Stroke (Cerebral Vascular Accident)

Summary

- Stroke is the third most common cause of death in England after heart disease and cancer.
- Stroke is a treatable and preventable disease, but requires rapid recognition and treatment to decrease mortality.
- At present around one in three people who have a stroke die of it; many of these people do not die immediately but within the first three months of the stroke and around half of stroke survivors are left dependent on others for everyday activities.
- Stroke is not a disease of only the elderly, in the Royal Borough of Greenwich over the last 5 years, approximately 36% of strokes in men and 16% of strokes in women have occurred in people under the age of 75.
- There are between 500 and 600 admissions each year for strokes in Greenwich and around 120 deaths.
- In Greenwich people are four times more likely to be admitted to hospital with a stroke than the London borough with the lowest incidence of stroke admissions.
- Mortality rate from stroke in the under 75 years is higher in the Royal Borough of Greenwich than England and the gap between Greenwich and England is widening for both men and women.
- People of African and Carribean origin have double the incidence of stroke compared to others.
- Smoking, raised blood pressure, atrial fibrillation and depression and high levels of alcohol intake are all significant risk factors for stroke.
- Someone who smokes has a 6 times greater risk of a stroke than someone who doesn’t smoke.
- Heavy drinking in binges (more than 8 units in men and 6 units in women) leads to a 3 fold greater risk of a stroke.
- High blood pressure is the most important risk factor causing an estimated 72% of all strokes and atrial fibrillation the second most important.
- A significant number of the estimated people with stroke and TIA are missing from GP registers in Greenwich. Those who are on the registers have well controlled blood pressures in general but not cholesterol.
- Significant numbers of people are also missing from atrial fibrillation registers in Greenwich suggesting that there are people with this major risk factor who are underdiagnosed and untreated.
- Outcomes can be improved by continuing to reduce risk factors especially in high risk groups, treating and managing stroke patients in specialized stroke units, implementing an early stroke discharge service and considering ways to support carers.

What do we know?

Introduction

The following chapter outlines the stroke situation in The Royal Borough of Greenwich in comparison to the National situation and similar boroughs. It describes the evidence behind the stroke strategy and guidelines for stroke prevention and management. It concludes with an analysis of the local services and their performance.

Stroke or a cerebral vascular accident (CVA) occurs when blood flow to part of the brain is interrupted, causing damage to the brain tissue. The two main causes of stroke are blood clots blocking arteries (Ischaemic, 85% of all strokes) and arteries bursting (Haemorrhagic, 15%). Symptoms of stroke include numbness, weakness or paralysis, slurred speech, blurred vision, confusion and severe headache. A transient ischaemic attack (TIA) is defined as stroke symptoms and signs that resolve within 24 hours and is just as important to treat. A TIA can be considered a warning, as there is a 20% risk of developing a full stroke in the four weeks after a TIA (National Sentinel Stroke Audit 2006).

Stroke is a significant problem, at present around one in three people who have a stroke die of it; many of these people will not die immediately but within the first three months of the stroke. Around half of stroke survivors are left dependent on others for everyday activities (National Stroke Strategy 2007). Long-term health problems can include: paralysis down one side of the body, inability to speak, loss of cognitive abilities, incontinence. Other effects of these problems can include loss of job and breakdown in relationships.

Recognition of stroke as a preventable and treatable disease is relatively new. In the nineties the strategy was still to move away from hospital treatment to community care for stroke. However, over the past few years a growing body of evidence has overturned this traditional perception that stroke is simply a consequence of aging that inevitably results in death or severe disability. Evidence is accumulating for more effective primary and secondary prevention strategies, better recognition of people at highest risk, and interventions that are effective soon after the onset of symptoms.

National strategies

The Department of Health published a National Stroke strategy in 2007 to cover the next ten years and re-emphasise that stroke is preventable and treatable. Their ten point action plan included increasing the public’s awareness of what a stroke is and this manifested in the F.A.S.T campaign mentioned below, preventing strokes through addressing modifiable risk factors and acting on TIAs, involving patients and carers in planning, improving the quality of stroke units (through the National Sentinel Stroke Audits), specialised rehabilitation and community support and developing a skilled workforce. The National Sentinel Stroke Audits have documented the change in secondary care provision for stroke in the UK over the last ten years, with more people being treated in stroke units and decreasing mortality and hospital length of stay.

The F.A.S.T (Face, Arms, Speech and Time) campaign was launched in 2009 to educate both health professionals and the public on the signs of stroke and that prompt emergency treatment can reduce the risk of death and disability, focused on these main symptoms as a screen for whether someone had a stroke (DoH 2009). The campaign states that if a person suddenly has a problem smiling, raising both their arms or speaking clearly, then the advice is to call an ambulance.

The current government has issued three Outcome Frameworks to hold the National Health Service (NHS), Public Health (PH) and Adult Social Care (ASC) to account. Indicators vary between frameworks. However, the NHS and PH will both have mortality from cardiovascular disease as a measure of achievement and the NHS and ASC Outcome Frameworks will both measure the proportion of older people who were still at home 91 days after discharge from hospital into rehabilitation services and carer quality of life. This choice of indicators demonstrates the importance of cardiovascular outcomes and their consequent burden on services.

On March 5th 2013 the government launched a new Cardiovascular Disease Outcome Strategy to link with the NHS, Public Health and Adult and Social Care Outcomes Frameworks. Guidelines for the acute management of stroke and TIAs have been published by the National Institute for Clinical excellence in 2010 and previously by the Intercollegiate Stroke Working Party (ICSWP) National Clinical Guidelines for Stroke in July 2008

**Facts and Figures**

**2.1 Mortality from Stroke**

In 2010, in England 40,000 people died from a stroke, that is 27% of all cardiovascular disease (CVD) deaths (ONS 2012). Stroke is the third most common cause of death in England after heart disease and cancer. Estimates based on hospital and mortality data show that about 17% of men and 25% of women admitted to hospital for stroke in 2006 died within 60 days (CVD statistics 2012).

