a CHADS2 score of 1),¹² 85% are recorded as receiving anticoagulation/platelet therapy to prevent complications (such as stroke). This is lower than many similar areas in London and lower than the England average (Figure 46). It is also recognised that there is a high rate of exception reporting locally for AF patients treated with anticoagulation.

The CCG is currently funding a specialist outreach service to improve medicines optimisation in AF patients and reduce exception reporting. This service provides GP practices with specialist pharmacist support to carry out the tasks outlined in Box 1.

¹² The CHADS2 (and updated version, CHA2Ds2-VASc) score is a clinical prediction tool for estimating risk of stroke in patients with non-rheumatic AF. A CHADS2 score of 1 indicates moderate stroke risk.

Figure 46: Percentage of AF patients (CHADS2 score=1) treated with anti-coagulant/platelet therapy in last 12 months (2014/15)



Source: PHE Fingertips tool [2]

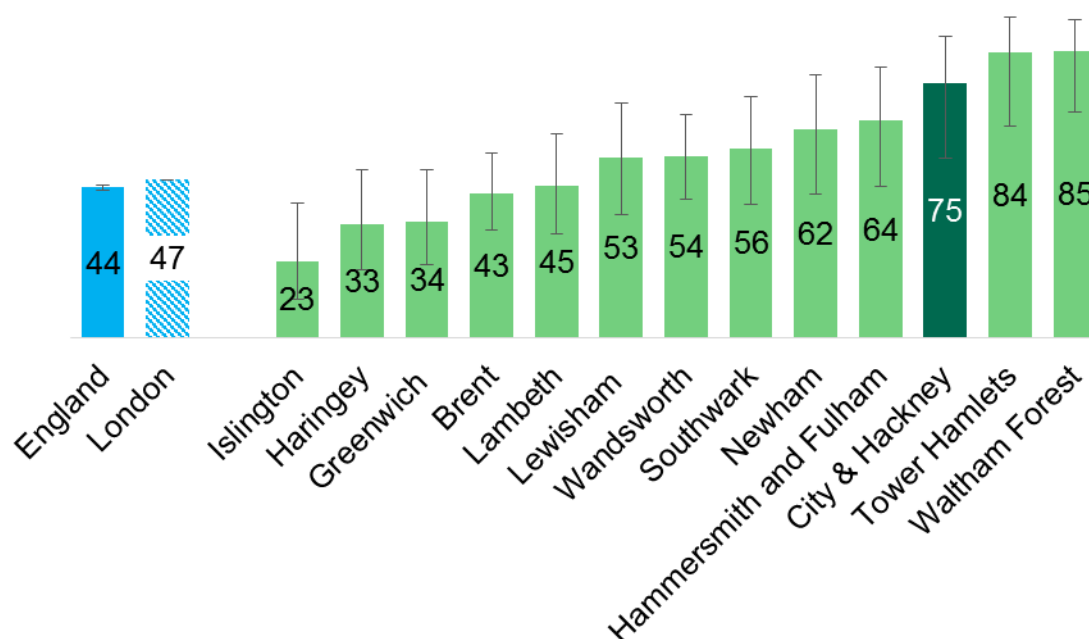
Table 12: City and Hackney CCG funded service to prevent stroke in high risk AF patients - specialist pharmacist support

This service will provide each GP practice with specialist pharmacist support to carry out the tasks outlined below, during 2017/18.

1. Review CHA2DS2-VASc and HASBLED scores in eligible patients.
2. Review absence of anticoagulation by investigating treatment to date.
3. Carry out consultations with patients and, as independent prescribers, initiate anticoagulant therapy for eligible patients and recommend an ongoing management plan (warfarin or direct oral anticoagulant (DOAC)).
4. Review patients inappropriately on antiplatelet monotherapy or combination of antiplatelet and anticoagulation therapy.
5. Refer to new medicines service within community pharmacy to aid adherence for warfarin and DOAC initiation.
6. Identify opportunities to optimise other cardiovascular parameters by opportunistic blood pressure and cholesterol monitoring, and develop further patient management plans where needed.

For patients admitted to hospital in 2014/15 as a result of a stroke, 75% of those diagnosed with AF were previously prescribed anticoagulation in City and Hackney. This is not statistically different from most statistical peers, but higher than the England and London averages (Figure 47).

Figure 47: Percentage of all stroke admissions with AF who had previously been prescribed anticoagulation (2014/15)



Source: PHE Fingertips tool [2]

Note: PHE Fingertips uses SSNAP data for the basis of these statistics (which includes patients who have experienced a stroke, but is unlikely to include patients with TIA)

Diabetes

Local delivery of the NHS Health Check programme (see section 7.2.1) provides a vehicle for systematically assessing diabetes risk and providing advice and support to help reduce that risk in adults age 40 to 74. Those identified to be at risk of diabetes are reviewed annually by their GP (this occurred for 87% of eligible patients in 2016/17). As mentioned previously, GPs are also incentivised locally to refer these patients to the NDPP – this programme provides support for patients at risk of diabetes to reduce this risk through lifestyle and behaviour change. Patients at risk of, or with, diabetes can also be referred to local weight management services (see section 7.2.3.1).

For patients diagnosed with diabetes, City and Hackney performs well in terms of primary care control of blood sugar, blood pressure and cholesterol in diabetic patients – when these targets are assessed separately. [205] However, when taking all three treatment targets together for patients with non-type 1 diabetes, the most recent National Diabetes Audit (NDA) assesses City and Hackney as ‘needing improvement’ – 37.7% of patients achieved all three treatment targets in 2015/16, compared with 40.4% on average across England. [206]

All GP practices in Hackney and the City participated in the 2015/16 NDA, which is a significantly higher participation rate than the England average of 81.4%. This may be contributing to the lower than average recorded local performance on the triple target measure, as it is possible that it is the lower performing practices that are not participating in the audit in areas with lower overall participation.

Finally, data from the latest NDA shows City and Hackney as performing poorly in terms of structured education for newly diagnosed patients, but this is due to data recording issues rather than poor access/uptake.

Obesity

As described in section 7.2.3.1, both the City of London Corporation and Hackney Council have recently commissioned an integrated 'healthy lifestyles' service, which aim to support overweight and obese adults to lose weight and support adults at risk of cardiovascular and other disease to be more active. Both of these services include a 'tier 2' multi-component weight management element (including dietary advice, physical activity, plus behaviour change support). The Hackney service (called 'Healthier Together') has a maximum annual referral capacity of 3,100 (for both weight management and exercise on referral); the City service (part of 'City Living Wise') has a maximum annual weight management capacity of almost 1,400 (including City residents and low paid City workers).

Commissioning responsibilities for weight management services were agreed in a consensus statement in 2014 by PHE, NHS England and other key partners. This stated that 'tier 1' (universal services including first line advice and support) and 'tier 2' services are the responsibility of local authorities to commission. 'Tier 3' services (clinical services for very obese people) are the responsibility of CCGs to commission, while 'tier 4' (bariatric) services were the responsibility of NHS England through specialised commissioning arrangements. Responsibility for tier 4 commissioning has since started to transfer to CCGs.

There is currently no tier 3 weight management service in operation in Hackney or the City. A specialist tier 4 (bariatric) service is provided by Homerton hospital, with 52 procedures carried out in 2016/17.

Sickle cell disease (SCD)

A specialist centre for adults with SCD is hosted at Homerton hospital, funded by NHS England through specialised commissioning arrangements. Around 350 City and Hackney adults are currently being managed through this service, and up to 100 at the Royal London Hospital. This compares with a total population of around 600 adults living with SCD locally.

