Derby City Council

DERBYSHIRE County Council

CARDIOVASCULAR DISEASE

A Health Needs Assessment

Derby City and Derbyshire County

2018-19

Contents

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Executive Summary

CVD is a leading cause of death and ill-health in the United Kingdom, with a prevalence of 6.8 million people and accounting for 25% of 2016 deaths[1]. Furthermore, Public Health England data has suggested that the area within the Derbyshire Sustainability and Transformation Plan (STP) footprint has higher rates of coronary heart disease-related mortality and hospital admissions than England as a whole.

Cardiovascular diseases are caused by the process of atherosclerosis ('hardening or furring-up of the arteries') and as such have shared modifiable and non-modifiable risk factors. The non-modifiable factors include age, gender, family history and the ethnic background while the modifiable factors are those such as smoking, hypertension and high cholesterol. There is also strong association with socioeconomic deprivation, hence CVD is more prevalent in the North of England and remains an important cause of health inequalities throughout the UK. Public health England has long recognised the importance of CVD in disease prevention and as such has recommended a range of measures across a number of different conditions. This needs assessment looks at eight key cardiovascular or related conditions, their incidence or prevalence in Derbyshire, how they are managed in primary and/or secondary care and if there are any notable opportunities to improve the cardiovascular health of the people of Derbyshire.

Chapter 1: Hypertension

Hypertension represents a significant risk factor in cardiovascular disease, as mortality from CVD rises with the increase in blood pressure. It causes around 15% of all deaths in England. The prevalence in Derbyshire STP (15.8%) was higher than the national average (14.2%) in 2017/18. The national PHE CVD prevention pathway includes improving detection and treatment of high blood pressure by working with the local authorities and pharmacists and using self-check facilities and digital solutions. The PHE ambition is that 80% of the expected number of people with hypertension are diagnosed, in 2016/17 the estimated prevalence diagnosed in Derbyshire STP was 60% compared to England estimated prevalence diagnosed (58.6%).

The current recommendations to help improve diagnosis rates include:

- Use of ambulatory BP monitoring e.g. for patients whose BP may vary significantly between readings.
- A 5 yearly GP check of BP especially for those at risk.

[1] British Heart Foundation, 'Cardiovascular Disease Statistics 2018' Online via https://www.bhf.org.uk/what-we-do/our-research/heart-statistics/heart-statistics-publications/cardiovascular-disease-statistics-2018

- Continued implementation of NHS health check programmes since this provides a valuable opportunity both for identifying previously undiagnosed hypertension but also an opportunity for risk discussion.
- A focus on GP practices and how they identify those at risk of hypertension who are thus far undiagnosed.

Chapter 2: Atrial Fibrillation:

Atrial fibrillation is an irregular heart rate condition, Derbyshire has a prevalence of 2.7% (28,062 patients) which is slightly higher than the national average of 2.5% (around 1.4 million patients), it is more common in men and the incidence increases with increasing age, and increased rates of thyroid disease, cardiovascular and respiratory disease. Patients with AF have a 5 fold higher risk of stroke than those without. Patients with AF who score more than 2 on the CHA2DS2-VASc scale (a measure of stroke risk in patients with AF) are recommended to have treatment with anticoagulants. This equates to around 775,837 patients in England and 16,337 in Derbyshire. This produces healthcare costs in the four Derbyshire CCGs of around 7.8 million pounds. Despite the numbers of patients on anticoagulation, AF related strokes led to 14306 of hospital bed stays in 2017/2018, representing a significant burden on the local health economy.

Recommendations:

- The Public health England action plan has set measures and targets to help monitor prevention outcomes. For AF these include increasing AF detection, increasing anticoagulation rates and stroke prevention. These remain the priorities for Derbyshire.
- In the East Midlands Region, the AF ADVANCE partnership is working towards improving these outcomes, and next year will provide the opportunity to assess how Derbyshire is performing in relation to these targets.
- Further analysis of data (e.g. anticoagulation rates) at place level may provide a useful geographic footprint for planning intervention at a county level.

Chapter 3: Ischaemic Heart Disease

Coronary heart disease is the biggest single cause of death in UK. It has a prevalence of 3.1% in England. Out of the four Derbyshire CCGs, only Erewash has lower prevalence rates (2.3%) than the England average (3.1%)[2]. It remains an important cause of hospital admissions, and the average admission rates for heart disease are now higher in Derbyshire than they are nationally. The risk factors for developing IHD include increasing age, male gender, smoking, physical inactivity, obesity, family history of heart disease and certain ethnicities. The identification of these risk factors, for example through NHS health checks, is vital for successful prevention.

Recommendations for improving IHD risk in Derbyshire include:

[2] Public Health England, available online via https://fingertips.phe.org.uk/profile-group/cardiovascular-disease-diabetes-kidney-disease/profile/cardiovascular/data#page/0/gid/1938133108/pat/46/par/E39000032/ati/152/are/E38000115

- Integrating lifestyle services into care pathways to ensure seamless access, for example into smoking cessation services after an MI
- Use of social prescribing and other wider determinants services to promote and generate physical activity.
- Linking IHD care pathways with the commissioning of physical activity services for healthy ageing. Since IHD incidence increases with age, this would maximise benefit to be gained.
- Ensuring referral to the appropriate lifestyle services following the completion of cardiac rehabilitation, and the appropriate move from cardiac rehabilitation in the acute stages after a cardiac event to the maintenance of healthy and beneficial physical activity levels in the longer term.

Chapter 4: Hypercholesterolemia

High cholesterol in the blood influences formation of atherosclerosis and is therefore an important predictor of CVD. PHE chose to highlight optimising detection as a major CVD prevention focus in 2018/2019. The Department of Health estimated that 2 out of 3 UK adults have high cholesterol levels, one of the highest country prevalence's in the world. NICE recommends prescribing medium or high intensity statin therapy to lower cholesterol and as a measure in the primary and secondary prevention of CVD.

The Evidence-Based Medicine DataLab reported that 103,188 patients are currently taking statins in Derbyshire putting Derbyshire in the 95th centile compared with the rest of England[3]. At CCG level, only 44% of NHS Erewash are on low and medium intensity statins (35th centile) while the rest of Derbyshire CCGs are all above the 90th centile for percentage of less effective statins prescribed as a proportion of total statins prescribed.

Recommendations:

- There is a need for a strategic approach to identification and risk assessment of individuals with high cholesterol and/or raised risk of CVD, rather than relying on an opportunistic approach.
- There is also potential for improvement in the percentage of high intensity statins prescribed to bring Derbyshire CCGs in line with NICE guidance.

Familial hypercholesterolemia (FH) is a type of high cholesterol that runs in families; it raises the risk of CHD to up to 50% in males and 30% in females. The Simon Broome criteria should be used for identifying patients at risk, including children, and those patients identified are likely to require higher doses of statins for treatment. A detailed family history is an important part of a CVD risk assessment and will help identify those at risk of FH. It is also important to note that standard CVD risk tools will underestimate 10 year risk in these patients.

Recommendations:

- A detailed family history of CVD forms a vital part of risk assessment and is a valuable tool for helping to identify those with FH

[3] Openprescribing.net March 2019 data Available online via: https://openprescribing.net/measure/statinintensity/stp/E54000012/#statinintensity

- Standard risk assessment tools such as QRISK will underestimate the 10yr CVD risk in these patients and so should not be used to inform treatment decisions in the same way as those without FH.

Chapter 5: Peripheral Arterial Disease (PAD)

PAD occurs when a build-up of fatty deposits in the arteries restricts the blood supply to the muscles in the legs and feet. It is the largest single cause of lower limb amputation in the UK and is an important marker for increased risk of other cardiovascular morbidity and mortality. Its incidence increases with age, with around 20% of people aged over 60 having some degree of PAD. Smoking in the most important risk factor for PAD; other risk factors include diabetes, high cholesterol and high blood pressure. In Derbyshire the prevalence of PAD (0.7%) was slightly higher than the England average (0.6%) except in Southern Derbyshire CCG which had a similar prevalence to the England average.

NICE recommendations on management include offering a supervised exercise programme, or angioplasty in case of failure to improve. Smoking cessation is an important factor in the prevention of PAD and the worsening of symptoms, and patients should also be offered information, advice, support and treatment for the other standard forms of secondary prevention of CVD. Across Derby and Derbyshire there were 140 angioplasty, bypass and amputation procedures a year on average for those with a diagnosis of PAD across 2015/16, 2016/17 and 2017/18, at significant personal and economic cost to patients and the NHS alike.

Recommendations:

- Smokers with PAD who continue to smoke have consistently worse outcomes, with higher risk of amputation and higher mortality. Integration of primary and secondary care pathways with local smoking cessation services are vital to ensure that referral opportunities are not missed, and these patients should be consistently informed of the risks and offered referral at clinical encounters.
- Hospital stay costs constitute the biggest healthcare spend for these patients across Derbyshire, followed by the costs associated with amputation. NICE evidence suggests that supervised exercise programmes are as effective as angioplasties for control of PAD but at a fraction of the associated cost. Imbedding these services within a cardiac rehab service may be the best way to ensure equitable access across the region.

Chapter 6: Diabetes

Diabetes is a disorder of the body's ability to control blood glucose levels with the hormone insulin. It is categorised as type 1 (earlier onset, failure of pancreas to produce insulin) or type 2 diabetes (decrease in the body's ability to respond to insulin, strongly associated with obesity). Diabetes affects 4.6 million people in the UK, and 8.8% of people over the age of 16 in Derbyshire have diabetes. Type 2 diabetes accounts for 90% of the adult cases and Derbyshire CCGs all have higher prevalence than the rest of UK.

Derbyshire mirrors the national age trend for ages affected, as type 1 is most prevalent among under 40s and 40-60s and type 2 in the age bands 40-64s and 65s-79s. However the type 2 prevalence among 65-79s is higher than the national average. Nationally and in Derbyshire diabetes rates are slightly higher among men, furthermore there is a proportional association between BMI and diabetes as 84% of adults with Type 2 Diabetes are overweight or obese

nationally compared to 90% for overweight and obese adults in Derbyshire. Diabetes is more prevalent among BAME groups, for example people of Pakistani ethnicity, and among populations with greater rates of socioeconomic deprivation. Diabetes carries a two-fold increase in risk of CVD and stroke, and type 2 diabetics have higher 1 year mortality after acute Myocardial Infarction (heart attack). The National Diabetes Audit between 2005 and 2015 showed that diabetics have higher mortality rates from CVD-related complications compared to non-diabetics, and they account for 25-30% of hospital admissions for cardiovascular complications.

Recommendations:

- 90% of adults with type 2 diabetes in Derbyshire are overweight or obese which also emphasizes the need for integrating lifestyle services into the care pathways for diabetic patients.
- Access and referral to lifestyle services is equally important for diabetic patients who smoke, since smoking status significantly increases micro and macrovascular complications of diabetes. As in peripheral arterial disease patients, smoking status should be discussed and referral for cessation offered at all clinical contacts where appropriate.
- Although the BAME population is small in Derbyshire County, it is larger in Derby city. Type 2 diabetes is more common in this population and also associated with lower BMIs than in the white British population. This not only necessitates lower thresholds for intervention in these patients but also emphasises the importance of culturally sensitive lifestyle interventions in these populations.

Chapter 7: Stroke/TIA

The prevalence of stroke or TIA in Derbyshire (2.2%) is significantly higher that the England average (1.8%). This may reflect population demographics since age-specific prevalence rates are similar. Risk factors for stroke include smoking, hypertension, obesity, high cholesterol levels, diabetes, excessive alcohol intake, atrial fibrillation, age, family history and ethnicity.

Rates of patients with stroke who had had a BP measured at less than 150/90 (QOF measure) were higher in Derbyshire than in the rest of England. Similarly, rates of treatment with anticoagulation or antiplatelet and flu vaccination for stroke or TIA patients were also higher than the England average. In terms of promptness of referral, the rates of patients referred for further investigation between 3 months before and one month after their latest episode is similar to the England average. NHS Erewash CCG however has rates less than the England average.

In 2017/18 there were over 3,000 admissions with a primary diagnosis of stroke/TIA in the Derbyshire STP area, 88% of which were emergencies, 10% of patients died while in hospital and over 40% remained in hospital at the end of their admission episode. Prompt diagnosis and treatment remains key to improving outcomes in patients admitted for stroke.

Recommendations:

- Stroke prevalence in Derbyshire is higher than the England average, possibly due higher prevalence of atrial fibrillation in the population.
- Rapid diagnosis using a validated tool and management of stroke is of paramount importance to allow for better outcomes.

- Adequate assessment and management of TIA is essential to prevent the development of stroke, including treating those with 'crescendo TIA' (increasing frequency of TIA) as higher risk of stroke even if their risk score does not reflect this.
- Personal risk factors and circumstances should be considered when planning treatment since anticoagulation is not without risk.
- There are a considerable number of admissions with stroke in Derbyshire mostly as emergencies with a significant proportion remaining in hospital at the end of their admission episode.
- There should be emphasis on people with atrial fibrillation receiving assessment using the CHA2DS2-VASc stroke risk score (see chapter 2).
- Preventive interventions to address the controllable risk factors - e.g. smoking, high blood pressure (hypertension), obesity, high cholesterol levels, diabetes and excessive alcohol intake - remain the cornerstone of decreasing morbidity and mortality from stroke.