**2.1.1 Directly Standardised Rates (DSRs) of Mortality**

There has been a steady decline in mortality from stroke over the last two decades, illustrated in *Figure 1*. 

Figure 1: Stroke mortality in the Royal Borough of Greenwich and England for Men and Women, all ages, from 1993-2001. Rolling 5 year average

Source of data: The NHS Information Centre for health and social care and proxy data from Public Health Mortality files using ONS census populations

In 2011, in Greenwich there were 117 deaths directly from stroke (ICD 10 codes I60-I69), 54 in males and 63 in females. Over the last two decades the male mortality rate from stroke in Greenwich has remained constantly above the England average, mirroring its decline. The female mortality rate appears to have declined in parallel with the national average and may have dropped below it. Deaths from stroke start to occur after the age of 45 years and increase with age see figure 2. The age standardised male and female mortality rate in 2011 was 49.2 per 100,000 males and 31.5 per 100,000 females respectively but because women live longer there are more female deaths than male in absolute numbers.

Stroke is more common in men than in women and women tend to have their first stroke 4.3 years later than men, but women who suffer a stroke are more likely to die of it (25% of women died within a month compared with 20% of men) (White 2008).

In RBG, the stroke mortality rate varies from ward to ward, see figure 3. The age standardised mortality rate varies from 85 deaths per 100,000 population in Glyndon to 30 deaths per 100,000 population in Coldharbour and New Eltham. The confidence intervals, represented by the bars, are the range in which the actual mortality rate for that ward might lie. The bars are wide, as the number of deaths per ward is small even when aggregating five years of data, and nearly all overlap, which makes it difficult to be sure that there is a significant difference in mortality rates between wards. There is an established relation between mortality and deprivation (Gregory 2009), that has not changed over the 20th century. Therefore one would expect to find a higher stroke mortality rate in more deprived boroughs. As 42.9% of RBG residents are from the most deprived national quintile and only 1% from the least deprived, the distinction between wards is not so obvious.
2.1.2 Direct Standardised rates of Premature Mortality

Stroke is often viewed as a disease of the elderly, but in Greenwich over the last 5 years, approximately 36% of strokes in men and 16% of strokes in women have occurred in people under the age of 75. According to the London Health Programme, Greenwich residents are twice as likely as people living in the London PCT with the lowest stroke death rate to die from a stroke before the age of 75 years (Greenwich stroke profile 2012).

The mortality rate in those under the age of 75 years (premature mortality rate) has also declined over the last two decades, but the decline in Greenwich has not been as consistent as it has been nationally, see figure 4. Both male and female premature mortality rates in Greenwich have been slower to decline than England. Premature deaths from cerebrovascular disease are believed to be preventable and therefore contribute to the “potential years of life lost” indicator. In 2011/12, 13% of deaths in Greenwich were preventable and 9% of those deaths were from cerebrovascular disease, link to PYLL chapter.

Risk factors for stroke and coronary heart disease (CHD) are very similar, link to CHD chapter, however mortality from CHD in RBG is steeply declining in men. This suggests that the decline in CHD mortality is either not as a result of an improvement of the risk factor profile of male residents, but rather access to life saving treatments and/OR possibly to reduction in risk factors.

that have a higher attributable risk fraction for heart disease than stroke such as high blood pressure. Improvement in the mortality rate requires both prevention to reduce the prevalence of risk factors and access to quality treatments in the acute event.

Figure 4: Stroke premature mortality in the Royal Borough of Greenwich and England for men and women from 1993-2011, 5 year rolling average

Source of data: The NHS Information Centre for health and social care
Proxy data from Public Health Mortality files using GLA population projections

2.2 Morbidity from Stroke

2.2.1 Recorded Prevalence & Trends

The incidence of stroke or the number of new strokes each year as a proportion of the population is decreasing in the UK, according to data from the South London Stroke Register the stroke incidence decreased by 18% in men and by 24% in women from 1995/96 to 2003/04 (Heuschmann 2008). Although the incidence of stroke is falling, the number of people living having had a stroke or the prevalence is increasing as more people survive strokes and stroke is the largest single cause of disability in England (Heuschmann 2008).

There are approximately 57,000 strokes in men and 68,000 strokes in women and 20,000 TIs per year in England (CVD statistics 2012). Although incidence rates are higher in men than in women, there are a greater number of events in women because women tend to live longer than men.

The number of people in Greenwich living after having suffered a stroke or a TIA can be estimated from the number of people on the stroke register, kept by General Practitioners. This

is called an observed estimate. In 2012, in Greenwich 1.1% of the population or 2917 people are living after having had a stroke or TIA, as compared with 1.7% or 951981 people in England. Greenwich has a younger demographic than England and this could explain why less of the population is on the register in Greenwich. However the stroke register will always be an under estimate of the actual prevalence because it cannot account for those in whom the diagnosis has been missed and those that have failed to be registered. It is also a crude figure that does not account for population structure. The estimated prevalence of people living having suffered a cerebral vascular accident (CVA) is between 2 and 3% in the UK, according to national surveys (Health survey for England 2006) and predictive modelling for Greenwich estimates the disease burden to be between 1.5% (JSNA 2012) and 2% (SEPHO). This means that up to 47.3% of people suffering from stroke are not on the register in Greenwich. A similar percentage is also missing from the register in London. Being on the General Practitioner’s stroke register is important for annual review of risk factors for future strokes and review of medications and other co-morbid conditions such as diabetes.

2.2.2 Stroke Admissions

The number of stroke related admissions are between 500 and 600 admissions a year in Greenwich. The absolute number of admissions does not vary significantly by gender, but when converted to a rate, there are significantly higher admission rates for men than women see figure 5; suggesting a higher incidence of stroke in men. Emergency hospital admission for stroke is used as a proxy for the incidence of stroke. Worldwide, stroke occurs 30% more often in men than women, but this difference decreases with increasing age (Appeleros 2009).