7.3 Acute care

Acute stroke services in London were reconfigured in 2010 following publication of the National Stroke Strategy. [207] The first point of treatment for stroke patients in London is usually a HASU. There are eight HASUs in London¹³ and all patients with suspected stroke are eligible for admission. HASUs were set up to provide rapid access to brain imaging, assessment by stroke specialists and interventions (including thrombolysis) – all available 24 hours a day, seven days a week. Most City

¹³ London HASUs are located with Queen's Hospital, Charing Cross Hospital, King's College Hospital, Northwick Park Hospital, Princess Royal University Hospital, Royal London Hospital, St George's Hospital and University College Hospital.

and Hackney stroke patients are seen at the Royal London Hospital HASU, with a smaller number seen at University College London.

Once stable, patients are referred to an acute stroke rehabilitation unit or directly to a community rehabilitation service (provided either in a nursing home or in the patient's own home). There are 23 acute stroke rehabilitation units in London, including one at Homerton Hospital in Hackney. There are no data available to reliably determine the number of patients transferring from HASUs to the local stroke unit.

The local acute and rehabilitation stroke pathway is described in Figure 48.

Figure 48: Overview of local acute and rehabilitation stroke pathway

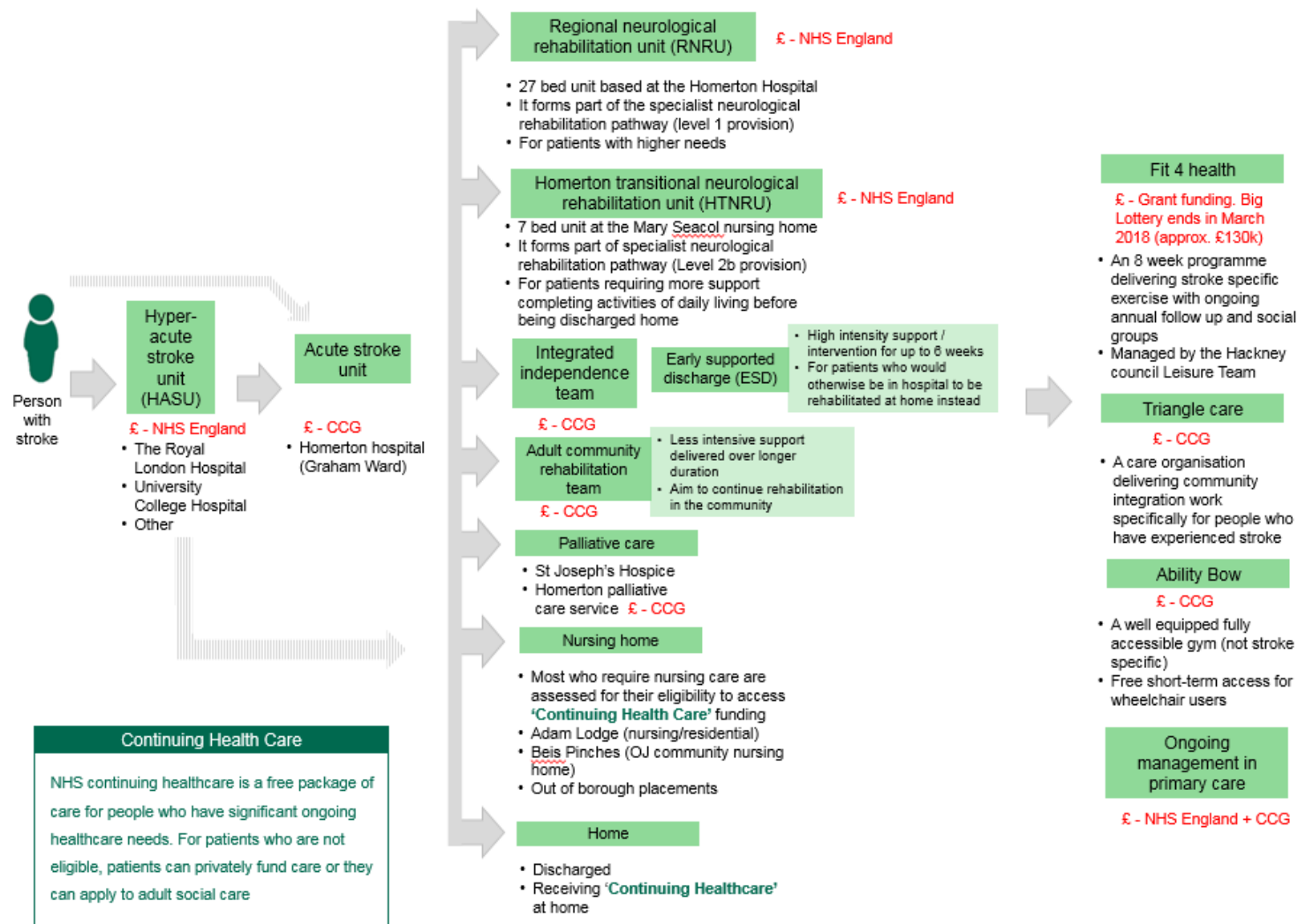


Table 13 shows that, in 2014/15, 87% of City and Hackney admitted stroke patients spent most of their stay on a stroke unit, and 60% were directly admitted to a stroke unit within four hours. These values are similar to comparable areas in London.

The London stroke standards specify that 95% of stroke patients should be admitted to a HASU within four hours of arriving at A&E. Data from April-June 2016 show that the Royal London Hospital achieved this for just under 60% of patients. [208] This is very similar to the England average.

Almost all City and Hackney patients were seen by a specialist stroke consultant or nurse trained in stroke management within 24 hours (94% and 96% respectively).

The most recent annual review of Homerton hospital's stroke unit (23 March 2017) assessed the unit to be meeting all staffing requirements. However, the unit was found to be falling short of meeting the standard to repatriate patients from HASUs within 24 hours (the standard is 90%). While admission times have improved since the previous year, out of hours admissions due to transport problems remain an issue.

Table 13: Acute care – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	City and Hackney vs. comparator group average
Directly admitted to a stroke unit within 4 hours of clock start	57%	57%	60%	Similar
Spent at least 90% of their stay on stroke unit	82%	84%	87%	Similar
Assessed by a stroke specialist consultant physician within 24 hours of clock start	76%	89%	94%	Similar
Assessed by a nurse trained in stroke management within 24 hours of clock start	87%	92%	96%	Similar

Source: SSNAP [209]

Notes: 'Comparator group' includes City and Hackney plus its statistical peers (see Section 2.3 of this report for details)

Similar = the difference between City and Hackney and the comparator group average is not statistically significant

Higher = figure for City and Hackney is statistically significantly higher than comparator group average

Lower = figure for City and Hackney is statistically significantly lower than comparator group average

7.3.1 Public awareness

As mentioned previously, there have been no local campaigns to raise awareness of how to recognise stroke. The only formal source of communication is via the national 'Act FAST' campaign managed by PHE.

7.3.2 Clinical identification of stroke

The duration between a person having a stroke and receiving appropriate treatment is a strong determinant of patient outcomes. Table 14 shows that two thirds (67%) of patients from the City and Hackney are scanned within an hour of arrival at hospital (or onset of their stroke if already in hospital), and 89% within 12 hours. These rates are similar to comparable areas in London. The median time taken for City and Hackney patients to be scanned is lower than comparable areas (although we are unable to comment on the significance of this difference with the data available).

The most recent annual review of the Homerton stroke unit (in March 2017) concluded that there is good access to appropriate radiology services (including CT scanning, MRI scanning and ultrasonic angiology).