Chapter 8: Heart Failure

Heart failure is the leading cause of hospital admission in people over 65 years creating a large demand on the NHS, and the mortality rate nationally was 40% at one year for people requiring admission. The estimated prevalence of heart failure in Derbyshire is 1.07% compared to the national average of 0.8%. The diagnosis of chronic heart failure in the community is made using a specialist investigations and referrals as recommended by the NICE guidelines. In addition to pharmacological management NICE recommends life-style advice and cardiac rehabilitation. Nationally heart failure admissions have been increasing and Derbyshire had a similar admission rate to the national average with 161.7 per 100,000 population. NICE recommend ongoing and early input from the HF team for all HF admissions and a 2-week HF team follow up once stabilization is achieved. In Derbyshire STP the detection and admission rates of HF patients are comparable to the national averages.

Recommendations:

- Derbyshire STP appears to be detecting and admitting an appropriate number of HF patients, with prevalence and admissions rates comparable to the national averages.
- Initial assessment suggest inpatient and outpatient echocardiography is an over stretched resource in keeping with the national picture.
- Significant opportunity exists to increase the prescribing of B-blockers in Derbyshire for people with Chronic Heart Failure.
- The provision of ACE-I /ARBS (ACE inhibitor or angiotension receptor blocker medications) is comparable to national standards for people with heart failure but people would benefit from even higher levels of prescribing across the region.
- There is a national and local need to allow people at the end of life suffering from heart failure to die at home if they wish. In Derbyshire the needs are greater with significantly less people able to do so. -*Further assessment of end of life care and heart failure is needed*.

Conclusion:

Cardiovascular disease remains an important cause of morbidity and mortality both nationally and in Derbyshire. The cornerstone of prevention remains the addressing of the risk factors that cause atherosclerosis: the underlying disease process. These include smoking, obesity, physical inactivity, hypertension and diabetes. As such the integration of lifestyle service contacts and referral into care pathways is a recurring theme throughout this needs assessment.

Derbyshire is keeping up with the national average in many aspects of CVD care such as blood pressure check in all patients over 45 and anticoagulation treatment for patients at high risk of stroke, however, there are areas of management that could be improved, such as prescribing of high intensity statins for people at risk, the co-prescription of B-Blockers to improve prognosis in heart failure patients and the provision of NHS health checks to the eligible population. Integration of exercise programmes to treat those with PAD within a large and well-resourced cardiac rehabilitation service (both for patients with IHD and heart failure) would go a long way towards improving morbidity of CVD sufferers in the region.

Introduction: why CVD?

What is Cardiovascular Disease?

Cardiovascular disease (CVD) refers to disease of the heart and blood vessels caused by the process of atherosclerosis - the build-up of fatty plaques within the vessels, sometimes known as 'hardening' or 'furring-up' of the arteries[4,5]. These plaques or deposits contain many different materials including white blood cells, lipids (fatty acids and cholesterol), calcium and fibrous connective tissue. Over months and years, these plaques can become bigger and thicker, causing narrowing of the arteries and impairment of blood supply. Sometimes, one of these atheromatous plaques can develop a crack or 'rupture'. This can then cause the formation of a blood clot which can then cause partial or even complete blockage of the blood flow in that artery[6]. The umbrella term CVD generally refers to coronary heart disease (angina and myocardial infarction or heart attack), stroke and peripheral arterial disease. It is closely associated with conditions such as heart failure, atrial fibrillation and diabetes[7]. It is the most important cause of death in the UK, accounting for around 25% of all deaths in 2016-2017[8]. Since the 1980s, cardiovascular mortality has been falling sharply, however, the burden of morbidity related to CVD seems to be increasing, and was responsible for an estimated £7,880 million of cost to the NHS in 2010[4] (an estimated 6.9% of total £112 billion NHS spend in that year according to the Kings Fund). According to the latest Global Burden of Disease study, an estimated 6.8 million people in the UK are living with CVD[5].

What are the important risk factors?

Cardiovascular diseases are a family of diseases that share a common set of risk factors of which there are both modifiable and non-modifiable examples. Non-modifiable risk factors include age, sex, ethnic background and family history of CVD. Modifiable risk factors include smoking, hypertension and raised cholesterol, and some of these conditions including hypertension and hypercholesterolemia are discussed here separately in dedicated chapters. Importantly, CVD shows a strong association with low income and social deprivation, and England manifests a North-South divide, with higher rates in the north of England. Cardiovascular disease is an important public health problem and accordingly, Public Health England has cemented its commitment to cardiovascular disease prevention for the coming year with some key prevention initiatives including indicators for cholesterol, hypertension and atrial fibrillation[9]. The concept of prevention can be further subdivided into categories which have subtly but importantly different objectives. The following terminology will appear throughout this needs assessment:

Primary Prevention (e.g. of cardiovascular disease): The treatment of individuals who are identified to be at higher risk of developing a disease, in order to prevent incidences of that disease or condition occurring. For example, in cardiovascular disease, this might refer to the

[4] NICE Clinical Guideline 181 Cardiovascular disease risk assessment and reduction, including lipid modification. 2014. Last updated Sept 2016
[5] British Heart Foundation online information 'Atherosclerosis' via https://www.bhf.org.uk/informationsupport/conditions/atherosclerosis last accessed 05/06/2019
[6] NICE Clinical Knowledge Summary. Lipid Modification- CVD Prevention, Oct 2015. Online via https://cks.nice.org.uk/lipid-modification-cvd-prevention last accessed 5/6/2019
[7] NICE PH Guideline 25, 'Cardiovascular Disease Prevention' June 2010. Online via https://www.nice.org.uk/guidance/ph25/consultation/html-content
[8] British Heart Foundation, 'Heart Statistics' Online via https://www.bhf.org.uk/what-we-do/our-research/heart-statistics
[9] PHE Cardiovascular Disease Prevention Initiatives 2018-19, Midlands and East Region, available online https://www.healthcheck.nhs.uk/commissioners-and-providers/national-guidance/

treatment with statins of individuals found to have a 10 year cardiovascular risk of greater than 10%, but do not yet have known CVD.

Secondary Prevention: The treatment of risk factors in someone already diagnosed with a given condition or disease of interest in order to prevent progression of that disease. In CVD for example, this might refer to the treatment and control of blood pressure or blood cholesterol levels in someone who is known to already have coronary artery disease to prevent acute myocardial infarction or worsening angina.

There is also a concept of ***tertiary prevention***. This is generally used to describe the prevention of long-term complications or disability occurring as a consequence of having developed a disease. For example, in cardiovascular disease, this might refer to cardiac rehabilitation after an acute cardiac event, with the aim to preserve cardiac function and prevent development of disabling heart failure.

Primary Prevention in Cardiovascular Disease

Improving rates of CVD morbidity and mortality requires interventions at both an individual and population level. Population level interventions have included measures to reduce sugar and salt content in foods, as well as reducing excess calorie consumption. The NICE public health guideline on cardiovascular disease prevention (PH 25) has suggested policy goals aimed at reducing consumption of fat and salt in the population, as well as reducing marketing of foods high in these substances aimed at young children.

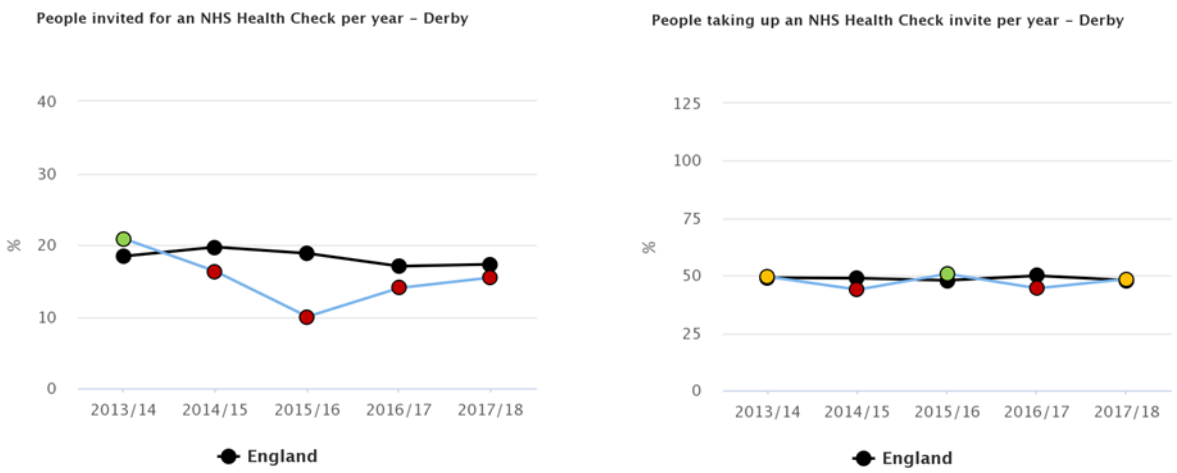
At an individual prevention level, the NHS health check program aims to identify those at higher risk of developing CVD, in order to modify that risk.

NHS health checks

NHS health checks are offered to people in England aged 40-74 every five years and aim to prevent premature death from conditions such as heart disease and stroke by identifying those at increased risk. They involve an appointment with a healthcare professional, at which people are asked about their family history and lifestyle, as well as having their body mass index, blood pressure and blood cholesterol measured [10].

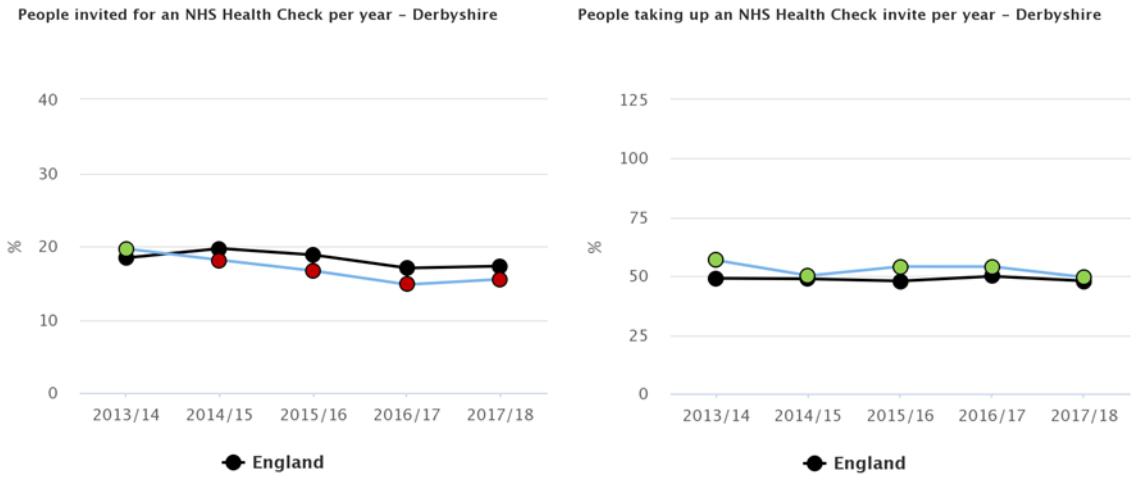
In Derby, 15.4% of the eligible 40-74 year old population were invited for an NHS Health Check in 2017/18: an increase on the prior year (14%), however still lower than the national average of 17.3%. Of those invited, 48.5% took up the Health Check which was similar to national rates (47.9%), however lower than the local target of 51%. Across Derby, this meant that only 7.5% of the overall eligible population received an NHS Health Check.

[10] NHS, 2016 https://www.nhs.uk/conditions/nhs-health-check/ 'What is an NHS health check?'



Percentage of eligible people invited for health check in Derby and percentage of those taking up their health check (Public Health England)

Meanwhile, 15.5% of the Derbyshire eligible population were invited for an NHS Health Check, with 49.5% taking up the invite. The number of people taking up the invites was significantly higher than the national rate (47.9%), however the overall proportion of the eligible population that actually received a health check was significantly lower (7.7%) than national average (8.3%).



Percentage of eligible population invited for health check and those taking it up in Derbyshire (Public Health England)

Background: CVD in Derbyshire

Demographics of Derbyshire

For the purposes of this needs assessment, 'Derbyshire' refers to the Derbyshire STP footprint which covers both Derbyshire county and Derby City. The population of this area is around a million people; according to ONS figures, at last census there were 791,966 people living in Derbyshire and 248,752 in Derby City. Average life expectancy for men in the county is 79.3 years (compared with an England average of 79.6) and for women it is 82.8 years (compared with England average of 83.1). In Derby City, this is lower again with an average life expectancy for males of 78.5 years and one for women of 82.7 years. Importantly, there is

variation across the region in inequality of life expectancy at birth (PHE fingertips data using Slope Index of Inequality) which is a key indicator of health inequalities- something which is inextricably linked with cardiovascular disease mortality. Derbyshire County has a small ethnic minority population compared with the rest of England (around 4% compared with 20% for England) and the largest ethnic group is 'Other White'[11] By contrast, the Derby City Population has a BAME population of 24.7%, with the largest single ethnic group being the Pakistani population at 5.9 % overall population.[12]

Who are our population?

The Sustainability and Transformation Plan (STP) for Derbyshire divides the regional footprint into eight place alliances as follows:

- Amber Valley
- Bolsover and North East
- Chesterfield
- Derby City
- Derbyshire Dales
- Erewash
- High Peak
- South Derbyshire

Healthcare commissioning and providing organisations within the region include*:

- NHS Southern Derbyshire Clinical Commissioning Group (CCG)
- NHS North Derbyshire Clinical Commissioning Group (CCG)
- NHS Hardwick Clinical Commissioning Group (CCG)
- NHS Erewash Clinical Commissioning Group (CCG)
- Derbyshire Community Health Services NHS Foundation Trust
- Derbyshire Healthcare NHS Foundation Trust
- DHU Health Care formerly (Derbyshire Health United)
- Derby Teaching Hospitals NHS Foundation Trust
- Chesterfield Royal Hospital NHS Foundation Trust
- Derby City Council
- Derbyshire County Council

Data, where available, has been given here by place alliance, but mostly data in this HNA is shown by CCG or GP practice level.