Hospital stroke admission rates in Greenwich are higher than the national average, especially for men, see figure 5; according to the London Health programmes 2012, residents in Greenwich are nearly four times as likely as residents in the local authority with the lowest admission rate to be admitted to hospital for a stroke before the age of 75 years (Greenwich stroke profile 2012).
The emergency admission rate for stroke in Greenwich has increased by 18% between 2004/05 and 2011/12 (SEPHO analysis of HES data) as compared with 10.6% in London and 3% in England. This increase in emergency admissions is in contrast to the Oxford Vascular Study that demonstrated a 40% reduction in stroke incidence from 1984 to 2004 (Rothwell 2004). As the rise in admissions is particularly since 2007 and after the launch of the national strategy, it could be accounted for by the push to get stroke recognised and treated as an emergency, rather than a true increase in incidence. We are currently awaiting acute admissions data in order to produce a graph to show this.

2.2.3 Comorbidities

Many of the major risk factors for stroke are also known as co-morbidities. About three quarters of people who suffer a stroke have associated co-morbidities many of which are linked through common lifestyle factors. Figure 6 illustrates prevalence data from England detailing the extent to which various circulatory diseases and diabetes are present in stroke patients. The situation is probably not dissimilar for Greenwich patients.
2.3. Health inequalities

2.3.1 Deprivation

Nationally stroke incidence, using individual level measures, is three times higher in the lowest socioeconomic group as compared with highest socioeconomic group (Lee 2011). Greenwich has 42.9% of its population in the most deprived national quintile and less than 1% of the population in the least deprived quintile (SEPHO 2012) and therefore one would expect a high incidence of stroke in RBG.

The number of emergency admissions for stroke is higher in deprived communities. Those living in the most deprived parts of the Royal Borough of Greenwich have a stroke admission rate (DSR) of 126 per 100,000. This is 2.3 times as high as those coming from the least deprived areas of RBG where the rate (DSR) is 54.9 per 100,000 (SEPHO 2012).

Figure 7, maps all stroke admissions, including readmissions, across the different wards in RBG. There are significantly fewer stroke admissions in the more affluent wards. The data has been standardised for age, as wards with older populations will have a higher incidence of stroke.
2.3.2 Ethnicity

In a study by Heushmann, who used the South London Stroke register from 1995 to 2004 as his study cohort, people of African or Caribbean ethnicity have a 27% higher risk of stroke than white people (Heushmann 2008). This is corroborated by the National Stroke Strategy that states that the incidence rates, adjusted for age and sex, are twice as high in black people as for white people (National Stroke Strategy 2007). According to Heuschmann, the decline in the incidence of stroke generally is attributed to the decline in risk factors such as hypertension, smoking and atrial fibrillation. However, there has been no significant decline in the prevalence of these risk factors in black patients, except hypertension in Black women and hence the continuing higher incidence (Heushmann 2008).

In RBG, the stroke mortality rate is higher in Indians, Black Caribbean and Black Africans. Unfortunately as numbers are so small, it is not possible to demonstrate a statistically significant higher mortality rate in these ethnic groups, see figure 8.
**3.0 Stroke: The Risk Factors**

### What Works?

#### 3.1 Prevention

**3.1.1 Behavioural risk factors**

*Smoking:* A person who smokes 20 a day has a 6 times higher risk of stroke than someone who does not smoke (Leatherman 2008).

**Add a link to the prevention chapter on smoking**

*Unhealthy diet and Obesity:* A diet high in saturated fat can raise a blood cholesterol level which in turn causes atherosclerosis that predisposes to stroke. The World Health Report 2002 estimated that around a third of ischaemic stroke in developed countries was due to people being overweight. Research has shown that eating a Mediterranean diet is cardio-protective; this includes eating more bread, fruit, vegetables and fish and less meat and replacing butter and cheese with plant and vegetable oils (Sofi 2010). DASH (dietary approach to stop hypertension) is a specific diet rich in fruits, vegetables and whole grains, moderately high in protein and low in dairy fats and total saturated fat consumption, has been shown to reduce

both blood pressure and cholesterol. A combined DASH diet for two months and low salt intake lowered blood pressure by 9mmHg (Sacks 2001).

**Salt:** A diet high in salt can raise blood pressure which is the most important risk factor for stroke. A Cochrane review of available research found that in Caucasians with high blood pressure, after one month of a low salt diet their systolic blood pressure was reduced by 4mmHg and their diastolic by 2mmHg. The studies they reviewed suggested there was an even greater effect in Blacks and Asians (Jürgens 2004). This is of importance as according to the Health Survey for England 2004, Black Caribbean have the highest prevalence of high blood pressure.

**High alcohol intake:** People who consume a large amount of alcohol, especially in binges have a threefold increase of stroke (Sensible drinking DoH 1995). The World Health Report 2002 estimated that 26% of haemorrhagic stroke and 5% of ischaemic stroke in men in developed countries was due to alcohol. The most recent Government advice is that regular consumption of between three and four units a day for men, and between two and three units a day for women will not lead to significant health risk (Sensible drinking DoH 1995). Consuming over these levels is not advised. The benchmark for heavy drinking is set at more than eight units in one day for a man and more than six units in one day for a woman.

3.1.2 Medical risk factors

**High blood pressure:** Risk of stroke is directly related to higher levels of both systolic and diastolic blood pressure. A meta-analysis of prospective data on over one million adults has shown that for adults aged 40 to 69 years, each 20mmHg increase in usual systolic blood pressure, or 10mmHg increase in usual diastolic blood pressure, doubles the risk of death from stroke (Prospective Studies Collaboration 2002). Both drug treatment and lifestyle changes – particularly weight loss, increase in physical activity, and a reduction in salt and alcohol intake – can effectively lower blood pressure. The 2006 National Institute of Health and Clinical Excellence (NICE) guidelines recommended persistent high blood pressure of 160/100 mmHg or 140/90 mmHg with higher CVD risk) as the threshold for offering drug treatments, and that optimal blood pressure treatment targets are 140/90 mmHg (NICE 2006).