Also, according to local SSNAP data, around 4% of City and Hackney stroke patients receive palliative care within 72 hours of the onset of symptoms, which indicates an advanced, progressive and terminal diagnosis. This value is similar to national rates (5%), but due to small numbers locally it is not possible to draw any reliable conclusions from these data.

Table 14: Clinical identification of stroke – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	City and Hackney vs. comparator group average
Patients scanned within 1 hour of clock start	44%	57%	67%	Similar
Patients scanned within 12 hours of clock start	88%	92%	89%	Similar
Time between clock start and scan (mins)	75	41	28	n/a

Source: SSNAP [209]

Notes: see Table 13

7.3.3 Treatment of stroke

As described in Section 6.3.3) of this report, thrombolysis is recommended for certain patients suffering from acute ischaemic stroke (an estimated 15% of stroke patients are suitable for thrombolysis on average).

Table 15 shows that a lower proportion of *eligible* stroke patients in City and Hackney received thrombolysis in 2014/15, compared to patients in other similar

areas. However, it is difficult to draw any conclusions on the basis of these data due to small numbers.

Table 15: Treatment of stroke – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	City and Hackney vs. comparator group average
Percentage of all stroke patients given thrombolysis (all stroke types)	12%	15%	15%	Similar
Percentage of eligible patients (according to the RCP guideline minimum threshold) given thrombolysis	81%	84%	71%	Lower
Median time between clock start and thrombolysis (mins)	56	41	40	n/a*

Source: SSNAP [209]

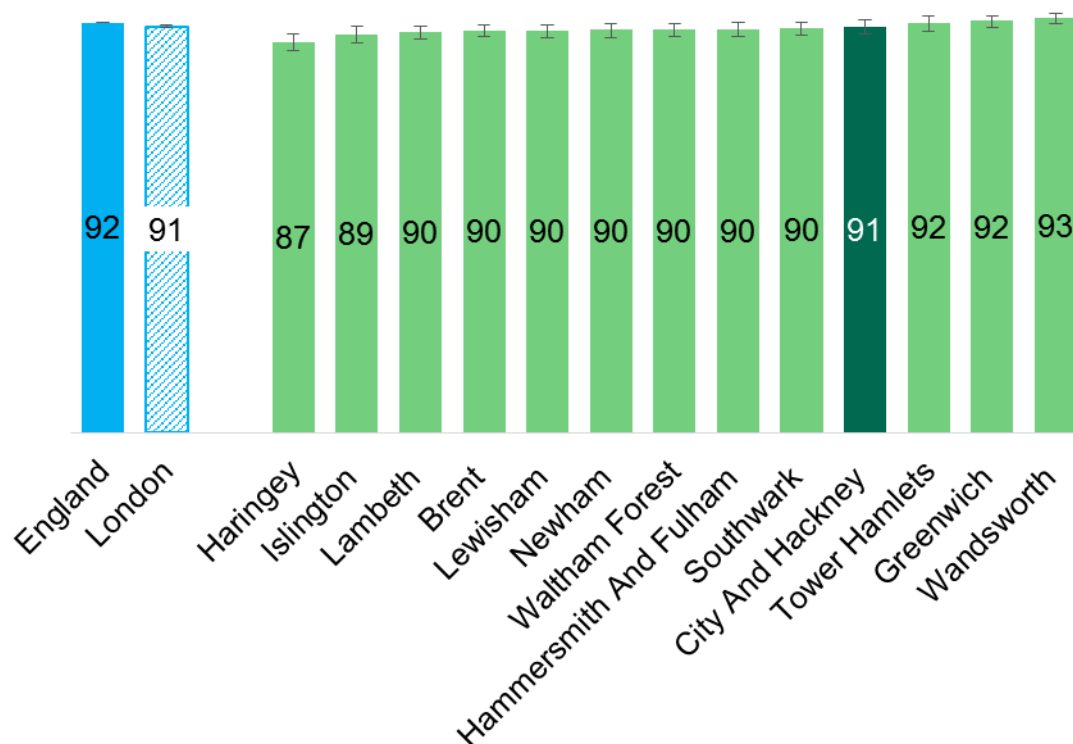
Notes: see Table 13

7.3.4 Preventing recurrent stroke

Secondary prevention of stroke includes controlling blood pressure, blood thinning agents, reducing cholesterol with statins, addressing smoking and obesity, while also improving the management of conditions that contribute to stroke such as diabetes and AF.

Nine out of ten GP patients (91%) with history of (non-haemorrhagic) stroke or TIA have been prescribed an anti-coagulant and/or anti-platelet medication in the previous 12 months. This is in line with London and other similar areas (as shown in Figure 49 below). [2]

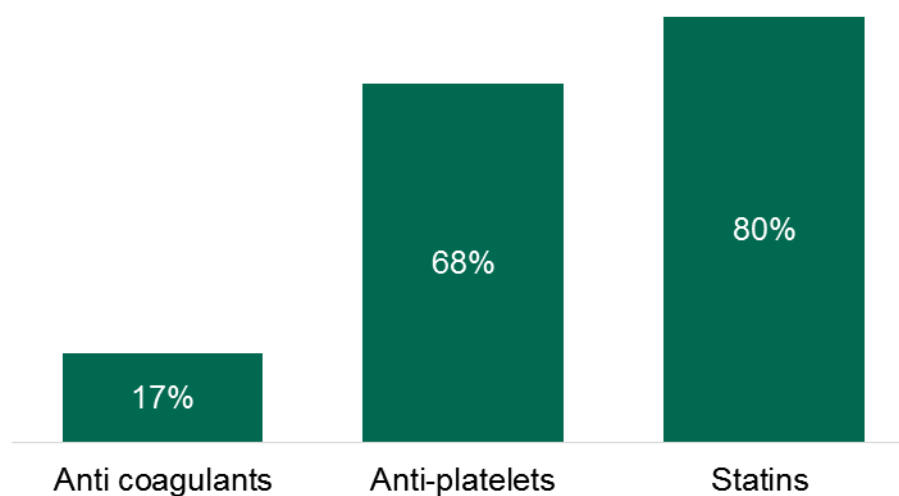
Figure 49: Percentage of GP-recorded stroke/TIA patients (non-haemorrhagic only) prescribed an anti-platelet agent or an anti-coagulant (2015/16)



Source: PHE Fingertips tool [2]

Figure 50 presents local data on the percentage of City and Hackney GP patients recorded as having had a stroke (of any type) or TIA who have been prescribed either statins, anti-platelet medication or anti-coagulants in the past 12 months.

Figure 50: Percentage of all GP-recorded stroke/TIA patients prescribed medication in the past 12 months (2016)



Source: CEG [124]

Following diagnosis of a stroke, the hospital team makes recommendations on medications for the prevention of further events. City and Hackney GPs provide an annual review for patients who have had a stroke to review blood pressure, cholesterol, medication, lifestyle factors, mood, cognition, pain, spasticity, communication, continence, activities of daily living and mobility.

In the most recent annual review of Homerton stroke unit, the service was assessed as performing well in seeing TIA patients at high risk of recurrent stroke/TIA within the 24 hour target (actual performance was 82% due to patient behaviour, but capacity is at 90%).

At the time of writing this report, City and Hackney CCG and the Homerton stroke unit were in the process of completing the local consensus protocol for long-term secondary prevention for patients with stroke and TIA (in line with relevant NICE and RCP guidance). The aim of this protocol is to inform and guide GPs in managing stroke/TIA patients to prevent further events, as well as to provide a reference for junior doctors and stroke nurse specialist. The protocol covers antithrombotics, management of vascular risk factors (including hypertension, high cholesterol, smoking, diabetes and obesity), specialist follow-up, as well as shared primary and secondary care educational events.