[11] About Derbyshire Online: https://www.derbyshire.gov.uk/council/news-events/about-derbyshire/about-derbyshire.aspx
[12] Derby City Council Census Briefing paper 2013, online: https://www.derby.gov.uk/media/derbycitycouncil/contentassets/documents/reports/DerbyCityCouncil-Population-Profile-April-2013.pdf

*As of April 2019, the four Derbyshire CCGs have become one organisation known as Derby and Derbyshire Clinical Commissioning group.

CVD in Derbyshire

According to PHE fingertips data, the Derbyshire STP area has higher rates of hospital admissions due to coronary heart disease and/or heart failure than the England average. In addition, rates of mortality due to coronary heart disease are higher than those in England as a whole, and figures suggest that a greater than average proportion of people dying from heart failure are doing so in NHS care providers in Derbyshire, rather than their home/usual place of residence or a hospice environment. This needs assessment will discuss each of eight important CVD or CVD-related conditions in detail, including data on the impact of that condition in Derbyshire.

Aims of this Needs Assessment:

1. To describe the cardiovascular health of Derbyshire in terms of incidence and/or prevalence of important conditions, as well as patterns of diagnosis and management.
2. To assess and describe important CVD health outcomes
3. To look at service provision across the region
4. To identify avenues for improvement in CVD prevention and care

Objectives:

- Collate and describe current data on prevalence and/or incidence of the following conditions:
    - Atrial Fibrillation
    - Hypertension
    - Hypercholesterolemia
    - Stroke/Transient ischaemic attack (TIA)
    - Ischaemic Heart Disease
    - Heart Failure
    - Peripheral Vascular Disease
    - Diabetes
- To identify numbers of people with these conditions, but also numbers of those who have received appropriate diagnostic tests as per guidelines, and/or are receiving optimal management.
- Map service provision across the pathway and compare with current best available evidence-based practice.
- Collate and describe current data on important CVD health outcomes such as hospital admissions and mortality rates as well as CVD prevention within the region.
- Identify potential actions for health gains.

The following areas are out of scope for this work:

- Type 1 diabetic complications including retinopathy and nephropathy and screening for these conditions (the increased cardiovascular risk associated with diabetes **is** discussed here)
- Congenital Heart Disease
- Deep Vein Thrombosis and Pulmonary Embolism

- Chronic Kidney Disease

Important CVD Conditions

1. Hypertension

1.1 What is hypertension?

Arterial blood pressure measurement is described using two values: the top number or systolic pressure refers to the force or pressure with which the heart pumps blood round the body, the bottom number or diastolic pressure refers to the resistance in those vessels to the flow of the blood. It is measured in millimetres of mercury. An ideal blood pressure is considered to be between 90/60 mmHg and 120/80 mmHg [13] however, most adults in the UK will have blood pressures between 120/80 and 140/90 [14].NICE [15] defines hypertension as persistent raised arterial blood pressure, often referred to simply as 'high blood pressure'.

NICE classifies hypertension according to the level of blood pressure (BP):

- Stage 1: Clinic BP above 140/99mmHg and subsequent average of home monitoring of 135/85 or higher.
- Stage 2: Clinic BP above 160/100 mmHg and subsequent average of home monitoring of 150/95 or higher.
- Severe: Systolic BP 180mmHg or higher or diastolic 110mmHg or higher (Derby Hospitals, 2018).

Meanwhile, the Quality Outcomes Framework (QOF) defines hypertension as an arterial blood pressure of 150/90mmHg or higher.

Specific medical conditions can also mean that thresholds for classifying hypertension levels may vary. In diabetic patients, a target clinic blood pressure below 140/80mmHg is suggested, while 130/80mmHg is advised if kidney, eye or cerebrovascular disease is also present. Meanwhile, for those living with renal disease, a target pressure of 140/90mmHg is suggested or again 130/80mmHg is advised in patients with chronic kidney disease or diabetes. Caution should also be taken around pregnant women with hypertension, as hypertensive complications can be hazardous for both the mother and the foetus. For women with uncomplicated chronic hypertension, a target blood pressure of <150/100mmHg is recommended, and in women with target-organ damage as result of chronic hypertension, or post-natal women with chronic hypertension, a target blood pressure of <140/90mmHg is advised.[9]

Throughout this chapter, data is provided which refers to both the NICE and QOF measures of hypertension.

Hypertension is not in itself a disease but is a significant risk factor for other important diseases and conditions such as coronary heart disease, stroke, peripheral vascular disease,

[13] NHS conditions, online https://www.nhs.uk/conditions/high-blood-pressure-hypertension/ last accessed 5/6/19

[14] Blood Pressure UK, online http://www.bloodpressureuk.org/BloodPressureandyou/Thebasics/Whatisnormal last accessed 5/6/19

[15] NICE (2011). Hypertension in adults: diagnosis and management [online]. NICE [viewed 31/10/18]. Available from: https://www.nice.org.uk/guidance/cg127

retinopathy, aortic aneurysm, heart failure and end-stage renal disease. The risk associated with increasing blood pressure is continuous, with each 2mmHg rise in systolic blood pressure associated with a 7% increased risk of mortality from ischaemic heart disease and a 10% increased risk of mortality from stroke.[9] High blood pressure is responsible for around 15% of all deaths in England.[16]

There are two main categories of hypertension: essential hypertension and secondary hypertension. Essential hypertension refers to high blood pressure with no specific identifiable cause and more commonly related to lifestyle factors. Meanwhile, secondary hypertension is the result of a known underlying cause or condition such as renal disorders, vascular disorders, endocrine disorders or drugs, amongst others.

While the majority of hypertension cases are essential, there are a variety of diseases that can cause raised blood pressure (secondary hypertension). Until recently, the prevalence of secondary hypertension was thought to be around 5%. However, more recent work suggests that this is probably higher, with at least 10% of hypertension cases attributable as secondary to other conditions. Hyperaldosteronism (e.g. Conn's Syndrome), where there are increased levels of the adrenal hormone aldosterone released, is a known cause of raised blood pressure since aldosterone causes retention of sodium and potassium in the blood instead of allowing them to be excreted in the urine, thus raising the blood pressure. Secondary hypertension is important to identify, as resolving the underlying cause may be life-saving and lead to normotension (normal blood pressure)[17]

Prevalence of essential hypertension is expected to continue to increase, both due to an aging population, but also due to worsening lifestyle factors, including: smoking, excessive alcohol consumption, excess dietary salt, obesity, and physical inactivity. In older adults in particular, systolic hypertension is more commonly the significant problem as a result of progressive stiffening and loss of compliance of larger arteries (NICE, 2011).

Other important risk factors for developing hypertension include:

- **Sex** – up to 65 years, women often have a lower blood pressure than men, which then reverses between the ages 65 to 74 where women tend to have a higher blood pressure. Despite the higher prevalence of hypertension in men than women, the prevalence of treated hypertension is higher in women than men. [18]
- **Ethnicity** – people of Black African and Black Caribbean origin are more likely to be diagnosed with hypertension.
- **Social deprivation** – people from across the more deprived areas in England are 30% more likely to have Hypertension compared to those living in the least deprived areas.
- **Anxiety and emotional stress**- can raise blood pressure through increased adrenaline and cortisol levels (NICE, 2011).

[16] DOH (2018). Prevention is better than cure: Our vision to help you live well for longer. Department of Health and Social Care.

[17] McManus, R.J., & Mant, J. (2010). Hypertension [online]. Available from: https://www.birmingham.ac.uk/Documents/college-ds/haps/projects/HCNA/05HCNASeries3D2.pdf

[18] McManus, R.J., & Mant, J. (2010). Hypertension [online]. Available from: https://www.birmingham.ac.uk/Documents/college-ds/haps/projects/HCNA/05HCNASeries3D2.pdf

Hypertension can be treated with lifestyle measures such as reduction of weight if obese, following a healthier diet and exercising. Stopping smoking, reducing salt intake and stress reduction mechanisms can all also help lower blood pressure. Where these are ineffective, insufficient or not adhered to, a variety of different medications can be used to help reduce blood pressure.

In patients with other conditions that increase cardiovascular risk, such as diabetes, a combination of lifestyle modification and antihypertensive drug treatments will be required to lower the blood pressure.

NICE references a major systematic review which found that, in populations whose high blood pressure was corrected, every 10mmHg reduction in BP resulted in:

- A 17% reduction in coronary heart disease
- A 27% reduction in stroke
- A 28% reduction in heart failure
- A significant 13% reduction in all-cause mortality

1.2 Hypertension Prevalence in Derbyshire

Hypertension prevalence data is a recorded by a Quality Outcomes Framework measure in primary care, where hypertension is defined as a blood pressure of 150/90mmHg or above. Data is available by GP practice through QOF.

In this section there is also a breakdown of prevalence by CCG and by Place Alliance. Charts are available by GP practice in the appendices. There is some variation between practices; it is important to be aware that practices with a higher recorded prevalence may be due to actual prevalence, but otherwise could be due to other factors such as different rates of engagement of that population with healthcare services.

Each CCG and place should therefore be considered independently, as comparisons may be inappropriate without taking into account underlying social and demographic characteristics of the population concerned.

Prevalence by CCG

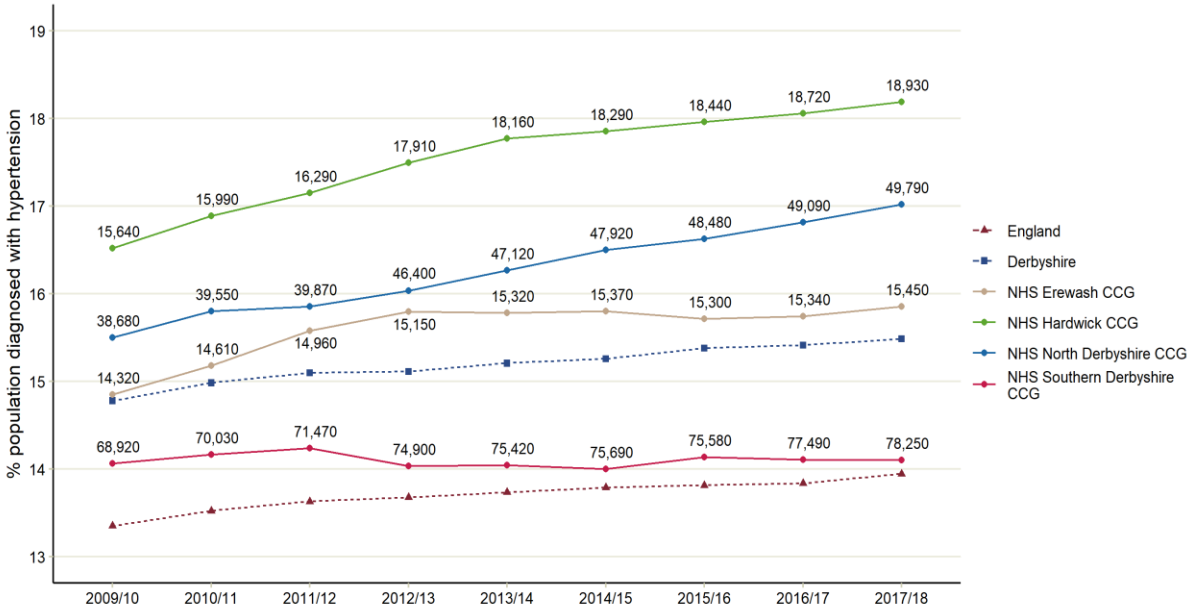
Table 2 shows the number of individuals on the QOF register for Hypertension and the percentage prevalence of all registered patients in each CCG.

Number on QOF Hypertension register		
	2016/17	2017/18
Erewash CCG	15338	15454
Hardwick CCG	18715	18934
North Derbyshire CCG	49090	49789
Southern Derbyshire CCG	76427	78253
Prevalence (%)		
England Ave.	14.1%	14.2%
NHSE North Midlands Ave.	15.2%	15.5%
Derbyshire STP Ave.	16.2%	15.8%
Erewash CCG	15.7%	15.9%
Hardwick CCG	18.1%	18.2%
North Derbyshire CCG	16.8%	17%
Southern Derbyshire CCG	14.1%	14.1%

Prevalence of Hypertension (QOF) 2016/17 to 2017/18

In 2017/18, prevalence of the overall registered GP populations was highest in Hardwick CCG (18.2%) and lowest in Southern Derbyshire (14.1%). Prevalence has increased in each CCG since 2016/17, however only by 0.02% in Southern Derbyshire.

The national average hypertension prevalence in 2017/18 was 14.2%. In each of the CCGs across Derbyshire, hypertension prevalence was higher than the national average. In all CCGs besides Southern Derbyshire CCG, prevalence was higher than the Derbyshire STP average and the NHSE North Midlands Average.



PHE trend in population hypertension prevalence, source: QOF diagnosed hypertension figures

Prevalence by Place Alliance

The numbers of individuals on the QOF register for Hypertension, along with the percentage of the overall registered patients with Hypertension for each Place is displayed below.