**Irregular heart rhythm (atrial fibrillation):** Atrial fibrillation (AF) is the commonest sustained heart arrhythmia (irregular heart rhythm). The prevalence of AF roughly doubles with each advancing decade of age, from 0.5% at age 50–59 years to almost 9% at age 80–89 years (National Source: Greenwich JSNA 2013/14 “Closing the Gap.” Public Health & Well-Being, Royal Borough of Greenwich.

*The World Health Report 2002 estimates that 72% of stroke in both men and women in developed countries is due to systolic blood pressure levels in excess of 115mmHg.*
According to the Framingham study (Wolf 1991), there was a fivefold increase in the incidence of stroke when patients had atrial fibrillation (AF). The effect of atrial fibrillation is independent of other associated cardiovascular abnormalities. Furthermore, the influence of other cardiovascular abnormalities by the ninth decade in life will have begun to decrease, but the impact of atrial fibrillation continues to increase. This suggests that the elderly are particularly vulnerable to stroke when atrial fibrillation is present (Wolf 1991). The DoH commissioning tool for stroke services (ASSET) demonstrates that after hypertension, atrial fibrillation is the second most important risk factor to manage in order to prevent strokes.

The Framingham study also demonstrated that strokes suffered by people with AF are more serious in terms of subsequent mortality and morbidity than those experienced by people without AF. In addition, the reoccurrence of AF-related strokes is more frequent than that of other strokes (Framingham Study 2006).

AF-related strokes are eminently avoidable through the provision of appropriate anticoagulation. Unfortunately anticoagulants are under prescribed in the UK because of the fear of adverse side effects. NICE estimates that 46 per cent of people with AF who could benefit from treatment with anticoagulants are not currently receiving them (GRASP AF 2012).

It is now clear that aspirin and other antiplatelet agents have a weak effect in modifying the AF-related stroke risk, reducing it by only 22% compared with oral anticoagulants such as warfarin which reduces the relative risk of stroke by 64% and all the newer anticoagulants cannot beat this reduction (European Society of cardiology 2012). Treatment with warfarin can prevent 31 ischemic strokes each year for 1000 patients with AF (Furie 2011). Where patients are unable to take warfarin, aspirin alone is recommended (European Society of cardiology 2012).

**Cholesterol:** Risk of stroke is directly related to blood cholesterol levels. Blood cholesterol levels can be reduced by drugs, physical activity and by dietary changes, in particular a reduction in the consumption of saturated fat. The World Health Report 2002 estimates around 40% of ischaemic stroke in developed countries is due to total blood cholesterol levels in excess of 3.8mmol/l. The 2008 NICE guidance states that statins should be initiated in adults with clinical evidence of CVD or adults considered to be at greater than 20% risk of CVD in the next 10 years.

**Diabetes:** Epidemiological studies show that diabetes is a risk factor for first ischemic stroke (Hier 1991). Patients with diabetes have higher mortality, more severe disability, and slower recovery after a stroke, as well as higher rates of stroke recurrence compared to non-diabetic stroke patients (Diabetes Care 2009). In patients with type 2 DM with history of TIA and stroke, glucose control is recommended (Diabetes Care 2009). Based on the current knowledge, a target BP < 130/80mmHg for patients with type 2 DM is recommended (Diabetes Care 2009) and further evidence on the usefulness of pioglitazone in preventing recurrent stroke in diabetic patients is required.

Depression: An association between depression and stroke has been identified. In the Framingham study, the risk of developing a stroke/TIA was more than fourfold higher in those with depression. Unfortunately taking antidepressant medications did not alter the risk (Salaycik 2007).

Previous stroke or TIA, or family history of stroke: Approximately 15% of ischaemic strokes are preceded by a transient ischaemic attack (TIA) (Hankey 1996) and after a TIA, the seven day risk of stroke is between 8-12%: other studies have found risk to be as high as 20% in some patient groups (Coull 2004). A TIA is therefore a warning of an impending possible stroke and the new National Stroke Prevention Strategy outlines prompt treatment in the event of a TIA to prevent a further, more severe stroke. A family history of stroke also has a significant role in development of stroke and they may serve as a basis for determining the person's susceptibility to stroke in a certain period of life (Petrovic 2000).

Treatment of a Stroke

There is evidence that rapid treatment improves outcomes after stroke and TIA. Therefore early recognition that the patient is presenting with a stroke or TIA is crucial. NICE 2010 recommends the use of the FAST (Face, Arm, Speech Test) tool for community settings and the ROSIER tool for hospital settings to aid diagnosis.

Early imaging: One of the key standards of care is early brain imaging in order to distinguish between ischaemic and haemorrhagic stroke. People who suffer a TIA should see a specialist within one week to decide if they require imagining (NICE 2008). According to the National Stroke Prevention Strategy, provision needs to be made for brain imaging within 24 hours where clinically indicated and stroke units should provide 24 hour access to imaging (National Stroke strategy 2007). In England, 82% of people eligible for a brain scan and presenting in a timely fashion received one, according to the 2011 National audit (National sentinel Audit for Stroke 2011).

Thrombolysis in a specialised unit and anticoagulation: Acute stroke is a medical emergency, according to the strategy; patients should be transferred by ambulance to a hospital providing hyper acute stroke services where there is expert clinical assessment, timely imaging and the ability to deliver intravenous thrombolysis throughout the 24 hour period (National Stroke Strategy 2007). The strategy was based on a case study from Ontario, Canada which found that after they redesigned their services to provide care in specialised centres the hospital case fatality rate (the proportion of patients with stroke dying in hospital) dropped by 7.6%, the number of patients receiving thrombolysis increased by 30% and there were fewer readmissions to hospital.