7.3.5 Enabling essential functions

Most HASUs in London are not achieving the 95% standard for ensuring stroke patients are given a swallow screen within the first four hours. Based on data from April to June 2016, the HASU at the Royal London Hospital was the worst performer in London on this measure, at just over 60%. [208]

This is reflected in SSNAP data in Table 16, which shows that 66% of City and Hackney stroke patients were given a swallow screen within four hours. However, almost all (97%) were given a formal swallow assessment within 72 hours.

Table 16: Enabling essential functions (swallow screen/assessment) – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	City and Hackney vs. comparator group average
Percentage of patients given a swallow screen within 4 hours of clock start	68%	74%	66%	Similar
Percentage of applicable patients given a formal swallow assessment within 72 hours of clock start	83%	92%	97%	Similar

Source: SSNAP [209]. Notes: see Table 13

7.4 Rehabilitation

Rehabilitation facilities on the Homerton stroke unit are deemed to be 'good', based on the results of the latest annual review (March 2017). Figure 48 summarises the local community rehabilitation pathway for stroke patients, which was assessed as generally working well in this same review. This pathway includes:

- in-reach by the Integrated Independence Team to identify appropriate patients for early discharge
- Homerton Transitional Neurological Rehabilitation Unit, which enables step down of suitable patients for community-based rehabilitation (including stroke unit in-reach)
- the Stroke Project, which provides group and one-to-one support for stroke patients, as well as specialist exercise classes (and also stroke awareness sessions)
- active referral to the Fit4 Health (exercise after stroke) programme
- sharing of patient information between primary and secondary care via the Health Information Exchange (for out of area patients, discharge summaries are sent by the ward clerk/therapy team as appropriate).

Further information on each of these services is provided in Sections 7.4.3 and 7.4.4.

7.4.1 Multidisciplinary team

Table 17 shows that virtually all City and Hackney stroke patients (wherever they are admitted) receive timely therapist assessments.

Homerton stroke unit was assessed in the most recent annual review (March 2017) as performing well in ensuring appropriate access to physiotherapy, occupational therapy and speech and language therapy – praise was particularly high for speech and language therapy, where performance compared very favourably compared to other acute stroke units. Availability of supporting services (including orthotics, podiatry and dietetics) was also assessed as good in this same review.

Table 17: Multidisciplinary team assessments – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	City and Hackney vs. comparator group average
Percentage of applicable patients assessed by an occupational therapist within 72 hours of clock start	89%	95%	98%	Similar
Percentage of applicable patients assessed by a physiotherapist within 72 hours of clock start	94%	97%	98%	Similar
Percentage of applicable patients assessed by a speech and language therapist within 72 hours of clock start	82%	94%	97%	Similar

Source: SSNAP [209]

Notes: Table 13

7.4.2 Therapy standards

Table 18 shows that, in 2014/15, City and Hackney stroke inpatients received a similar level of therapy support to comparable areas. Almost nine out of ten patients have their rehabilitation goals agreed within five days of clock start.

In addition to occupational therapy, physiotherapy and speech and language therapy, guidelines also indicate that stroke patients should have access to neuropsychological care. In London, access to this type of support varies considerably. The most recent annual review concluded that there was a good skill mix of psychology staff available at Homerton stroke unit.

Table 18: Therapy standards – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	Statistical difference between City and Hackney and comparator group
Percentage receiving recommended amount of occupational therapy (25.7 mins)	72%	85%	85%	Similar
Percentage receiving recommended amount of physiotherapy (27.1 mins)	69%	86%	90%	Similar
Percentage receiving recommended amount of speech and language therapy (16.1 mins)	36%	70%	71%	Similar
Percentage who have rehabilitation goals agreed within 5 days of clock start	87%	87%	88%	Similar

Source: SSNAP [209]

Notes: see Table 13

7.4.3 Discharge from hospital

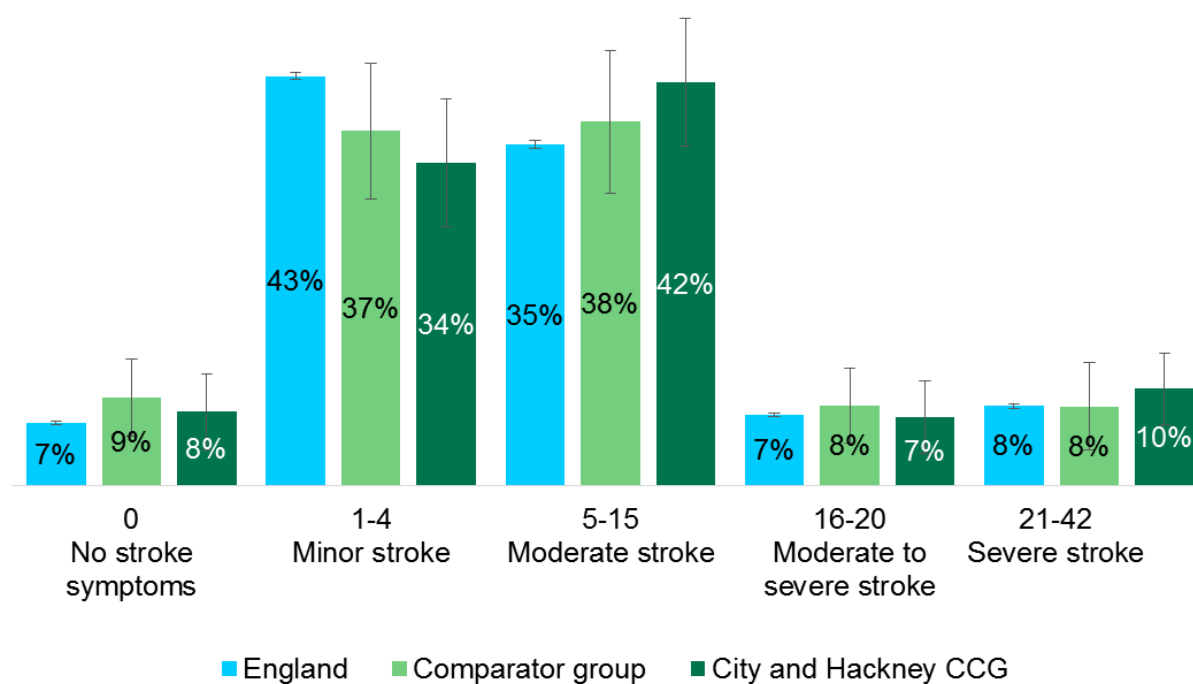
Homerton hospital has among the highest average length of stay of all acute stroke units in London, although this has been reducing recently. [208] It is worth noting that these figures are not necessarily comparing like with like, as each stroke unit has a different patient case-mix and offers different packages of care. Comparisons are also affected by patient access to onward services in their home borough, linked to local nursing home and social care capacity issues. For example, a significant proportion (around one third) of Homerton stroke unit patients are Haringey residents with high levels of disability, and access to community rehabilitation in this borough is relatively poor. A significant ongoing challenge locally (as elsewhere) is longer length of stay in patients with no recourse to public funds. Reducing length of stay and delayed discharge is a key area of focus for the Homerton stroke unit.

Discharge standards for all City and Hackney stroke patients (regardless of where they were treated) were mostly similar or better in 2014/15 compared with other areas (Table 19). However, a lower percentage than average of applicable patients had a continence plan drawn up within three weeks of clock start.