Number on QOF register for Hypertension	
Amber Valley	20,990
Bolsover & North East	31,194
Chesterfield	19,566
Derby City	44,311
Erewash	15,454
High Peak & Buxton	9,534
North & South Dales	13,365
Southern Derbyshire	8,016
Prevalence (%)	

England Ave.	14.2%
NHSE North Midlands Ave.	15.5%
Derbyshire STP Ave.	15.8%
Amber Valley	15.7%
Bolsover & North East	17.9%
Chesterfield	17.3%
Derby City	13.2%
Erewash	15.9%
High Peak & Buxton	15.8%
North & South Dales	16.6%
Southern Derbyshire	14.5%

Prevalence of Hypertension by Place Alliance (QOF) 2017/18

Derby City (13.2%) had a lower prevalence of hypertension than the national average (14.2%), the NHSE North Midlands average (15.5%) and the Derbyshire STP average (15.8%) in 2017/18. All other 7 places had a higher prevalence in comparison with the national average.

1.3 Diagnostic 'gap to ambition'

Correctly diagnosing and treating hypertension is an important part of reducing the CVD burden both locally and nationally.

One of the interventions included in the national CVD Prevention pathway is the detection and treatment of high blood pressure[19]. The intervention recommends:

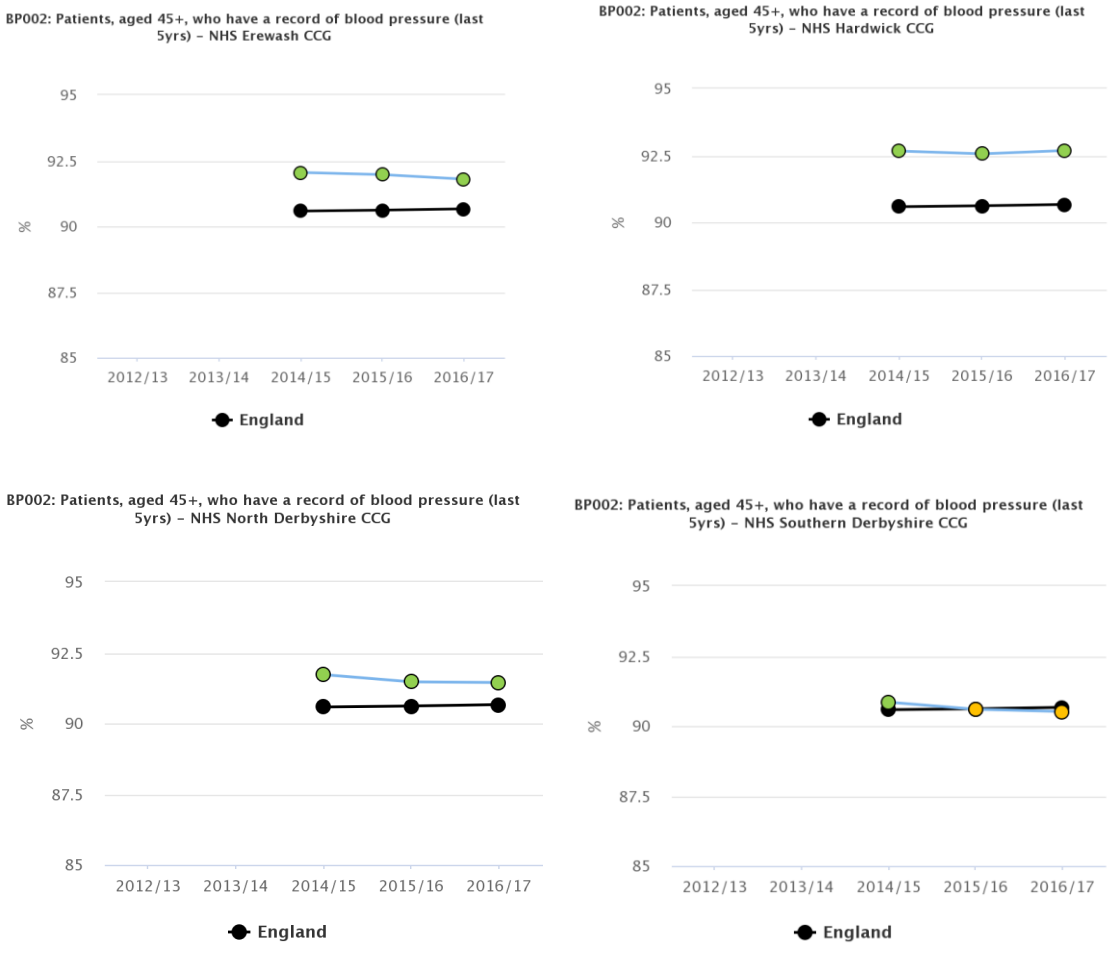
- A systematic audit across practices to identify people with possible undiagnosed hypertension, and people who are diagnosed but not optimally treated to target.
- Work should be done with practices and local authorities to maximise NHS Health Check uptake and follow ups.
- Local primary care should build a leadership to challenge unwarranted variation and to drive quality improvement in detection and management of hypertension.
- Practice-based pharmacists should be used to optimise management of hypertension, and ambulatory blood pressure monitoring services should be commissioned for diagnosis.

Other commissioning opportunities are encouraged to be considered including:

[19] NHS England (2016). High value intervention in high blood pressure [online]. NHS England [viewed 31/10/18]. Available from: https://www.england.nhs.uk/rightcare/products/pathways/cvd-pathway/blood-pressure/

- Systematic support for adherence from community pharmacists through medicine use reviews
- BP self-test units (e.g. In surgery waiting rooms, community pharmacies and leisure centres)
- Digital solutions for self-monitoring and treatment optimisation.

Improving diagnostic rates locally is an important goal in improving overall hypertension and cardiovascular outcomes. The QOF recommends a blood pressure check in all patients over 45 at least once every 5 years. The following charts show a breakdown by CCG of percentages of patients meeting this recommendation. Derbyshire is significantly above the national average in all CCGs apart from Southern Derbyshire, where the rates are similar.



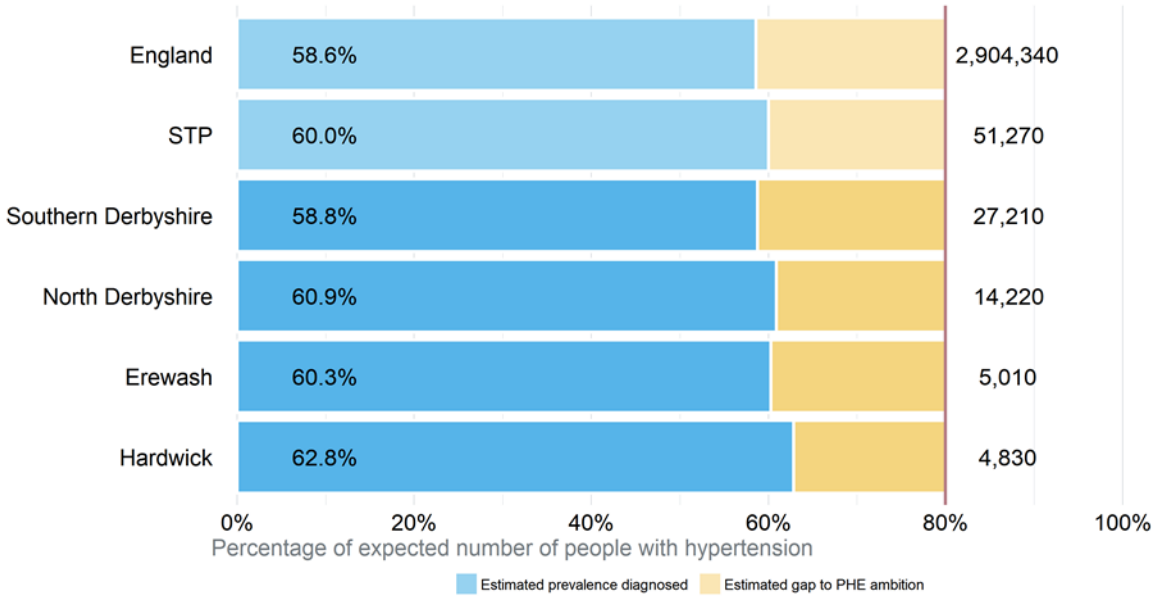
Percentage of patients with known hypertension with a recorded BP in the last 5yrs, by CCG (Public Health England)

The Public Health England ambition is that 80% of the expected numbers of people with hypertension are diagnosed by 2023. Over a span of 10 years a 15% increase in the proportion of adults diagnosed with hypertension would result in an estimated 7,000 quality adjusted life years (QALYs) saved, and £120m therefore not spent on associated health and social care costs.

The charts below show the estimated prevalence of diagnosed hypertension compared with expected prevalence, and consequently the estimated number of people with hypertension required to be diagnosed to meet the PHE ambition (80%) across the four Derbyshire CCGs

for the year 2016/17. A more detailed breakdown by GP practice can be found in the appendices. The figures below are based on the threshold of 140/90, to illustrate the progress towards the ambition.

The figure below shows that the CCG locally with the largest gap to meet the 80% ambition of people diagnosed with hypertension is in Southern Derbyshire (58.8%), with similar estimated prevalence of diagnosed hypertensives to the national rate (58.6%). Southern Derbyshire is the largest of the 4 CCGs in Derbyshire, and while percentages are a relative measure, it is still important to bear this in mind when looking at the estimated numbers of people to target to 'close the gap' on the right-hand side. It is likely that a larger population will have a greater proportion of undiagnosed hypertensive patients than a smaller one.



Observed prevalence of Hypertension vs predicted prevalence- CCGs in Derbyshire, 2016/17

1.4 Diagnosis and Management of Hypertension

It is estimated that there are more than 5.5 million people in England with undiagnosed hypertension. PHE[20] acknowledge that for every 10 people who are diagnosed with high blood pressure, a further 7 people will remain undiagnosed and untreated. However, PHE also note that the proportion of adults with untreated high blood pressure decreased between 2003 and 2015 for both sexes: from 20% to 15% among men, and from 16% to 10% among women.

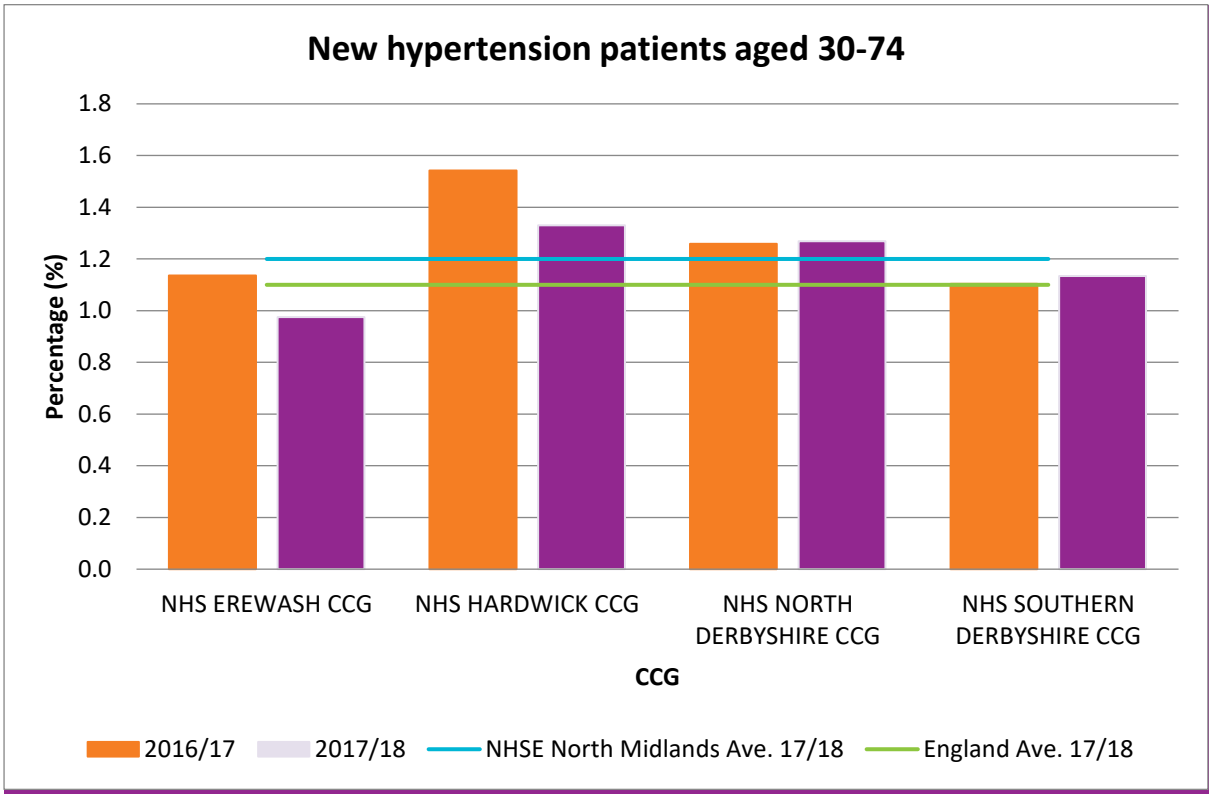
New diagnoses of hypertension

The below chart shows the percentage of patients with a new diagnosis of hypertension, aged 30-74, as a proportion of all patients aged in this bracket. The data excludes those with pre-existing coronary heart disease, diabetes and stroke/transient ischaemic attack.