Unfortunately in 2010, 5% of stroke patients received thrombolysis although 14% were found to be eligible by the National sentinel audit for stroke (NICE 2010). The department of health toolkit suggests that if 10 per cent of acute stroke patients were to receive thrombolysis, over 1,000 people per year would regain independence rather than die or be dependent in the long term (ASSET 2 – Action on Stroke Services). Patients having had an ischaemic stroke

should also be commenced on aspirin 300mg, unless taking another anticoagulant, within 48 hours of the event, according to the key standards of care.

**Carotid interventions:** The strategy advises that carotid interventions, echocardiography and ECG should be available within 48 hours when clinically indicated. About 80 per cent of TIAs and minor strokes require scanning of the arteries in the neck, which provide blood supply to the brain called ‘Carotid imaging’ (Doppler ultrasound, magnetic resonance angiogram (MRA) or a computed tomography angiogram (CTA) to check for carotid stenosis, significant atherosclerosis of the artery (Coull 2004). A carotid intervention for carotid stenosis should be considered an emergency in those that are neurologically stable.

**Nutrition and Hydration:** Many people with acute stroke are unable to swallow safely, and may require supplemental hydration and nutrition. Swallowing should be assessed by a trained health professional on admission and there should be weekly screening for malnutrition (NICE 2010).

**Early mobilisation and optimum positioning:** Patients should be mobilised as early as possible as part of an active management programme. Patients should be helped to sit up as sitting up will help to maintain oxygen saturation and reduce the likelihood of hypostatic pneumonia (NICE 2010).

**Mood assessment:** The NICE 2010 guidelines recommend cognitive and mood assessments for stroke survivors.

**Rehabilitation:** Specialist co-ordinated rehabilitation, started early after stroke and provided with sufficient intensity, reduces mortality and long-term disability. Early rehabilitation is effective when provided in specialist stroke units, or as part of properly organised early supported discharge, and then longer-term support in the community, according to need (Langhorne 2005).

Components of a multifaceted stroke specialist rehabilitation and support service are (NICE 2010):

- mobility and movement;
- communication;
- everyday care activities e.g. dressing, washing, meal preparation;
- depression and distress;
- swallowing;
- nutrition;
- cognitive difficulties;
- vision and visual perceptual difficulties;
- continence; and
- relationships and sex.

Care Models

Risk assessment tools: GRASP AF is an audit tool for Primary Care to assist in identifying patients with Atrial Fibrillation (AF) and assessing their risk of stroke. The tool:

- Provides a set of MIQUEST \(^1\) queries to identify patients with a diagnosis of AF
- Calculates their stroke risk using the validated CHADS\(_2\) scoring system
- Highlights patients with a CHADS\(_2\) score of 2 or more not receiving warfarin who would benefit from a review to assess the appropriateness of anti-coagulation
- Does not assess contraindications to warfarin, the decision whether or not to start warfarin remains a clinical one

CHADS\(_2\) score is a clinical prediction rule for estimating the risk of stroke in patients with non-rheumatic AF using the following criteria:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>C  Congestive Heart Failure</td>
<td>1</td>
</tr>
<tr>
<td>H  Hypertension: blood pressure consistently above 140/90 mmHg (or treated hypertension on medication)</td>
<td>1</td>
</tr>
<tr>
<td>A  Age ≥75 years</td>
<td>1</td>
</tr>
<tr>
<td>D  Diabetes Mellitus</td>
<td>1</td>
</tr>
<tr>
<td>S(_2)  Previous stroke, TIA or Thromboembolism</td>
<td>2</td>
</tr>
</tbody>
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A more sensitive tool is the CHADS\(_2\)-VASc and should be used for low risk patients with a CHADS\(_2\) of less than 2. According to the findings of the initial validation study, the risk of stroke as a percentage per year for the CHADS\(_2\) score is shown in the table (Gage 2001).

\(^1\) MIQUEST is software for collecting data from general practice (GP) computer systems. It is a tool to collect data, based around a query language, incorporating security and confidentiality safeguards.
Table 2: Interpreting stroke risk from the CHADS<sub>2</sub> score

<table>
<thead>
<tr>
<th>CHADS&lt;sub&gt;2&lt;/sub&gt; score</th>
<th>Stroke risk %</th>
<th>95% CI</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>1.9</td>
<td>1.2 – 3.0</td>
</tr>
<tr>
<td>1</td>
<td>2.8</td>
<td>2.0 - 3.8</td>
</tr>
<tr>
<td>2</td>
<td>4.0</td>
<td>3.1 - 5.1</td>
</tr>
<tr>
<td>3</td>
<td>5.9</td>
<td>4.6 - 7.3</td>
</tr>
<tr>
<td>4</td>
<td>8.5</td>
<td>6.3 – 11.1</td>
</tr>
<tr>
<td>5</td>
<td>12.5</td>
<td>8.2 - 17.5</td>
</tr>
<tr>
<td>6</td>
<td>18.2</td>
<td>10.5 – 27.4</td>
</tr>
</tbody>
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These risk prediction models are useful in clinical practice. However they do not consider frailty, cognitive and functional decline, or non-adherence to anticoagulant therapy and therefore require the input of clinical expertise and the individual’s circumstance.

*Specialised stroke units:* A systematic review to assess the effect of stroke unit care compared with alternative forms of care for patients with stroke published in 2002, demonstrated a 14% reduction in death at one year (95% CI 0.71 to 0.94) and a 20% reduction in the need for institutionalised care (95% CI 0.71 to 0.90) (Cochrane Collaboration 1997, repeat 2009). The results were irrespective of age, sex and stroke severity. As a result of this evidence, the national stroke strategy, published in 2007, advocated more specialised acute and hyper-acute care for stroke patients. A reconfiguration of services in London over the last five years led to the creation of a network of eight hyper acute stroke units that could provide specialised stroke services.