Table 19 also shows that, in 2014/15, 57% (n=106) of stroke patients in the City and Hackney were treated by a stroke-skilled Early Supported Discharge team to support

their health needs following acute treatment in hospital. This is a higher percentage than reported in comparable areas and for England as a whole. This may be due to better local access to support for early discharge or possibly a different case mix (in terms of severity of stroke and therefore suitability for ESD). However, Figure 51 shows that City and Hackney patients appear to have a similar severity of stroke symptoms to England and the comparator group average, based on the NIHSS score.

Figure 51: Average NIHSS score for stroke patients (2014/15)



Source: SSNAP [209]

Table 19: Discharge from hospital – relevant SSNAP indicators (2014/15)

Indicator	England	Comparator group	City and Hackney CCG	Statistical difference between City and Hackney and comparator group
Percentage of applicable patients screened for nutrition and seen by a dietitian by discharge	74%	78%	72%	Similar
Percentage of applicable patients with continence plan drawn up within 3 weeks of clock start	85%	94%	71%	Lower
Percentage of applicable patients with mood and cognition screening by discharge	86%	94%	88%	Similar
Percentage of AF patients discharged on anticoagulants/with plan to start anticoagulants	95%	96%	100%	Higher
Percentage of applicable patients with a joint health and social care plan on discharge	81%	96%	93%	Similar
Percentage of patients treated by a stroke skilled Early Supported Discharge team	28%	39%	57%	Higher
Percentage of patients given a named person to contact after discharge	86%	98%	97%	Similar

Source: SSNAP [209]

Notes: see Table 13

Early Supported Discharge (ESD) is highly cost effective and an estimated 40% of stroke survivors could benefit. Data from April to July 2016 suggests that just under 20% of patients are discharged from Royal London HASU with ESD (comparable to the national average) and just over 30% from Homerton acute stroke unit. These are much lower figures than those reported for City and Hackney in Table 19 above (for full year 2014/15). [208] It is therefore difficult to make any clear recommendations on the basis of these different sources of data.

ESD is provided by the Integrated Independence Team (IIT) at Homerton hospital, an integrated health and social care intermediate care service. The service has a single point of access and uses a multi-disciplinary assessment and care planning framework. The team comprises administrators, coordinating officers, geriatricians, independence assistants, managers, nurses, occupational therapists, physiotherapists, psychotherapists, speech and language therapists, social workers, specialist independence assistants and independence assistants and a therapy technician. In 2016/17, a total of 107 new stroke referrals were accepted by the IIT, from the following sources:

- Homerton stroke unit (31%)
- out of borough hospital (28%)
- HASU (16%)
- other Homerton ward (16%)
- Hackney and City of London community services (1%)
- other source not classified (8%).

The **adult community rehabilitation team (ACRT)** at Homerton hospital provides support over a longer period of time, for those patients who require therapy in the community after discharge (including occupational therapy, physiotherapy and speech and language therapy). ACRT received 2318 referrals in 2016/17 (a 7% increase on the number in 2015/16), of those 8% had a diagnosis of stroke. Of the 923 patients on the ACRT caseload (snapshot of records on 30th June 2017) 10% had a diagnosis of stroke. The average number of sessions per client referred to ACRT is seven, for those with a stroke diagnosis it's 10. It is suggested (by the ACRT manager) that stroke patients are more likely to be in receipt of intervention from more than one discipline which increases the number of sessions required.

The **regional neurological rehabilitation unit (RNRU)** is a 27 bed unit at Homerton hospital, which provides specialised rehabilitation for high need patients after a single incident neurological event - including stroke. This is part of the specialist neurological rehabilitation pathway (level 1 provision) and is funded by NHS England. It has not been possible to obtain data on annual occupancy/caseload or length of stay for RNRU for the purpose of this needs assessment.

Homerton transitional neurological rehabilitation unit (TNRU) is located in Mary Seacole nursing home on the St Leonard's site of Homerton hospital. This is a seven bed unit, also part of the specialist neurological rehabilitation pathway (level 2b provision) and is funded by City and Hackney CCG. The unit typically serves patients with lower medical need but higher social need in terms of support with daily activities. A summary of TNRU activity in 2016/17 is provided below:

- 12 patients admitted – most directly from Homerton stroke unit
- 10 patients discharged – 6 of these were delayed
- average length of stay was 101 days (or 14 weeks), with a range of 24 to 171 days
- on discharge, 4 patients returned to their own home and 5 to a new home (the other discharged patient died).

Patient outcomes within TNRU are assessed using a range of measures, with the following improvements observed:¹⁴

- Rehabilitation Complexity Score – improvement in mean score of 3.6 points, range -1 to +13
- Functional Independence measure – improvement in mean score of 30 points, range -77 to +83 (significant improvement = 22 points on scale)
- Northwick Park Dependency Scale – improvement in mean score of 12 points, range 4 to 29 (significant improvement = 4 points on scale)
- Neurological Impairment Set – improvement in mean score of 6.7 points, range 6 to 26
- Community Integration Measure – improvement in mean score of 2.9 points, range 0 to 14.

For patients requiring **nursing care** following a stroke, the majority will be considered for 'continuing healthcare'. NHS continuing healthcare is a free package of care for people who have significant ongoing healthcare needs. It is arranged and funded by the NHS. NHS continuing healthcare can be received in any setting outside hospital, including in people's own home or in a care home. Eligibility for NHS continuing healthcare includes an assessment by a team of healthcare professionals as having a 'primary health need' for care - this means that you need care primarily because of your health needs. Eligibility is always based on these needs, rather than any particular diagnosis or condition. Based on the limited data available for this needs assessment, for June and July 2016, 7% of the 161 patients receiving continuing healthcare funding had a primary diagnosis of stroke.¹⁵

Nursing care is provided at Acorn Lodge, Beis Pinchos (for the Orthodox Jewish community) or out of borough – and either paid for by the NHS or self-paid by the patient/their family. Some patients will received nursing and/or social care in their own homes.

For those patients requiring **palliative care** (i.e. identified to be in the last years of life), there are a number of options locally, including care at home coordinated by the patient's GP, St Joseph's Hospice and community nursing team, or Homerton palliative care team (providing support to inpatients).

Data are not available for this needs assessment on the number of stroke patients following all of these different pathways.

7.4.4 Follow up assessments and care

Data from SSNAP on six month follow-up are incomplete and therefore cannot be used to assess local performance on this measure. Data collected as part of a recent annual review of the Homerton stroke unit identified that 83% of 130 eligible patients were followed up at six months following a stroke.

¹⁴ For further information on these tools, visit <https://www.kcl.ac.uk/lsm/research/divisions/cicelysaunders/research/studies/uk-roc/tools.aspx> (accessed June 2017)

¹⁵ This does not include 'fast track' referrals, who are mainly palliative patients.

Annual post-stroke reviews in primary care are now incentivised through KPIs within the CCG's Long-term conditions contract with the GP Confederation.

The final stage of the stroke rehabilitation and re-enablement pathway is supported by three specific commissioned services in Hackney and the City (see Figure 48) as outlined below.

- The Stroke Project (delivered by Triangle Community Services) runs four stroke support groups (including specialist exercise sessions), one-to-one outreach services and stroke awareness workshops (in partnership with Fit4 Health – see below) to residents of Hackney and the City. In 2016/17, an average of just over 100 stroke survivors each quarter received services from the Stroke Project, and self-reported outcomes are good (e.g. improved wellbeing, physical/mental health, confidence and independence).
- Fit4Health provides an 11 week specialist programme for clients to build confidence through professional support, social interaction and exercise sessions. Between April 2015 and January 2017, five programmes were run, attended by 19-29 clients each (109 people in total). On average, three quarters of those starting a programme successfully completed, and reported outcomes are good. This programme is funded by the Big Lottery Fund until March 2018; anticipated spend in 2017/18 is almost 30% above available grant funding.
- Ability Bow is a fully accessible gym in Tower Hamlets, commissioned by the CCG to provide a service for a small number of City and Hackney eligible patients (13 local stroke patients were actively using the facilities as of April 2017).