In both Erewash and Hardwick CCGs the percentage of newly diagnosed patients decreased between 2016/17 and 2017/18, while there was an increase in the proportion of new hypertensive patients in North Derbyshire and Southern Derbyshire CCGs. There is a large

[20] PHE (2017). Health matters: combating high blood pressure [online]. Public Health England [viewed 15/11/18]. Available from: https://www.gov.uk/government/publications/health-matters-combating-high-blood-pressure/health-matters-combating-high-blood-pressure

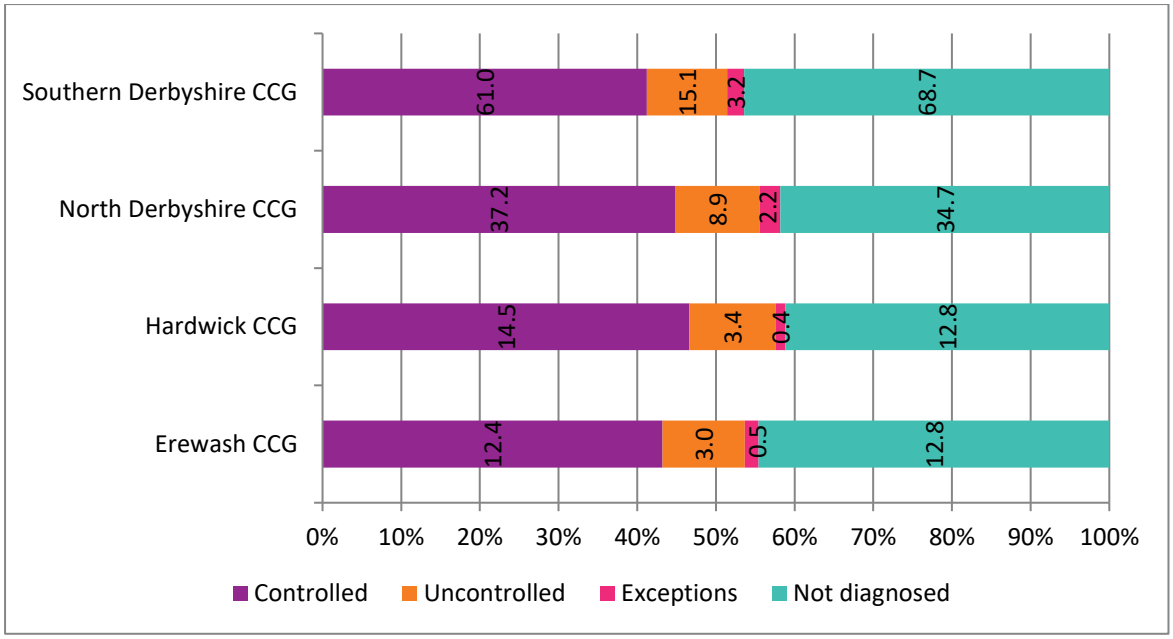
number of individuals that are identified as previously undiagnosed hypertensives; therefore it is questionable as to whether true prevalence is increasing in these CCGs or whether GP practices have got better at diagnosing and reporting new hypertensive patients.



Treated and untreated hypertension

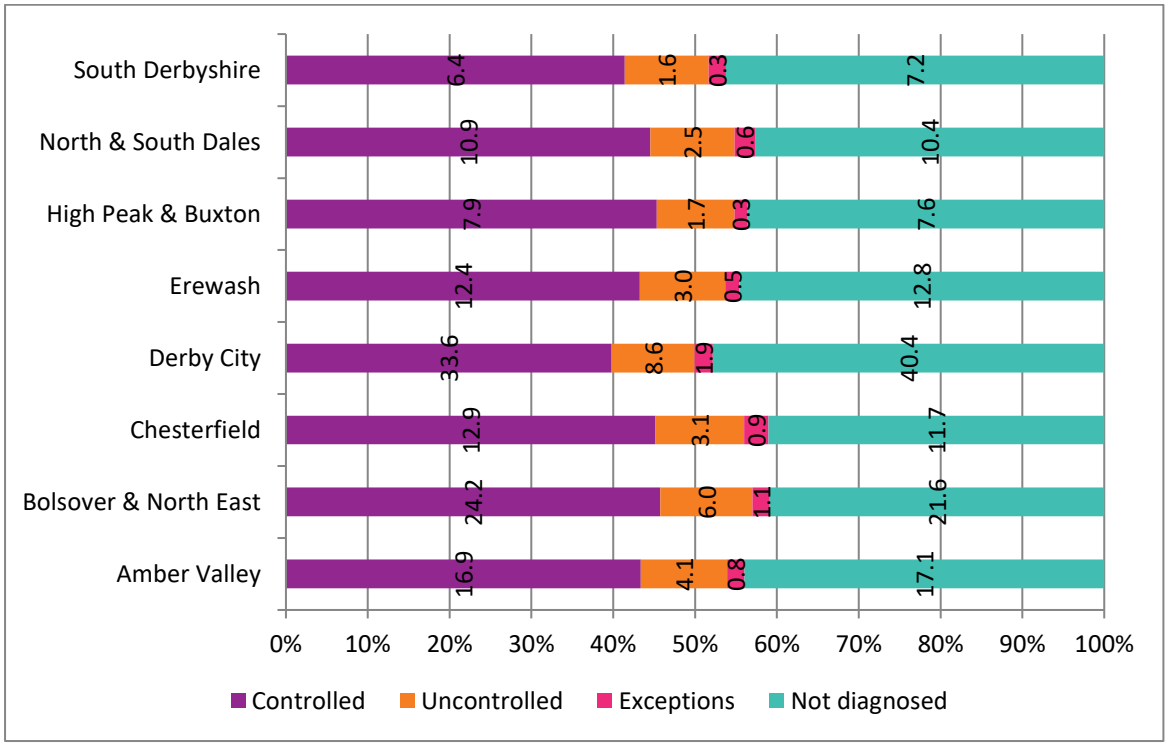
What is meant by 'treated' hypertension? The QOF target is for all hypertensive patients to have a blood pressure of 150/90mmHg or less. From the 2017/18 QOF dataset, the number of hypertensive patients in Derbyshire who are controlled, uncontrolled or reported as exceptions have been extracted and split by CCG and place alliance, below. The undiagnosed numbers are a crude estimate based on uplift from the 2014 PHE model[21] and numbers are recorded in thousands of patients. The exception rates reflect the percentage of patients who are not included when determining QOF achievement. Exception reporting and the variation of reporting between practices is a key measure to help identify key inequalities. Practices will record exceptions for patients if there has been no response after three invitations to attend for example, which will have a greater impact on certain groups. Where exception rates are particularly high, these should be looked into further by GP practices, as it may mean that the treatments given are being poorly tolerated or that patients are simply not engaging with healthcare.

[21] PHE (2016). Hypertension prevalence estimates for local populations [online]. Public Health England [viewed 16/11/18]. Available from: https://www.gov.uk/government/publications/hypertension-prevalence-estimates-for-local-populations



Numbers (in thousands) of patients with controlled, uncontrolled and estimated undiagnosed hypertension by CCG, 2017/18

In the figure above, all numbers are in thousands and presented as a percentage of the overall estimated individuals with hypertension. Based on uplift from the 2014 PHE model, Southern Derbyshire had an estimated 68,700 undiagnosed, which equated for 46% of the overall hypertensive population in that CCG. Hardwick CCG had 47% of its estimated overall hypertensive population, at a controlled rate, with 11% uncontrolled, and the lowest proportion of exceptions (1%). The highest rate of exceptions was in North Derbyshire CCG with 3% (2,200 people).



Numbers (in thousands) of patients with controlled, uncontrolled, exception reported and estimated undiagnosed hypertension by Place, 2017/18

When looking at the data by Place Alliance, Bolsover & North East had the largest proportion of controlled hypertensives (46%, 24,200 people) and the lowest proportion of estimated undiagnosed cases (41%, 21,600) relative to size of place. In Derby City, 40% (33,600) of the estimated hypertensives were controlled, with an estimated 48% (40,400) undiagnosed in 2017/18. The rates of uncontrolled hypertension were highest in Amber Valley, Bolsover & North East and Chesterfield (11%).

Recommendations for Practice

- Encourage the use of ambulatory blood pressure monitoring. As the most accurate method for confirming diagnosis of hypertension, its use should reduce the unnecessary treatment in people who do not have true hypertension.
- GP practices should continue to check patients' blood pressure every 5 years, with a particular focus on men who are least likely to have their blood pressure recorded.
- GP practices should continue to implement the NHS Health Check programmes, as these represent an opportunity for diagnosis of hypertension as well as counselling on associated risk.
- More work and research should be undertaken into GP practices with higher exception rates, as a key measure to identify any inequalities between and within practices.

2. Atrial Fibrillation

2.1 Introduction

Atrial Fibrillation (AF) is an irregular heart rate condition. It is caused by multiple additional irregular electrical impulses in the atria (the upper chambers of the heart) causing twitches or fibrillations of the atrial heart muscles, and results in an increased likelihood of blood clots forming in the heart. AF is the most common form of cardiac arrhythmia (rhythm disturbance), and is a major risk factor for stroke. The prevalence of AF is estimated at around 2.5%, and there are approximately 1.4 million people with AF in the UK.[22] AF is more common in males than females, and increasing incidence of AF is associated with increasing age. AF is also known to occur more commonly in people with other cardiovascular conditions including hypertension, heart valve disease, and diabetes, with some thyroid disorders and with respiratory conditions such as asthma or COPD. Episodes, with symptoms such as palpitations and dizziness, can be triggered by smoking, caffeine, illegal drugs, and consuming excessive amounts of alcohol. However, AF is asymptomatic in many individuals, and an estimated 425,000 people in England live with undiagnosed AF.[23]

There is a range of presentations of AF:

- Paroxysmal or intermittent AF where episodes arise sporadically, with each episode lasting up to about 48 hours duration before resolving without treatment
- Persistent AF when episodes last more than 7 days (or fewer days with treatment), and further defined as 'long-standing persistent' when the persistent episodes are experienced for more than a year
- Permanent AF is present all the time. This occurs in approximately 50% of patients.[24]

The treatment for AF includes therapies to control heart rate, and to control heart rhythm, as appropriate to the patient (NICE CG180).[25] The relative risk of stroke increases by five times when AF is present, with people aged over 80 years at particular risk of stroke attributable to AF.[26] The individualised risk of stroke in patients with AF is assessed through the CHA_2DS_2-VASc scale, and patients with a score of 2 or more on this scale will usually be prescribed anticoagulants to interrupt the formation of blood clots, with further assessment of their risk of bleeding. Treatment with an oral anticoagulant medication (e.g. warfarin) reduces the risk of stroke in someone with AF by two thirds.[27]

There are other forms of atrial arrhythmias associated with heart diseases such as atrial flutter, an arrhythmia which has a similar thromboembolic risk to AF and is an indication for management with anticoagulation; 25-35% of patients with AF may be observed to have atrial flutter.[28]

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[25] NICE Atrial fibrillation: management. Clinical Guideline (CG180). Available at: https://www.nice.org.uk/guidance/cg180

[26] Wolf PA, Abbott RD, Kannel WB. (1991) Atrial Fibrillation as an independent Risk Factor for Stroke: The Framingham Study. https://www.ncbi.nlm.nih.gov/pubmed/1866765

[27] Hart R.G., Pearce L.A., Aguilar M.I. (2007) Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation. Ann Intern Med 146: 857–867

[28] BMJ Best Practice https://bestpractice.bmj.com

AF is a condition of particular public health concern: the prevalence of AF is rising in the UK due to an ageing population. Approximately 30% of people with AF have not been diagnosed. In many cases AF-related strokes and their associated ill-health and hospitalisations can be prevented with oral anticoagulation.

2.2 Prevalence of Atrial Fibrillation

Estimated Prevalence

The prevalence of AF can be estimated locally using data on the age and sex distributions of AF in a known population. Public Health England developed estimates for England in 2015/16.

Estimated prevalence of atrial fibrillation 2015/16 — Proportion - %

Area	Count	Value	95% Lower CI	95% Upper CI
England	1,408,101	2.4	-	-
Derbyshire	28,062	2.7*	-	-
NHS Erewash CCG	2,616	2.7	-	-
NHS Hardwick CCG	2,938	2.9	-	-
NHS North Derbyshire CCG	8,815	3.0	-	-
NHS Southern Derbyshire C...	13,693	2.6	-	-

Source: Populations by age and sex: http://www.content.digital.nhs.uk/catalogue/PUB22008/gp-reg-patients-prac-quin-age.csv Age and sex-specific prevalence rates derived from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3862395/pdf/clep-5-475.pdf

Source: PHE

For Derbyshire in 2015/16 an estimated **28,062** people had AF. The Derbyshire prevalence for AF was higher at 2.7% of the population than the national value of 2.4%. The highest prevalence within Derbyshire was calculated for North Derbyshire CCG area at 3.0%, although the greatest burden in terms of numbers was for Southern Derbyshire CCG with an estimated 13,693 people living with AF in that area.

QOF Prevalence

The prevalence of AF according to GP Practice Registers is reported through the Quality and Outcomes Framework programme, with most recent annual data from 2017/18. All cases of AF that have been diagnosed and recorded on the AF Registers will be included in this.

Table: QOF Prevalence of AF 2017/18

	% Prevalence (95% Confidence Intervals)	Number of AF Patients
NHS Erewash CCG	2.2 (2.1 - 2.3)	2,116
NHS Hardwick CCG	2.3 (2.2 – 2.4)	2,356
NHS North Derbyshire CCG	2.6 (2.5 – 2.6)	7,578
NHS Southern Derbyshire CCG	1.9 (1.9 – 2.0)	10,779
Derbyshire	2.2 (2.1 – 2.2)	22,829
England	1.9 (1.9 – 1.9)	1,113,553

Source: QOF

The data shows that there is variation in QOF Prevalence for AF between the CCGs across Derbyshire. The lowest prevalence of 1.9% recorded in Southern Derbyshire is in line with the national picture.