*Stroke Rehabilitation:* The Cochrane systematic review showed that not only did stroke rehabilitation units benefit all patients irrespective of age and severity, but that those with the more severe stroke gained the most. Rehabilitation, although started in hospital can also occur at home through a supported early discharge programme. Langhorne and colleagues performed a meta-analysis of data from individual participants who took part in randomised control trials looking at early discharge programmes versus conventional therapy. Early supported discharge (ESD) provided by specialist multi-disciplinary reduced the risk of death and dependency, there were six fewer adverse outcomes for every 100 people managed with ESD (Langhorne 2005).

*Improving quality of life of stroke patients:* Studies have shown that training carers can improve the well being of patients. In a randomised controlled trial, Kalra and colleagues randomised 300 care givers, who were looking after stroke patients, to an intervention consisting of training in basic nursing and helping with activities of daily living or to standard care. The trained caregivers reported that care giving was less of a burden, and they were less anxious or depressed. Patients' mortality and admission to hospital were similar in both groups, but patients who were helped by trained caregivers experienced less anxiety, less depression, and a better quality of life (Kalra 2004). Considering the strong association between depression and stroke both as a risk factor and a consequence of the event, the study demonstrates an effective and replicable method for reducing depression among suffers and their carers.

Local Assets
An asset based approach values the capacity, skills, knowledge, connections and potential in a community that enhance well being and a central element is ‘discovering and mobilising what people have to offer’ (Assessing local assets as part of the JSNA). The list below of associations and organisations in the community working with stroke patients and their carers does not constitute an assets based approach, but can contribute to the assets mapping that is involved in the process.

The majority of the community assets are not disease specific, but those focusing on the elderly will have services that meet the needs of stroke patients, the majority of whom are elderly, and their carers. The Stroke Association has a club in Greenwich, which offers carer support, social support, information and advice, and communication support to build confidence in those that need to relearn to speak. The Stroke Association is also providing outreach services to check blood pressures for patients who cannot attend their GP.

Age UK and Greenwich association of disabled people all provide services and support to older people and stroke victims. These services could be prevention orientated like ‘get fit programmes’ or podiatry, some are social services such as providing social spaces and events or financial advice, others are more medical such as supporting patients after they have been discharged from hospital.

Some organisations’ focus is more on supporting the needs of the carers, such as Greenwich carers centre, Greenwich crossroads and Greenwich Volcare, which was set up specifically to offer respite to carers. Other organisations concentrate on advocating for the rights of elderly people such as Advocacy for older people.

Link to The expert patient programme and the expert carers programme

Of the seven hundred civil society organisations in Greenwich, approximately 150 focus their activities on the elderly (Greenwich Action for Voluntary Service) and a third of the civil society groups are for ethnic minorities in the borough. These associations will offer support to elderly patients and a network to carers and patients from these ethnic groups. Therefore there is a potential for further developing this asset base in Greenwich.

What do we know about local services?

The Stroke Pathway

The FAST campaign raised awareness about the signs and symptoms of stroke with the intention of encouraging people to call 999 should they have a slumped face, be unable to lift both arms and slurred speech. The campaign also challenged existing perceptions about stroke among general practitioners and paramedics, raising their awareness of the new strategy.

In the event of a 999 call for stroke that meets the FAST criteria, Royal Borough of Greenwich residents are blue light transferred to the hyperacute stroke unit at the Princess Royal University
Hospital which has 24 hour expertise including intravenous thrombolysis. Thrombolysis, where suitable, must start within three hours of the onset of the stroke symptoms and only after appropriate imaging to exclude an intracranial haemorrhage. Where there is a delay in calling the emergency services of more than three hours, it may be more appropriate to take patients to the acute stroke unit at the Queen Elizabeth Hospital.

Patients with residual symptoms of stroke after the initial management require specialist co-ordinated rehabilitation. This should start on the stroke unit and be continued in the community on discharge. Health and social services need to work together to organise a smooth transition home providing emergency care packages where necessary. For others in whom the stroke has been devastating and where they are unlikely to recover end of life care may be more appropriate and should be implemented sensitively.

General Practitioners keep a register of all their patients who have had a stroke. A review of the health and social care status and secondary prevention needs of the patient should be conducted six weeks post hospital discharge, at six months and then annually.

Costs

In England, stroke is estimated to cost the economy around £7 billion per year. This comprises direct costs to the NHS of £2.8 billion, costs of informal care of £2.4 billion and costs because of lost productivity and disability of £1.8 billion (Mant 2004). One acute patient episode for stroke costs approximately £4000 (Nicholas 2012).

According to the London Health Programme, in 2010/11 RBG spent £2,881,000 on treating stroke, this includes non-health or social care services for patients. This equates to £10.8 per weighted head of population. This is lower than London and the England average that spent £14.1 and £15.1 respectively per weighted head of population (Greenwich Stroke profile 2012). A weighted head of population means that the age of the population has been standardised in order to make the different regions comparable.

Outcomes and Performance

- **Prevention**
Stroke shares risk factors with other cardio-vascular disorders and information about these risk factors are outlined elsewhere in the JSNA

  **NHS Health checks** – Link

  **Smoking** - Link

  **Weight management** – Link to physical activity and diet

- **Primary care**

Primary care performance for stroke is monitored through the Quality Outcomes Framework. The indicators measure whether people who have suffered a stroke or TIA are receiving the interventions to prevent them from suffering from another stroke. All these patients should be on a specific disease register and have their risk factors regularly assessed and managed.

General practitioners can exclude patients from the calculation of measures in the Quality and Outcomes Framework. This is allowed within reason to stop them being unfairly penalised as this is a payment tool. Patients who do not attend for review, for example if they are terminally ill with another disease, or where medication cannot be prescribed because of a contraindication, would be acceptable exceptions. The exception rate for Stroke and TIA in Greenwich in 2011/12 was 6.7%, compared with 6.2% in London and 4.1% in England (SEPHO 2012).