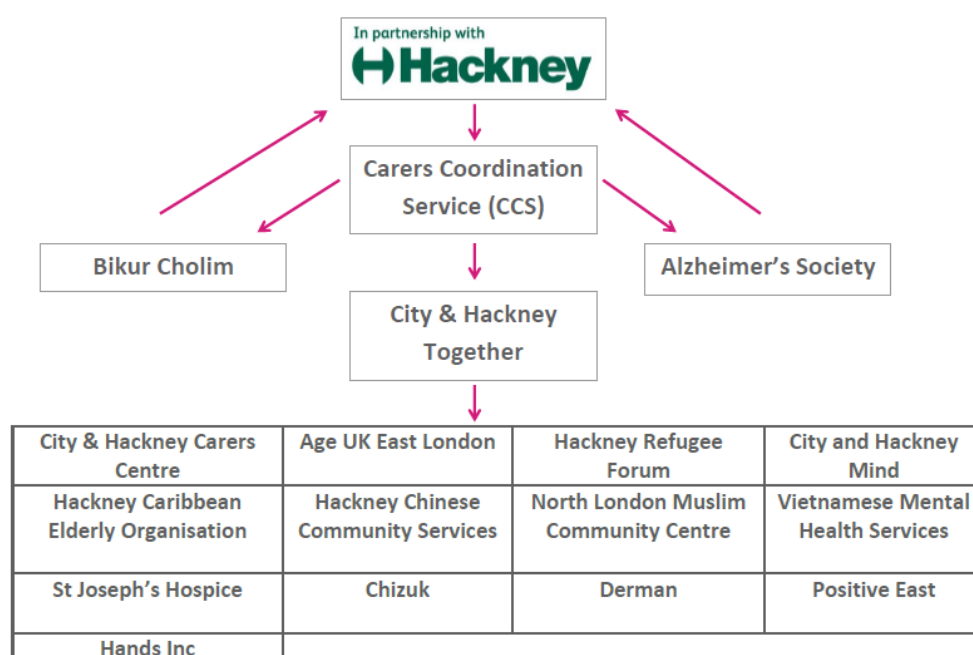
As described in section 7.3.4, City and Hackney CCG is currently working with the Homerton acute stroke unit to complete the local consensus protocol for long-term secondary prevention for patients with stroke and TIA (in line with relevant NICE and RCP guidance). During 2017/18, local GPs will be carrying out annual reviews with people who have had strokes using the WHO post stroke checklist, as part of the CCG's Long-term conditions contract with the GP Confederation.

7.4.5 Carers

An estimated one in five stroke survivors are cared for by family and friends (see section 6.4.5). It is not known how many people in City or Hackney care for someone who has had a stroke. General provision for local carers is described below.

'Carers are the bedrock' is a partnership of local organisations in Hackney that aims to support unpaid carers in the local area. The structure of this partnership is shown in Figure 52 below.

Figure 52: 'Carers are the bedrock' partnership flowchart



The City and Hackney Carers Centre works in partnership with local organisations to provide support to carers in a number of ways, as set out in Box 1. City and Hackney Carers Centre also provide the Carers Coordination Service on behalf of 'carers are the bedrock' partnership.

In addition, there are several other organisations funded through the local authority to provide advice, counselling and support for those who care for adults or children with special needs.

Box 1: Support provided by City and Hackney Carers Centre

- Carers groups – a place where carers can meet other carers and access peer support (currently six different groups are run, most of which are targeted at specific groups).
- Carers needs assessments – offered for Hackney residents only. Where appropriate, carers are referred to adult social care for a care package assessment.
- Advice – personalised, confidential and specialist advice is offered in relation to housing needs, benefit claims and information on social services.
- Advocacy support.
- Counselling – available to all carers living in the City and Hackney (or caring for someone who lives in these areas), with unlimited access and an optional £5 charge per session.
- 'Listening ear' sessions – these are free, one-to-one meetings with an experienced member of staff, lasting 45 minutes (six sessions over a six month period are available to each carer).
- Coaching – three to six sessions offered per carer, to support them with specific goals or to overcome particular hurdles. There is an optional £5 charge per session.

7.4.6 Return to work

Section 6.4.4 of this report described how, nationally, more than two thirds of stroke survivors are unable to return to work.

A range of employment support is available in Hackney and the City to help people with long-term health problems find and stay in work. [210] However, it is not clear what specific help is available to stroke patients to return to work as part of their rehabilitation pathway.

8 Recommendations

The recommendations listed below have been grouped under headings in line with the structure of the rest of this report, identifying actions across the stroke pathway, from prevention to rehabilitation.

8.1 Prevention of stroke

1. Raise local **awareness** of stroke, in particular in high risk communities, by ensuring adequate reach of the national 'Act Fast' campaign into communities at high risk of stroke (e.g. in terms of language and communication channels).
2. Improve identification and management of '**lifestyle**' risk factors for stroke

<i>Making every contact count (MECC)</i>	<ul style="list-style-type: none"> • Embed MECC principles (identification, brief advice and signposting/referral) for lifestyle risk factors into all service contracts – to complement national CQUINs on alcohol and smoking in acute and mental health trust contracts.
<i>Smoking</i>	<ul style="list-style-type: none"> • Ensure the planned re-design of local stop smoking services addresses the needs of residents and patients at increased risk of stroke.
<i>Physical activity and healthy weight</i>	<ul style="list-style-type: none"> • Use the results of the Healthier Together (Hackney) evaluation to ensure that the service meets the needs of residents at increased risk of stroke.
<i>Reduce increasing risk drinking (from draft Alcohol strategy)</i>	<ul style="list-style-type: none"> • Increase routine alcohol screening (e.g. using AUDIT-C tool) in primary care, including pharmacy, to reach a wider group of patients at increased risk of stroke. • Work with partners in social care, housing, employment services and other organisations in the statutory and voluntary sector to enhance the advice and sign-posting they are able to offer for people at risk of alcohol-related harm. • Work with local employers and their staff, business organisations and trade unions, to promote responsible drinking and sensitive and effective responses to harmful drinking • Promote evidence-based digital and social behaviour-change approaches.

3. Improve the management of **medical risk factors** for stroke

Hypertension	<ul style="list-style-type: none"> Implement recommendations of the 2016 adult hypertension needs assessment related to primary prevention, early identification and management. [133]
AF	<ul style="list-style-type: none"> Reduce variation in undiagnosed AF across GP practices in City and Hackney, promoting the use of the free GRASP-AF software tool. Consideration should be given to appropriate mechanisms for incentivising the uptake of the GRASP-AF tool across primary care. Use learning from the current CCG-funded specialist prescribing audit to optimise the use of anticoagulation/platelet therapy in primary care to prevent complications from stroke.
Diabetes	<ul style="list-style-type: none"> Full implementation of plans to improve local performance on the national 'triple target' and uptake of structured education. Explore further the potential reasons for the relatively high estimated additional risk of stroke among people with diabetes in Hackney and the City.
Raised cholesterol	<ul style="list-style-type: none"> Improve local action on primary prevention and early identification (see MECC recommendation under 2. above)
Complex obesity	<ul style="list-style-type: none"> Address gap in obesity care pathway by commissioning an evidence-based weight management service for patients with complex needs/co-morbidities.
Family history and previous stroke/TIA	<ul style="list-style-type: none"> Improve the systematic identification of family and personal history of stroke, and consistent care pathways for effective management of modifiable risk factors in those affected.