As the QOF prevalence rates reflect the levels of formally diagnosed AF, the difference between the QOF Prevalence here and the Estimated Prevalence above from 2015/16 provides an indication of the scale of undiagnosed AF in the population. However these measures are not directly comparable due to the different dates and methods

2.3 AF-Related Stroke

Stroke Risk Assessment

In primary care the QOF indicator AF006 measures the percentage of patients with atrial fibrillation in whom stroke risk has been assessed using the CHADS2DS2-VASc score risk stratification scoring system in the preceding 12 months (excluding patients with a previous CHADS2/CHA2DS2-VASc score of 2 or more).

Table: QOF Assessment of stroke risk in patients with atrial fibrillation 2017/18

	% (95% Confidence Interval)	Number of AF patients
NHS Erewash CCG	94.4 (93.0 – 95.4)	1,354
NHS Hardwick CCG	92.7 (90.8 – 94.2)	874
NHS North Derbyshire CCG	93.8 (92.9 – 94.6)	2,937
NHS Southern Derbyshire CCG	96.0 (95.6 – 96.4)	7,365
Derbyshire	95.1 (94.7 – 95.4)	12,530
England	93.6 (93.5 – 93.7)	469,201

Source: QOF

Southern Derbyshire CCG is the only area with a statistically higher reported completion of stroke risk assessment compared with national completion values. Hardwick reported lower stroke assessment.

Stroke-Related Admissions

The Hospital Episode Statistics data record the hospital admission events for stroke and then can be analysed by whether the patient has an AF diagnostic code. The data was extracted for the registered Derbyshire population.

In 2017/18 there were 1216 patients who were recorded with a stroke hospital admission event and who had an AF diagnosis coded on their record. The files do not distinguish the time point of the AF diagnosis and whether it was diagnosed prior to the stroke, nor whether the patient was on anticoagulants. The HES data does include the number of bed days, providing an indication of the service utilisation associated with strokes.

Table: Number of stroke admissions and bed days for Derbyshire patients

	All stroke patients		Stroke and AF diagnosis patients	
	Number of hospital admission events	Bed days	Number of hospital admission events	Bed days
2013-14	3171	35713	1200	15938
2014-15	3205	32977	1236	15368
2015-16	3216	30796	1351	14038
2016-17	2927	31403	1129	13060
2017-18	2917	27988	1216	14306

Source: Hospital Episode Statistics. Data include all stokes whether stroke was recorded at admission or in a later finished consultant episode, and AF diagnosis data include all patients where an AF code appeared anyway in the string of diagnostic codes.

The Sentinel Stroke National Audit Programme (SSNAP) reports annually across key indicators on stroke care to inform healthcare improvement. This data discriminates on whether patients had an AF diagnosis prior to stroke, and therefore provides information about AF-related stroke. In 2017-18 the proportion of AF-related stroke admissions, compared with non AF-related stroke admissions ranged between 14.4% and 26.8% across the four CCGs in Derbyshire. The numbers of AF-related strokes in the data are in the range of 10 to 70 patients, so these are relatively small numbers.

Table: Patients admitted to hospital for stroke with known AF prior to stroke

	Apr 2013-Mar 2014	Apr 2014-Mar 2015	Apr 2015-Mar 2016	Apr 2016-Mar 2017	Apr 2017-Mar 2018
	%	%	%	%	%
NHS Erewash CCG	.	19.7	23.9	15.1	26.8
NHS Hardwick CCG	21.1	18.4	17.9	17.6	14.4
NHS North Derbyshire CCG	17.4	21.3	20.2	23.4	21.2
NHS Southern Derbyshire CCG	19.8	23.4	23.0	17.5	19.4
England	**20.8**	**20.5**	**20.1**	**19.7**	**19.2**

Source: SSNAP

2.4 Anticoagulation

Anticoagulation in Primary Care

QOF Indicator AF007 reports the percentage of patients deemed at higher stroke risk (CHADS2DS2-VASc of 2 or more) who are currently treated with anticoagulants.

Table: QOF Proportion of AF patients with higher stroke risk on anticoagulation 2017/18

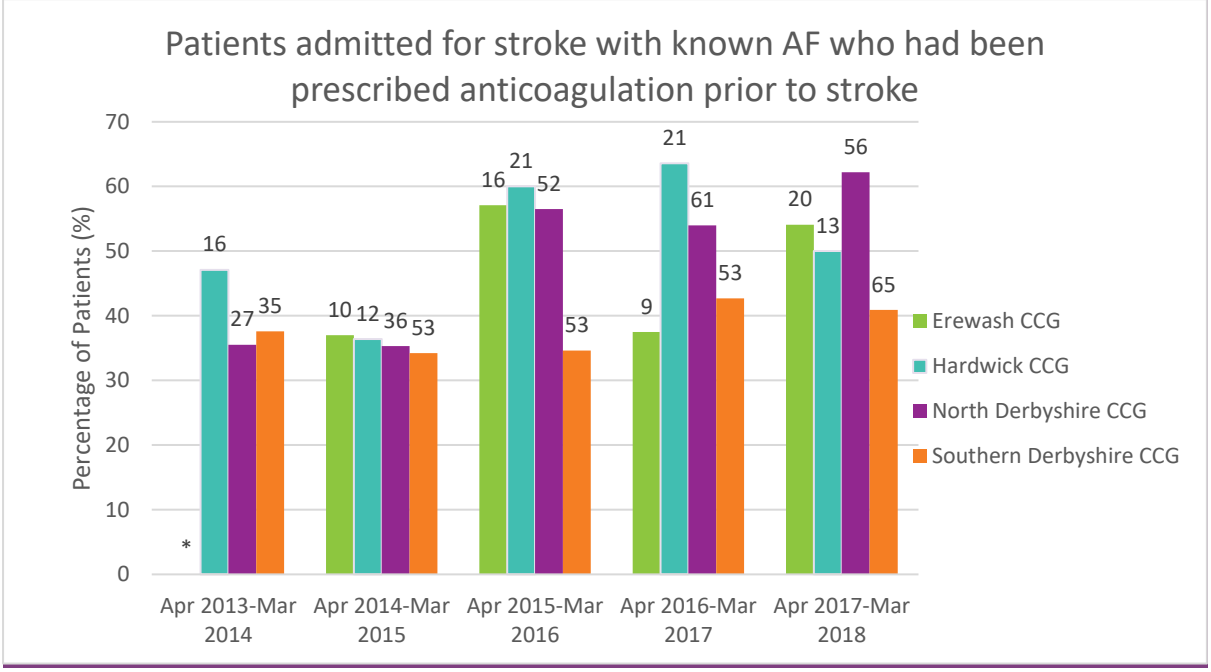
	% (95% Confidence Interval)	Number of AF patients
NHS Erewash CCG	88.1 (86.5 – 89.5)	1,557
NHS Hardwick CCG	87.5 (86.0 – 88.9)	1,758
NHS North Derbyshire CCG	85.2 (84.3 – 86.1)	5,362
NHS Southern Derbyshire CCG	85.8 (85.1 – 86.5)	7,660
Derbyshire	86.0 (85.5 – 86.5)	16,337
England	84.0 (83.9 – 84.1)	775,837

Source: QOF

The data shows that both Derbyshire overall, and all the CCGs within Derbyshire have higher proportions of patients on anticoagulation than the national average.

AF-related Admissions with Prior Anticoagulation

For the patients that had known prior AF, the SSNAP audit captures on data on whether the patients were prescribed anticoagulants before their stroke occurred.



Source: SSNAP Data labels indicate number of AF patients prescribed anticoagulation prior to stroke

The figure shows that there may be some indication of improvement, particularly in certain CCG areas from 2014/15 onwards, at ensuring appropriate anticoagulation for their patients.

Anticoagulant Prescribing

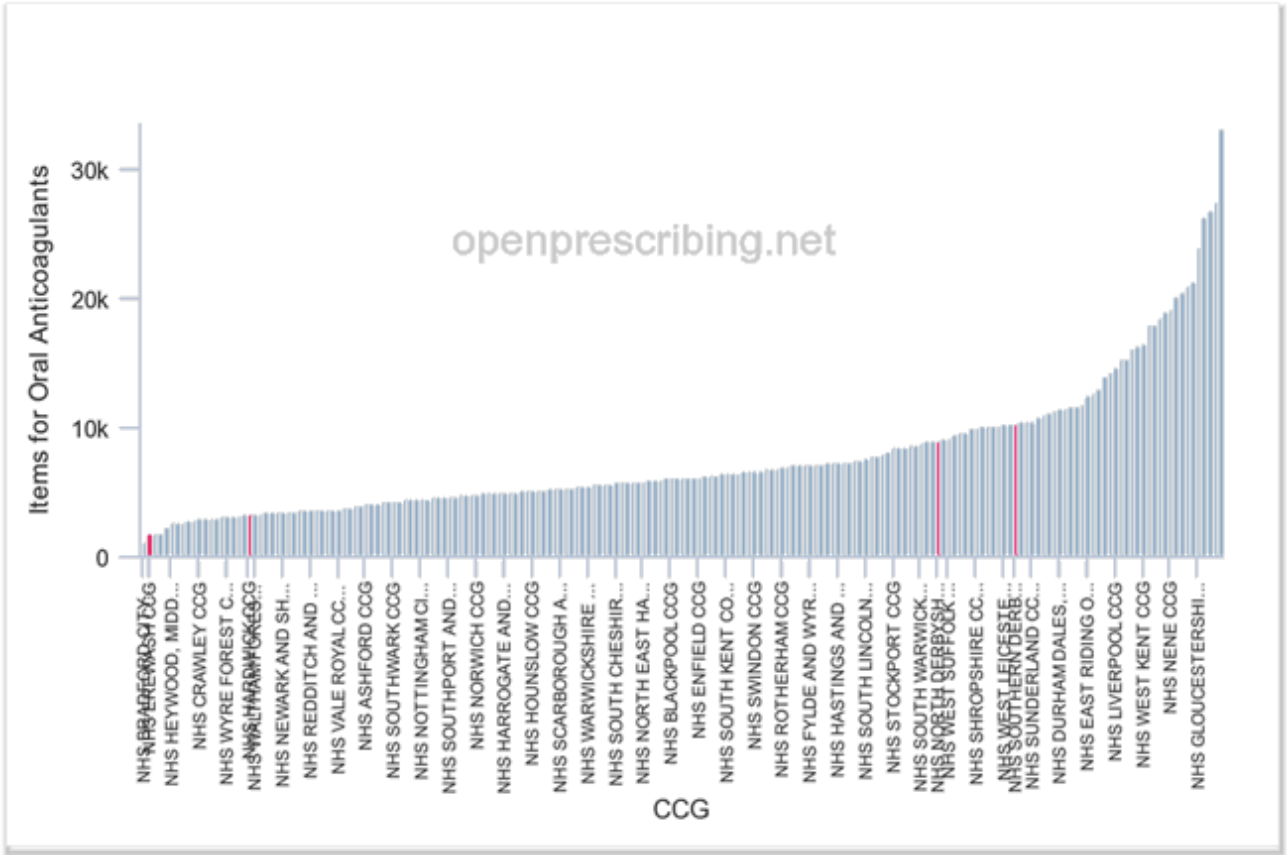
Prescribing data is available for the number of items, total costs, and net ingredient costs for prescribed items within the British National Formulary groupings for NHS prescriptions written and dispensed within the community (in England). The net ingredient cost comprises the basic cost of the drug excluding VAT without accounting for contract prices, discounts, fees or income.

Section 2.8 prescribing data relates to 'Cardiovascular system/Anticoagulants and Protamine' and is available at CCG and practice level. The 2.8 section includes several sub-sections:

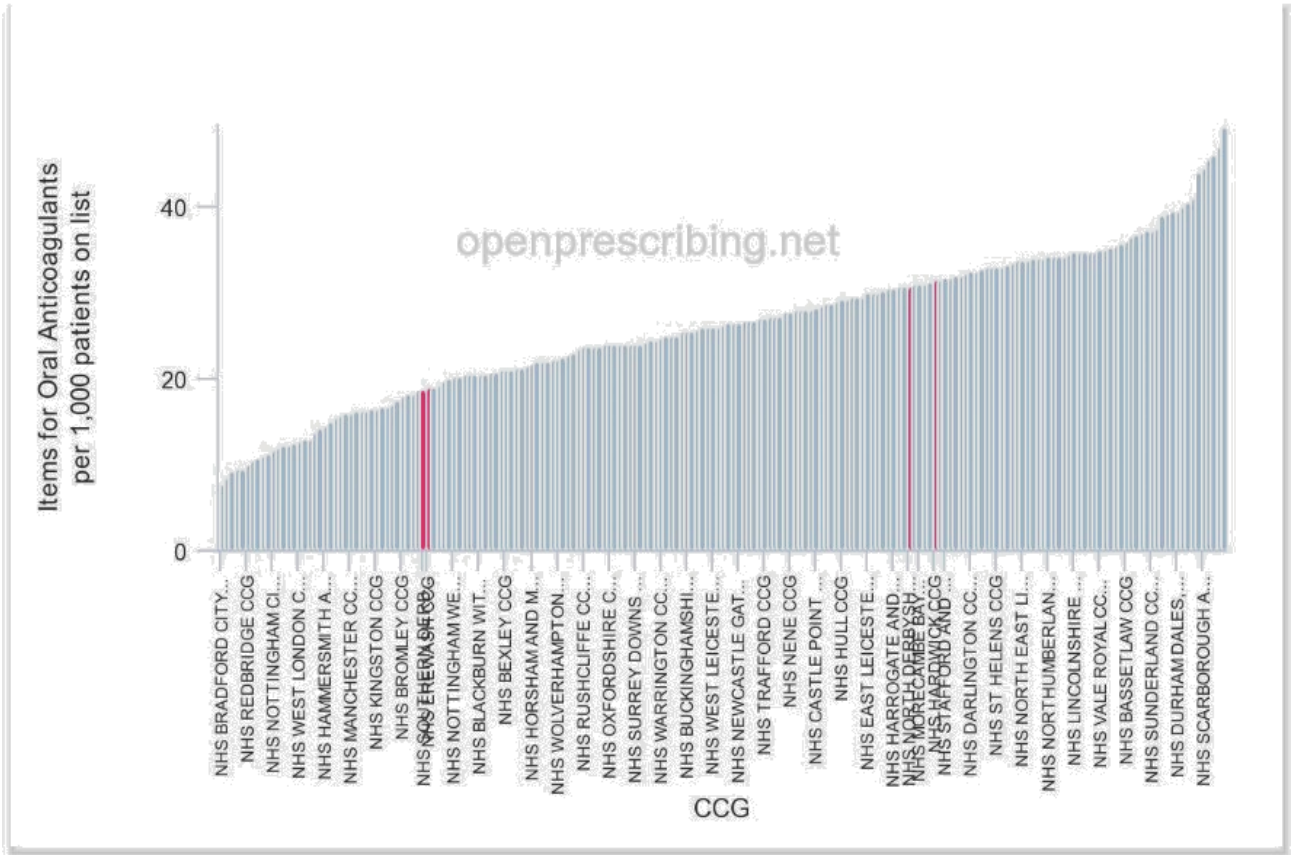
- 2.8.1 Parenteral anticoagulants (injectable drugs)
- 2.8.2 Oral anticoagulants
- 2.8.2 Protamine

It is important to note that these prescriptions are not specific to atrial fibrillation patients and therefore data must be interpreted with caution when looking to make conclusions about AF patients only.