In England 1.7% of the population is on the stroke disease register, but in Greenwich only 1.1% of the population is on the register. A lower percentage in Greenwich could be a reflection of the younger demographic in Greenwich compared with England, as surrounding boroughs such as Lewisham have a similar percentage on their register. However the low percentage might also be because not all stroke and TIA patients are systematically being put on a disease register.

The achievements in secondary prevention achieved by primary care are outlined in figure 9.

**Figure 9: Secondary prevention achievements in Greenwich compared with the England average for 2012 from the Stroke and TIA register**

Source: Quality Outcomes Framework

The achievements in the Royal Borough of Greenwich are in line with the England average. High blood pressure is a significant risk factor for stroke, as mentioned previously, 72% of stroke is attributed to a systolic blood pressure over 115 mmHg (World health report 2002). This is especially important in men who have a higher blood pressure value than women of a similar age (Appelros 2009). Management of hypertension in primary care of patients who have had

either a stroke or TIA has significantly improved from 74.6% of patients with well controlled hypertension in 2005 to 89.1% in 2012. This improvement exceeds the rate of improvement in other neighbouring boroughs and brings Greenwich on a par with England, see figure 10. [Link to hypertension chapter for more information.]

Figure 10: Management of hypertension in primary care patients on the stroke/TIA register from 2005 to 2012 compared with neighbouring boroughs and England

Cholesterol is another modifiable risk factor, but unfortunately achievements have not been so impressive, see figure 11.
More than 1 in 4 people in Greenwich who have suffered a stroke or TIA at some point in the past do not have their cholesterol controlled below the recommended level of 5mmol/L, see figure 9. With around 40% of ischaemic stroke due to cholesterol greater than 3.8mmol/l according to the World Health Report 2002, this is an important consideration. A study into prescribing in primary care in the UK found that older patients (over the age of 84 years) were prescribed fewer lipid modifying drugs and beta blockers than younger patients (aged 45-54) (Mathur 2011). Stroke patients tend to be older and this may explain why even nationally achievements for lowering cholesterol in stroke patients are below other indicators. Although there has been a sustained improvement in this indicator, having increased from 1 in 2 or 50% in 2005, Greenwich is lagging behind the England average and the achievements of neighbouring boroughs.

**Atrial Fibrillation (AF)** – Since April 2011, through the Quality Outcomes Framework, general practitioners are encouraged to identify patients with AF, assess their risk using the CHADS₂ score and put them on anticoagulants where appropriate. As a result there has been an increase in the number of patients on the AF disease register, although rates are still below 1% see figure 12. The prevalence of AF in the UK is 1.5% and the prevalence of AF is expected to increase as result of the ageing population. General Practice has been encouraged to also use the GRASP-AF tool.

According to the primary care Quality Outcomes Framework data, over the last five years 93% of those identified with AF are being treated for adequately, which is similar to the national average. However, NICE estimates that 46 per cent of people with AF who could benefit from treatment with anticoagulants are not currently receiving them (GRASP AF 2012) and this therefore suggests that a significant number of people are missing from the AF register either undiagnosed or not registered.

According to figure 9, Greenwich is prescribing anti-platelet agents (e.g. aspirin) and anticoagulants (e.g. warfarin) to those that have suffered ischaemic strokes or TIAs as per evidenced based guidance, in high numbers and giving them the flu vaccine.

Depression is a significant risk factor for stroke, but is not included in the primary care performance indicators for stroke. In 2011/12, the prevalence of depression in adults in RBG was 7.9% compared with 11.68% in England (Community Mental Health Profile 2013, NEPHO). However there is no local measure of depression in stroke patients, its management and outcomes.

- **Community Services and Social care**

The integration of community health and social care in the Royal Borough of Greenwich saw the development of a Community Assessment and Rehabilitation Team (CAR team) and a Joint Emergency Team (JET team). The purpose of these teams was to facilitate discharge from hospital, prevent unnecessary admission to hospital and to assist people to stay independent in their own homes for longer.

The JET team is there as an emergency service to provide temporary support before the CAR team makes a full assessment and implements re-ablement or rehabilitation strategies. The JET team has access to intermediate care beds where necessary. Where stroke patients have
complex social needs their care will be assessed and managed by specialist teams such as the older peoples’ community mental health team.

There are three CAR teams, one in Eltham, in Woolwich and the last in Greenwich. In addition to their own assessment, the CAR team will also liaise with other specialist teams such as the “Neuro team” and “Falls team” who can give specific physiotherapy and occupational therapy support.

Since the implementation of this integrated community health and social care approach there have been no delayed discharges from hospital, an increase intermediate care bed occupancy and a decrease in intermediate care bed length of stay, no complaints and positive feedback from service users and hospital staff. The initiative has enabled an approximately 5.5% productivity saving (Jane Wells and Jay Stickland Presentation 2013).

- **Secondary Care**

As result of the evidence in favour of specialised stroke units and the potential for reperfusion therapies to improve the outcome of ischaemic stroke, the national stroke strategy, published in 2007, advocated more specialised acute and hyper-acute care for stroke patients. In the same year, NHS London published *A Framework for Action* which included a commitment to deliver these changes for Londoners. As result a network of eight hyper acute stroke units (HASU) were set up in the capital, supported by 21 local stroke units were patients can be transferred after the acute phase. In 2012, 75% of Londoners who suffer a stroke are admitted to a HASU as compared with 39% nationally in 2007. And thrombolysis rates have risen from 3.5% in 2009 to 12% at the end of 2010.

In 2012 the majority of stroke patients from the Royal Borough of Greenwich were receiving their care in The South London Health Care Trust (SLHT) made up of The Queen Elizabeth Hospital, The Princess Royal University Hospital and The Queen Marys Sidcup, see *figure 11*. The choice of hospital trust does not vary by age, see *figure 12*.

National performance data for each hospital is collected by the Stroke Improvement National audit programme (SINAP). The Princess Royal University Hospital (PRUH) is the hospital with a hyper acute stroke unit within SLHT. In 2012, there were 938 admissions to the PRUH, see figure 13 and its performance is described in table 3.