8.2 Acute care

- Explore reasons for poor relative performance on the following 2014/15 SSNAP indicator to assess whether or not this represents a current unmet need:
 - % of eligible patients given thrombolysis
- Improve data recording to enable tracking of patients across the local care pathway, including patient transfers between the HASU at Royal London Hospital and the acute stroke unit at Homerton.
- Full implementation of the recommendations from the recent review of Homerton acute stroke unit, including:
 - action to reduce the amount of time taken to repatriate patients from HASU – for example, improving communications between hospitals and agreeing/monitoring performance standards
 - measures to reduce length of stay, especially for out of borough patients

- completion of the consensus protocol for long-term secondary prevention.

8.3 Rehabilitation

- Explore reasons for poor relative performance on the following 2014/15 SSNAP indicator to assess whether or not this represents a current unmet need:
 - % of patients with continence plans drawn up within 3 weeks of clock start
 - % of applicable patients who are assess at 6 months
- Take urgent action to review the final stage of the community rehabilitation pathway for opportunities to consolidate current provision, and address the risk associated with grant funded support coming to an end (in March 2018) for one of the core current programmes (Fit4Health).
- Evaluate the impact on patient experience and outcomes of incentivising primary care annual reviews for stroke patients through the 2017/18 Long-term conditions contract.
- Use opportunities arising out of the new Integrated Commissioning arrangements to ensure that carers of stroke patients are identified and supported appropriately and effectively across the care pathway.
- Ensure that employment support is integrated into rehabilitation pathways to maximise appropriate opportunities to return to work for stroke patients – again seeking opportunities through the new Integrated Commissioning arrangements.

Appendices

Appendix A: UK National Guideline for Stroke

Note, the number in the first column of each row operates as a reference for the full guideline, and is helpful in locating further information on each recommendation in the original source.

Recommendation Number	Key Recommendation [7]
2.2.1A	Community medical services and ambulance services (including call handlers and primary care reception staff) should be trained to recognise people with symptoms indicating an acute stroke as an emergency requiring transfer to a hyperacute stroke centre.
2.3.1B	People with suspected acute stroke (including when occurring in people already in hospital) should be admitted directly to a hyperacute stroke unit and be assessed for emergency stroke treatments by a specialist physician without delay.
2.4.1A	People with stroke should be treated on a specialist stroke unit throughout their hospital stay unless their stroke is not the predominant clinical problem.
2.4.1B	A hyperacute and/or acute stroke service should provide specialist medical, nursing, and rehabilitation staffing levels matching the recommendations in Table 2.1 of the full guidelines.
2.4.1D	A hyperacute stroke unit should have continuous access to a consultant with expertise in stroke medicine, with consultant review 7 days per week.
2.4.1K	<p>A facility that provides treatment for in-patients with stroke should include:</p> <ul style="list-style-type: none"> • a geographically-defined unit; • a co-ordinated multi-disciplinary team that meets at least once a week for the exchange of information about in-patients with stroke; • information, advice and support for people with stroke and their family/carers; • management protocols for common problems, based upon the best available evidence; • close links and protocols for the transfer of care with other in-patient stroke services, early supported discharge teams and community services; • training for healthcare professionals in the specialty of stroke.
2.7.1A	Hospital in-patients with stroke who have mild to moderate disability should be offered early supported discharge, with treatment at home beginning within 24 hours of discharge.

Recommendation Number	Key Recommendation [7]
2.7.1K	People with stroke, including those living in care homes, should continue to have access to specialist services after leaving hospital, and should be provided with information about how to contact them.
2.8.1B	<p>Services for people with stroke should take responsibility for all aspects of service quality by:</p> <ul style="list-style-type: none"> • keeping a quality register of all people admitted to their organisation with a stroke; • regularly reviewing service provision against the evidence-based standards set out in relevant national clinical guidelines; • providing practical support and multi-disciplinary leadership to the process of clinical audit; • participating actively in regional and national quality improvement initiatives such as Clinical Networks.
2.8.1D	The views of people with stroke and their family/carers should be actively sought when evaluating service quality and safety, and when planning service developments.
2.11.1A	People with stroke should accumulate at least 45 minutes of each appropriate therapy every day, at a frequency that enables them to meet their rehabilitation goals, and for as long as they are willing and capable of participating and showing measurable benefit from treatment.
2.12.1A	Services for people with stroke should have a comprehensive approach to delivering psychological care that includes specialist clinical neuropsychology/clinical psychology input within the multi-disciplinary team.
2.15.1A	Services providing acute and long-term care for people with stroke should provide high quality end-of-life care for those who need it.
2.17.1A	People with stroke living in care homes should be offered assessment and treatment from community stroke rehabilitation services to identify activities and adaptations that might improve quality of life.
3.2.1A	Patients with acute neurological symptoms that resolve completely within 24 hours (i.e. suspected TIA) should be given aspirin 300 mg immediately and assessed urgently within 24 hours by a specialist physician in a neurovascular clinic or an acute stroke unit.
3.4.1B	Patients with suspected acute stroke should receive brain imaging urgently and at most within 1 hour of arrival at hospital.

Recommendation Number	Key Recommendation [7]
3.5.1A	Patients with acute ischaemic stroke, regardless of age or stroke severity, in whom treatment can be started within 3 hours of known onset should be considered for treatment with alteplase.
3.5.1G	Patients with acute ischaemic stroke should be considered for combination intravenous thrombolysis and intra-arterial clot extraction (using stent retriever and/or aspiration techniques) if they have a proximal intracranial large vessel occlusion causing a disabling neurological deficit (NIHSS score of 6 or more) and the procedure can begin (arterial puncture) within 5 hours of known onset.
3.6.1D	<p>Patients with primary intracerebral haemorrhage who present within 6 hours of onset with a systolic blood pressure above 150mmHg should be treated urgently using a locally agreed protocol for blood pressure lowering to a systolic blood pressure of 140 mmHg for at least 7 days, unless:</p> <ul style="list-style-type: none"> • the Glasgow Coma Scale score is 5 or less; • the haematoma is very large and death is expected; • a structural cause for the haematoma is identified; • immediate surgery to evacuate the haematoma is planned.
3.10.1E	Patients with acute stroke should have their swallowing screened, using a validated screening tool, by a trained healthcare professional within four hours of arrival at hospital and before being given any oral food, fluid or medication.
3.12.1B	Patients with difficulty moving early after stroke who are medically stable should be offered frequent, short daily mobilisations (sitting out of bed, standing or walking) by appropriately trained staff with access to appropriate equipment, typically beginning between 24 and 48 hours of stroke onset. Mobilisation within 24 hours of onset should only be for patients who require little or no assistance to mobilise.
3.13.1A	Patients with immobility after acute stroke should be offered intermittent pneumatic compression within 3 days of admission to hospital for the prevention of deep vein thrombosis. Treatment should be continuous for 30 days or until the patient is mobile or discharged, whichever is sooner.
4.1.4.1B	<p>People who wish to return to work after stroke (paid or unpaid employment) should:</p> <ul style="list-style-type: none"> • have their work requirements established with their employer (provided the person with stroke agrees); • be assessed cognitively, linguistically and practically to establish their potential for return; • be advised on the most suitable time and way to return to work, if return is feasible;