Graph: Number of items for oral anticoagulants (2.8.2) at November 2018 (Derbyshire CCGs in red)



Graph: Number of items for oral anticoagulants (2.8.2) adjusted by practice list size at November 2018

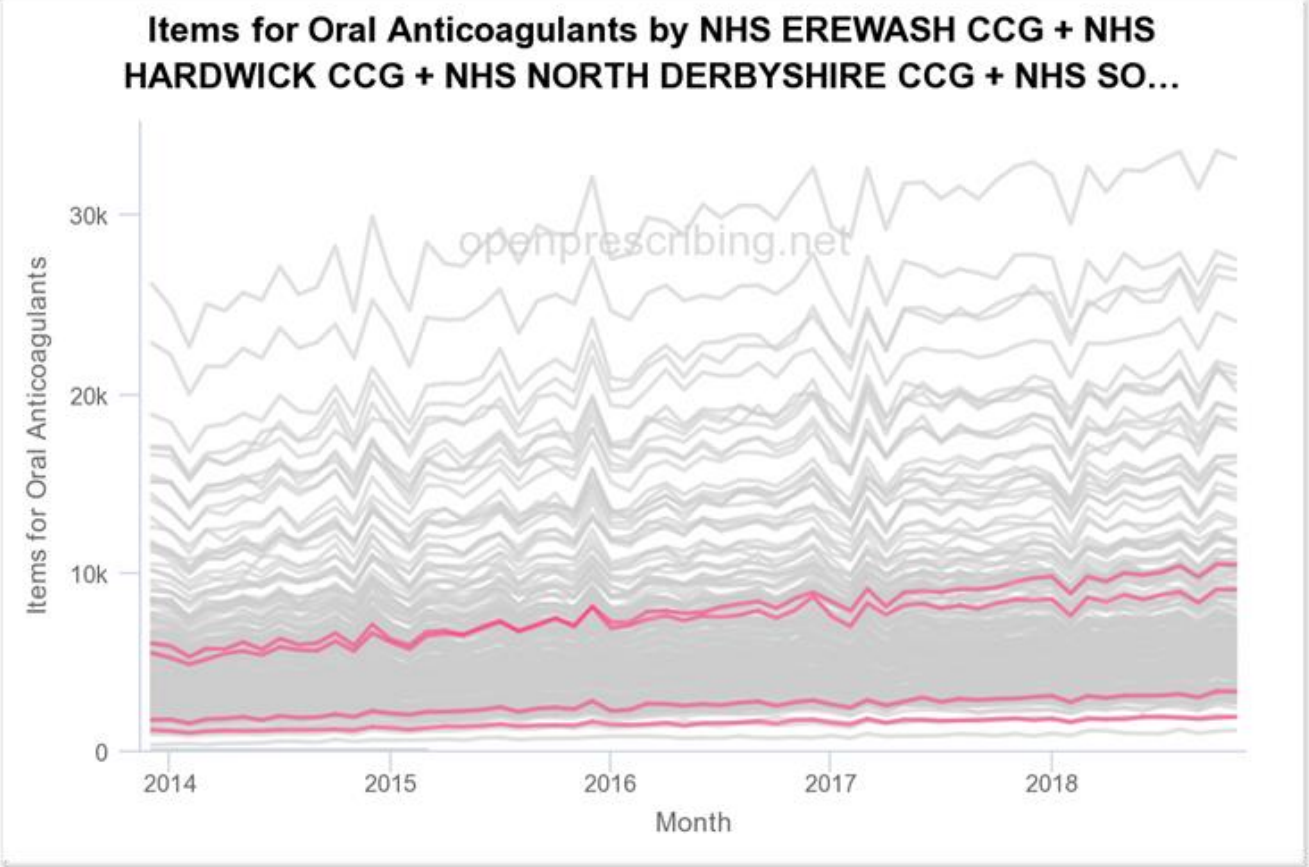


Source: OpenPrescribing.net, EBM DataLab, University of Oxford, 2017

Of note, while Southern Derbyshire is one of the CCGs in the country with the highest numbers of oral anticoagulants prescribed, it is in the lower quarter for the proportion of oral anticoagulants per list size. However it is not possible to analyse the number of items or costs of prescribing materials weighted by the estimated prevalence of AF in that population. Practice list size cannot account for the differences in case mix between practices, so it is possible that this apparent anomaly may reflect the different demographic of the larger Southern Derbyshire population.

Overall there has been an upward trend over recent years in the number of oral anticoagulants items prescribed.

Graph: Number of items for oral anticoagulants 2014-2018



The increased number of items is reflected in rising costs, with a total net ingredient cost for the Anticoagulant and Protamine category for all four CCGs of **£7.8 million** for 2017/18.

Table: Anticoagulant and Protamine spending in 2017/18

	Total Costs	Net Ingredients Cost
NHS Erewash CCG	670,497.26	722,881.08
NHS Hardwick CCG	668,546.82	720,058.78
NHS North Derbyshire CCG	2,473,246.16	2,666,730.06
NHS Southern Derbyshire CCG	3,452,684.07	3,720,967.2
Total	7,264,974.31	7,830,637.12

Source: NHS Digital

2.5 Strategy

Measures to address AF are specifically included within the Public Health England (PHE) Action Plan for CVD prevention and considered within national work on CVD (NHS Rightcare and PHE Health Inequalities). These action plans have required local implementation across

the three principal outcomes for AF: increasing detection of AF, increasing anticoagulation for cases detected and decreasing the incidence of AF-related stroke.

At a national level there has been collaborative work on an AF-related stroke prevention programme between PHE, the Academic Health Science Network (AHSN), NHS RightCare and the voluntary sector since 2013/14. The ambition has been to reduce the incidence nationally of AF-related strokes by 5000 over five years. At September 2017 the work had resulted in 68,093 new AF cases detected, preventing approximately 2000 AF-related strokes and estimated to save over £40 million across health and social care.[29]

In the East Midlands region 'AF ADVANCE' is the partnership programme to support CCGs and STPs to improve AF diagnosis and management. Partner organisations include East Midlands AHSN, East Midlands Clinical Networks, Public Health England - East Midlands, Health, Health Education East Midlands, Right Care, East Midlands CLAHRC, BHF, Stroke Association, and the Heart Rhythm Association. The AF ADVANCE programme has worked to 'Detect' targets focussed on AF diagnosis and 'Protect' targets for anticoagulation, specifically by March 2019 to:

- Increase AF diagnosis by 10%
- Increase anticoagulation to 89%

2.6 Guidance and Policy

The NICE Clinical Guideline CG180 for AF was published in 2014[30], and a refresh commenced in September 2017 although the updated version has not been released to date. In the 2014 version the CHA_2DS_2-VASc tool was advised for the assessment of stroke risk, replacing the prior $CHADS_2$ tool. The choice of anticoagulant medication includes warfarin (vitamin K antagonist) or the 'New oral anticoagulants' (NOACs) which include dabigatran, rivaroxaban and apixaban, sometimes referred to as 'direct oral anticoagulants' DOACs).

Derbyshire Joint Area Prescribing Committee have a policy for the Management of non-valvular atrial fibrillation[31], most recently updated in November 2018. This provides guidance for prescribers on identifying and managing AF patients for non-vitamin K antagonist oral anticoagulants (NOACs) or warfarin.

The Stroke Association makes the following recommendations to CCGs to assist in finding the missing high-risk patients[32]:

1. Compare recorded and expected prevalence across the CCG to estimate the total number of people with undiagnosed AF.
2. Examine the level of variation in detection rates between practices.
3. Explore and share approaches being used by practices that are more successful in detecting AF.

[29] Public Health England (September 2017). Action plan for cardiovascular disease prevention, 2017 to 2018. Available at: https://www.gov.uk/government/publications/cardiovascular-disease-prevention-action-plan
[30] NICE CG180 available at: https://www.nice.org.uk/guidance/cg180
[31] Medicines Management Policy Document http://www.derbyshiremedicinesmanagement.nhs.uk/assets/Clinical_Guidelines/Formulary_by_BNF_chapter_prescribing_guidelines/BNF_chapter_2/Atrial_fibrillation.pdf
[32] Stroke Association. AF care in England (2018) Available at: https://www.stroke.org.uk/sites/default/files/af-data_2018_england_eng_2.pdf

4. Support practices to audit and improve case finding using local solutions as developed in Bradford for example, or off the shelf tools such as GRASP-AF.

5. Add pulse checking to local enhanced service specifications where appropriate.

6. Ensure all eligible patients receive the NHS Health Check which will systematically detect abnormal pulse rhythms as part of blood pressure measurement.

7. Ensure local practices have access to quality assured ECG interpretation.

8. Explore potential for community pharmacists to offer pulse checking with diagnostic technologies such as AliveCor.

9. Ensure appropriate training in pulse checking for health care assistants.

10. Contact your local AF Academic Health Science Network lead

2.7 Local Implementation

The AF Advance Programme was delivered locally in partnership between East Midlands Clinical Network, the CCGs, and GP Practices from 2016/17 through to 2017/18.

The programme emphasised focussed engagement in GP practices for the detection of AF, care management including AF reviews, and medicine optimisation. The programme was informed by Rightcare data.

The programme activities varied within the Derbyshire CCG areas. The shared programme offer included a toolkit of resources for Primary Care staff, and the promotion of AliveCor remote testing devices for AF. This was organised in two tranches, from September 2017 to November 2017, and from October 2017 to April 2018. The take up of the AliveCor by GP Practices varied, Practices across all four CCG areas were able to access the devices, from North Derbyshire initially, for Southern Derbyshire and Hardwick, and reaching Erewash practices in 2018. Practices were offered the CHART software and the GRASP-AF software tool to allow them to analyse and report the AF data. The data can also be reviewed in less detail with RADAR software[33] which is in use locally.

Further specific activities in Southern Derbyshire included:

- The Clinical Network provided funding for medicines optimisation for AF within a 'Prescribing Quality Scheme'. This arrangement ends in March 2019.

- An AF steering group with representation from a Clinical lead, GP lead, Public Health and Medicines management coordinated the local work, taking a phased approach of identifying 10 Practices with highest prevalence compared with data on identification and diagnosis poorest performance on AF, working with them before progressing to the next 10, and facilitating conversations through a GP lead

The programme observed improvements in diagnosis and anticoagulation within some GP Practices. There were some implementation difficulties noted in rolling out the AliveCor devices with a challenge around data governance. Partners reported that they valued the practice-level information sharing and peer support, which was considered to be an effective approach. This learning will be applied when a similar approach to heart failure identification is carried out at practice level.