The number of admissions to the PRUH has increased over the last two years as the hyper acute stroke unit established itself.

Table 3: Performance of PRUH HASU in Comparison to the England average for 2012 and London 2012 Quarter 4 results

<table>
<thead>
<tr>
<th>Indicator</th>
<th>PRUH</th>
<th>England</th>
<th>London Q4 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator 11: Percentage of patients directly admitted to HASU within four hours of hospital arrival (Target 95%)</td>
<td>78.25%</td>
<td>64.5%</td>
<td>74.0%</td>
</tr>
<tr>
<td>Indicator 1: Percentage of patients scanned within 1 hour of arrival to hospital (Target 50%)</td>
<td>52.0%</td>
<td>38.0%</td>
<td>58.38%</td>
</tr>
<tr>
<td>Indicator 8: Percentage of potentially eligible patients thrombolysed (Target 100%)</td>
<td>78.25%</td>
<td>66.75%</td>
<td>84.38%</td>
</tr>
</tbody>
</table>

Source: SINAP report and targets from South East London Acute Stroke Services Report

SINAP measures 12 key indicators, three of which are mentioned in table 3. Patients attending the PRUH are receiving better than average care if measures are compared with England, but all the hyper acute stroke units appear to be falling short of many of the targets. Although 78.25% of those potentially eligible for thrombolysis are receiving this life saving treatment, they are only 18% of all the stroke patients admitted to the PRUH in 2012, a significant proportion of patients are unable to receive because they are not eligible. Eligible patients are those with infarction, aged under 80 years, whose onset of stroke to arrival at hospital time was less than 3 hours or who had their stroke in hospital, who did not refuse treatment and for whom there were no contra indications due to co-morbidity. According to the South East London Acute Services report, the percentage of eligible patients who received thrombolysis within 45 mins (for which the target is 90%) at the PRUH was 22.8% compared with 54.7% for London for the first three quarters.

quarters of 2012. The median time from arrival at the stroke unit to thrombolysis was 48.75 minutes in 2012, and 64% of patients are thrombolysed within 1 hour of arrival. The performance of the PRUH HASU is improving both in terms of the number of patients receiving thrombolysis and the speed at which they are getting the treatment.

After 72 hours patients, if patients still require care, they are transferred from the HASU to a local stroke unit at The Queen Elizabeth hospital (QEH). Over the first three quarters of 2012 there were 88 stroke admissions to the QEH. The performance of QEH stroke unit is outlined in table 4 and figure 13:

Table 4: Performance of QEH Stroke Unit in comparison to the London average from January to September 2012

<table>
<thead>
<tr>
<th>Indicator</th>
<th>QEH</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients arriving on SU bed within 1 hour of arrival following hospital transfer from HASU (Target 95%)</td>
<td>100%</td>
<td>96.8%</td>
</tr>
<tr>
<td>Number of patients weighed within 3 days of admission (Target 100%)</td>
<td>83.7%</td>
<td>75.6%</td>
</tr>
<tr>
<td>Number of patients to receive a physiotherapy assessment within 72 hours of admission (Target 75%)</td>
<td>92.6%</td>
<td>82.96%</td>
</tr>
<tr>
<td>Number of patients to receive an occupational therapy assessment within 7 days of admission (Target 60%)</td>
<td>90.0%</td>
<td>87.13%</td>
</tr>
<tr>
<td>Number of patients to have their cognition assessed by the time of discharge (Target 70%)</td>
<td>67.7%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Number of patients to have weekly nutritional screening (Target 100%)</td>
<td>98.87%</td>
<td>97.2%</td>
</tr>
<tr>
<td>Number of patients and carers with joint care plans on discharge from hospital (Target 85%)</td>
<td>4.06%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Number of patients presenting with stroke with AF anticoagulated on discharge (Target 60%)</td>
<td>100%</td>
<td>77.33%</td>
</tr>
<tr>
<td>Number of patients supported by a stroke skilled early discharge team (ESD) (Target 40%)</td>
<td>0%</td>
<td>11.13%</td>
</tr>
</tbody>
</table>

Source: South East London Acute services report: Q2 performance improvements

The Queen Elizabeth Hospital is performing well according to most of the measures. The QEH is falling behind on four targets, namely forming joint care plans, assessing cognition, weighing patients within three days of admission and supporting patients through an early discharge team. The Queen Elizabeth Hospital is still in the process of forming a supported early discharge stroke team and therefore is not able to report on this indicator. As mentioned under care models, an early discharge support service has been shown to reduce death and dependency. The Greenwich Clinical Commissioning Group’s aim is to commission a service to support early discharge. They are working with Oxleas, The Stroke Association, Social Services, SLHT and the South London Cardiac & Stroke Network to develop a model at present.

Forming joint care plans, assessing patient’s mood and cognition and weighing them within three days of admission are all measures that can be improved within the existing structures.
Figure 13: The performance of The Queen Elizabeth Hospital Stroke Unit compared to the London average from January to September 2012

Planned future work

- More needs to be done to consider the needs of the under 75 years and why their mortality rate is not declining faster. Efforts should concentrate on understanding their risk profile better and their access and use of treatments. Interventions can then be targeted at this group as part of a cardiovascular disease strategy.
- There is a growing Black African population in RBG who will have a higher incidence of hypertension and stroke. Projects should work with this community to reduce their high risk.
- Tools for identifying risks are already in place through the NHS Health Check Plus program and the Grasp AF tool. More information is required to know how well the identified risks translate into controlled risk factors and follow up through a disease register.
- More work needs to be done into identifying ways to support carers and to reduce depression in both patients and carers
- Efforts need to continue to improve stroke patients access to thrombolysis and support through early discharge teams.

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41. Wells. J, Stickland J: “Integrating Greenwich Community Health and Social Care services to improve prevention and early intervention services.”