Recommendation Number	Key Recommendation [7]
	<ul style="list-style-type: none"> • be referred through the job centre to a specialist in employment for people with disability if extra support or advice is needed; • be referred to a specialist vocational rehabilitation team if the job centre specialist is unable to provide the necessary rehabilitation.
4.4.1.1A	<p>People with communication problems after stroke should be assessed by a speech and language therapist to diagnose the problem and to explain the nature and implications to the person, their family/carers and the multidisciplinary team. Reassessment in the first four months should only be undertaken if the results will affect decision-making or are required for mental capacity assessment.</p>
4.7.1F	<p>Patients with stroke who are unable to maintain adequate nutrition and fluids orally should be:</p> <ul style="list-style-type: none"> • referred to a dietitian for specialist nutritional assessment, advice and monitoring; • be considered for nasogastric tube feeding within 24 hours of admission; • assessed for a nasal bridle if the nasogastric tube needs frequent replacement, using locally agreed protocols; • assessed for gastrostomy if they are unable to tolerate a nasogastric tube with nasal bridle.
5.4.1A	<p>People with stroke or TIA should have their blood pressure checked, and treatment should be initiated and/or increased as tolerated to consistently achieve a clinic systolic blood pressure below 130 mmHg, except for people with severe bilateral carotid artery stenosis, for whom a systolic blood pressure target of 140–150 mmHg is appropriate.</p>
5.9.1.1A	<p>People with stroke, including those living in a care home, should be offered a structured health and social care review at six months and 1 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:</p> <ul style="list-style-type: none"> • new problems are present; • the person's physical or psychological condition, or social environment has changed.
6.1.1A	<p>Commissioning organisations should ensure that their commissioning portfolio includes the whole stroke pathway from prevention (including neurovascular services) through acute care, early rehabilitation, secondary prevention, early supported discharge, community rehabilitation, systematic follow-up, palliative care and long-term support.</p>

Recommendation Number	Key Recommendation [7]
6.2.1B	<p>Commissioners should commission acute stroke services in accordance with the recommendations in this guideline to provide:</p> <ul style="list-style-type: none"> • urgent brain imaging for patients with suspected acute stroke; • treatment with alteplase for patients with acute ischaemic stroke; • an endovascular service for patients with acute ischaemic stroke; • a neuroscience service to admit, investigate and manage patients referred with subarachnoid haemorrhage, both surgically and with interventional radiology; • a neuroscience service delivering neurosurgical interventions for intracerebral haemorrhage, malignant cerebral oedema, and hydrocephalus; • direct admission of patients with acute stroke to a hyperacute stroke unit providing active management of physiological status and homeostasis within 4 hours of arrival at hospital; • an acute neurovascular service for the diagnosis and treatment of people with suspected TIA; • an acute vascular surgical service to investigate and manage patients with TIA and non-disabling stroke due to carotid artery stenosis.
6.4.1A	<p>Commissioners should commission stroke rehabilitation services in accordance with the recommendations in this guideline to provide:</p> <ul style="list-style-type: none"> • an inpatient stroke unit capable of providing stroke rehabilitation for all people with stroke admitted to hospital; • a specialist early supported discharge service to enable people with stroke to receive rehabilitation at home or in a care home; • specialist rehabilitation services capable of meeting the specific health, social and vocational needs of people with stroke of all ages; • services capable of delivering specialist rehabilitation in out-patient and community settings in liaison with in-patient services.

Appendix B: Numbered GP practices used in Chapter 5

	Practice Name	Practice prevalence
1	Greenhouse Health Centre	0.4%
2	Drs Gadhvi & Pathan	0.7%
3	Elm Practice	1.0%
4	Cranwich Road (Spitzer & Partners)	1.3%
5	Allerton Road Surgery	1.4%
6	Brooke Road (Dr SN Prasad)	1.4%
7	Tollgate Lodge	1.4%
8	Neaman Practice (Long Lane)	1.6%
9	Southgate Rd & Whiston Rd MC	1.7%
10	Kingsmead Healthcare	1.7%
11	Springfield Medical Centre	1.7%
12	Well Street Surgery	1.8%
13	Clapton Surgery	1.8%
14	Shoreditch Park Surgery	1.8%
15	Athena Medical Centre	1.8%
16	Trowbridge Practice	1.8%
17	Cedar Practice, John Scott HC	1.9%
18	Elsdale Street	1.9%
19	Stamford Hill Group Practice	1.9%
20	De Beauvoir Surgery	2.0%
21	London Fields Medical Centre	2.1%
22	Sandringham Road	2.1%
23	The Dalston Practice	2.1%
24	Wick Health Centre	2.1%
25	Beechwood Medical Centre	2.2%
26	The Heron Practice, John Scott HC	2.2%
27	Barretts Grove (Dr Gangola)	2.2%
28	Statham Grove Surgery	2.3%
29	Hoxton Surgery	2.3%
30	Barton House Health Centre	2.3%
31	Lea Surgery	2.3%
32	Sorsby Health Centre	2.3%
33	The Lawson Practice	2.3%
34	Healy Medical Centre	2.4%
35	Richmond Road MC	2.4%
36	Nightingale Practice	2.4%
37	Lower Clapton Health Centre	2.4%
38	Latimer Health Centre	2.4%
39	Queensbridge Group Practice	2.5%
40	Somerford Grove Health Centre	2.5%
41	Rosewood Practice	2.8%
42	Abney House	3.1%
43	Riverside Practice	3.3%

Source: CEG, 2016. [124]

Appendix C: GP practice codes and groupings

Practice code	Practice grouping	Practice name
F84686	Group 1	Cranwich Road (Spitzer & Partners)
F84685	Group 3	Elm Practice
Y00403	Group 7	Trowbridge Practice
F84080	Group 3	Drs Gadhvi & Pathan
F84072	Group 3	De Beauvoir
Y03049	Group 1	Springfield Medical Centre
Y01177	Group 1	Tollgate Lodge
F84716	Group 1	Allerton Road Surgery
F84668	na	Clapton Surgery
F84635	Group 7	Shoreditch Park Surgery
F84013	Group 1	Stamford Hill Group Practice
F84694	Group 4	Dr SN Prasad (Brooke Road)
F84692	Group 6	Hoxton Surgery
F84021	Group 6	London Fields Medical Centre
F84069	Group 5	Well Street Surgery
F84601	Group 5	Elsdale Street
F84119	Group 6	The Heron Practice, John Scott HC
F84036	Group 6	Cedar Practice, John Scott HC
F84105	Group 7	Lea Surgery
F84041	Group 4	Southgate Rd & Whiston Rd MC
F84033	Group 6	Somerford Grove Health Centre
F84115	Group 3	Statham Grove Surgery
F84018	Group 7	Nightingale Practice
F84096	Group 7	The Lawson Practice
F84060	Group 2	Athena Medical Centre
F84063	Group 4	The Dalston Practice
F84015	Group 2	Kingsmead Healthcare
F84640	Group 3	Neaman Practice (Long Lane)
F84636	Group 4	Dr Gangola, Barretts Grove
F84003	Group 5	Lower Clapton Health Centre
F84008	Group 3	Barton House Health Centre
F84117	Group 5	Queensbridge Group Practice
F84035	Group 4	Richmond Road MC
F84620	Group 4	Wick Health Centre
F84038	Group 4	Beechwood Road
F84621	Group 4	Sandringham Road
F84711	Group 2	Rosewood Practice
F84720	Group 2	Healy Medical Centre
F84043	Group 2	Sorsby Health Centre
F84619	Group 7	Riverside Practice
F84719	Group 4	Latimer Health Centre
F84624	Group 3	Abney House
F84632	Group 7	Greenhouse Health Centre

Source: Groupings derived from a cluster analysis of patient socio-demographics carried out by City and Hackney Public Health Intelligence Team (in 2015)

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