[33] Further information about RADAR Healthcare Software is available on their website: https://healthcare.radarsoftware.co.uk/

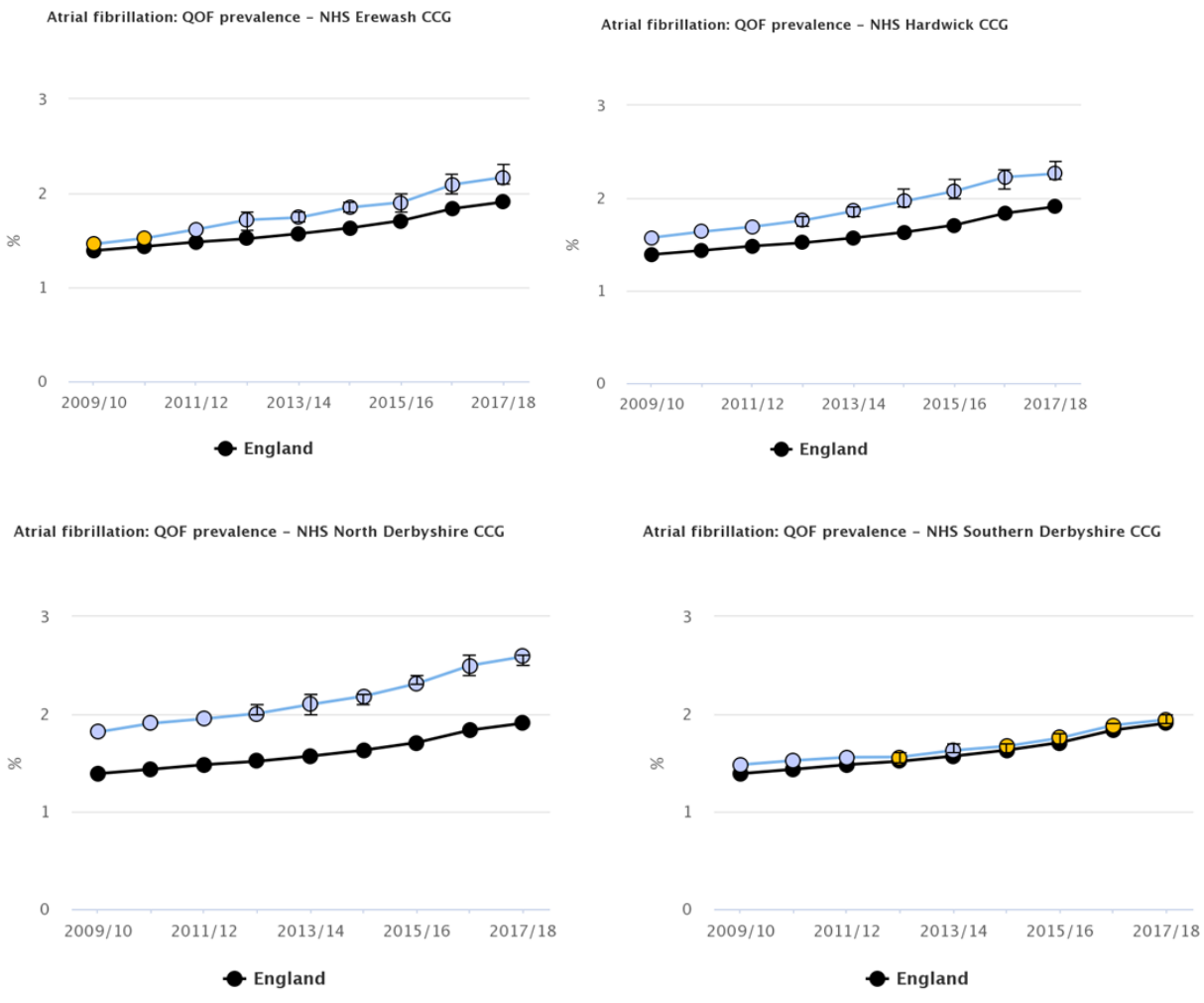
2.8 Assessment of Impact

Increasing Detection of AF

There are three ongoing strategic objectives for AF in Derbyshire:

- increasing the detection of AF
- increasing anticoagulation for cases detected
- decreasing the incidence of AF-related stroke

The local activity in Derbyshire to date has been primarily focussed at GP practice level with targeted support within practices. The trend data from Primary Care QOF data provides an indication of changes or improvements against these targets, although the direct attribution of any observed improvements at overall CCG level to specific interventions is not possible. The data to March 2019 is not yet available so it is not possible to assess Derbyshire's performance against the East Midlands AF Advance targets.



QOF-measured prevalence of AF by CCG Source: QOF

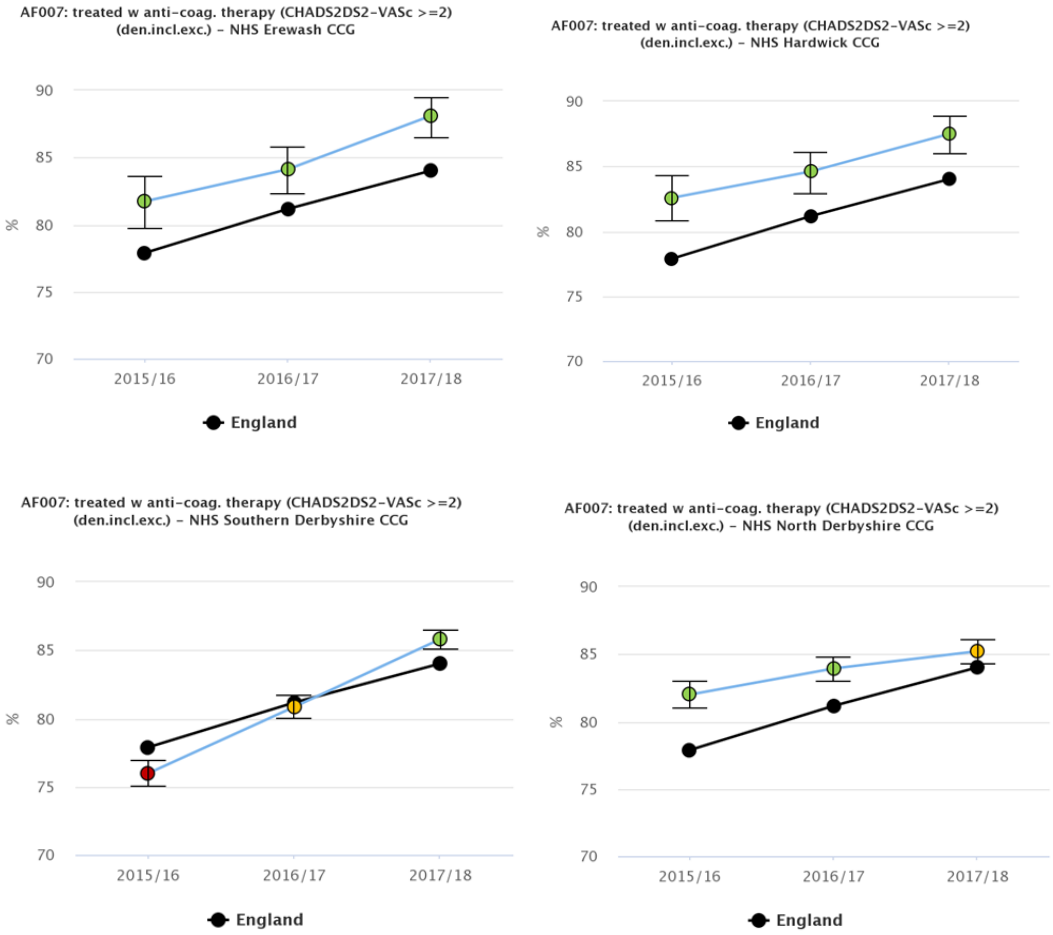
Within each CCG there remains variation between the individual GP practices. This variation will reflect both the differences in testing and diagnosis for AF between practices, and also the different population structure and case mix between practices. The estimated prevalence

figures described in the data section were calculated for individual GP practices in 2015/16, but there are no current estimates of these prevalence values so it is not possible to assess performance at practice level as an expected-observed comparison.

Increasing Anticoagulation for Cases of AF

In the data section above, data was displayed from the sentinel stroke audit (SSNAP) with indications of improvements in the proportion of AF patients prescribed AF prior to stroke in some of the Derbyshire CCG areas. This may have coincided with other changes in the national picture e.g. the use of the $CHADS_2DS_2VASC$ tool to assess stroke risk, and the widespread adoption of NOACs as alternatives to warfarin. The QOF anticoagulation trend data below shows increased proportions of eligible patients who were anticoagulated, and that this is fully aligned with the national trend.

Notably there has been a significant improvement in the anticoagulation rates in Southern Derbyshire between 2015/16 and 2017/18 with a shift in the CCG value from 76.0% to 85.5%, equating to an additional 1785 patients on anticoagulants.



Trend in % AF patients (CHADS2D2-VASc of more than 2) treated with anticoagulants by CCG Source: QOF

Decreasing the Incidence of AF-related Stroke

The trend data on AF-related stroke reported within the SSNAP audit (see data section) indicate that there has been a decrease in the proportion of strokes where patients had known prior AF, compared with all strokes in patients admitted to hospital in England, which provides evidence for a decline in the proportion of AF-related strokes within total stroke events. The

data for the Derbyshire CCGs does not indicate the same clear trend or decline: the fluctuating data may represent annual variation but may also be a reflection of the small numbers of patients.

The impact of the improvements in AF detection and care on the incidence of strokes can be estimated. Anticoagulation of high-risk AF patients averts one stroke in every 25 treated.[34] If an additional 1785 high risk patients are anticoagulated as calculated above, this could **prevent 71 strokes in Derbyshire**. There are important assumptions in this calculation and the number of AF-related strokes prevented will be fewer if the patients were lower risk, had some prior treatment, or anticoagulation was not optimised.

2.9 Conclusions and Recommendations

Several considerations and opportunities have been identified to further progress the work on AF in Derbyshire:

- To seek the perspectives of stakeholders in Derbyshire, including participants from previous AF working groups to consult on programmatic questions such as where and how local implementation has been effective, and how challenges have been overcome. This may also provide learning that could be relevant to other condition-specific work streams within Derbyshire.
- There may be possibilities to analyse data at smaller areas at Place level or within Primary Care Networks, particularly starting with the QOF data which would allow a more detailed analysis of trends and variation between areas more swiftly than examining at individual Practice level. These may also provide the geographic footprint for programmatic responses.
- To reassess progress next year in Derbyshire in relation to the East Midlands AF Advance targets and use the learning to develop further Derbyshire-wide targets.

[34] NHS England/PHE, The Size of the Prize in CVD Prevention: Derbyshire 2015/16. Available at: https://www.healthcheck.nhs.uk/commissioners_and_providers/data/size_of_the_prize_and_nhs_health_check_factsheet/

3. Ischaemic Heart Disease

3.1 What is Ischaemic Heart Disease (IHD)?

Ischemic heart disease (IHD), or coronary heart disease (CHD), occurs when the arteries of the heart cannot deliver enough oxygen-rich blood to the heart. The two terms are used interchangeably here in this chapter. It is caused by the build-up of atherosclerotic plaque inside the coronary arteries. This build-up can partially or totally block blood flow in the large arteries of the heart. The pain and discomfort related to this is called *angina*. If a piece of atheroma breaks off it may cause a blood clot to form. If this clot blocks the coronary artery and cuts off the supply of oxygen-rich blood to the heart muscles and tissues, the heart may become permanently damaged. This is known as a *myocardial infarction* or *MI*[35,36]. Acute myocardial infarction (MI) is a leading cause of hospital admissions and mortality in the UK and there are over 200,000 hospital visits each year due to heart attacks. It is estimated that around 1 million people alive in the UK today have survived a MI [37]

Heart and circulatory disease cause more than a quarter (26 per cent) of all deaths in the UK: nearly 160,000 deaths each year – an average of 435 people each day or one death every three minutes. Coronary heart disease (CHD) alone is the biggest single cause of death in the UK [38].In addition to being a major cause of premature and preventable death, coronary heart disease is also an important cause of disabling ill health for many.

3.2 The Impact of IHD in Derbyshire

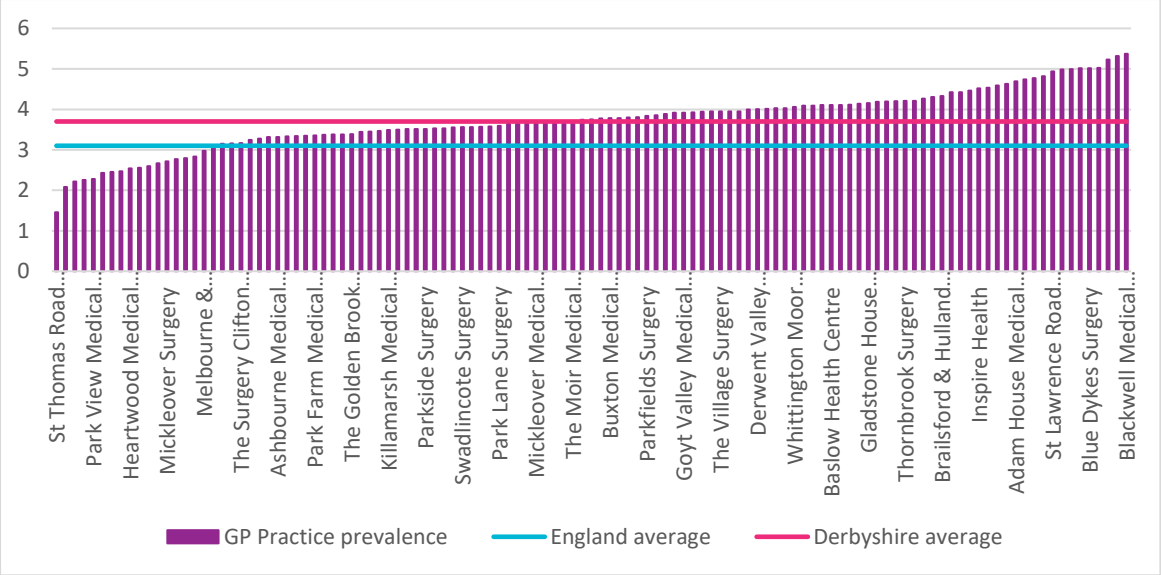
Prevalence

The England-wide prevalence of CHD is 3.1%. Three out of four Derbyshire CCGs have a higher CHD prevalence than the England average, with only Erewash CCG having lower rates. The mean CHD prevalence rate for GP Practices in the Derbyshire STP area is 3.7% (± 0.7%), this is 0.6% higher than the England average of 3.1%. 99/115 GP Practices in Derbyshire have a prevalence above the England average, and 60 GP Practices have levels above the Derbyshire STP average.

CHD Prevalence by CCG and by GP Practice

	% Prevalence
NHS Erewash CCG	2.3
NHS Hardwick CCG	3.1
NHS North Derbyshire CCG	3.6
NHS Southern Derbyshire CCG	4.3
England	3.1

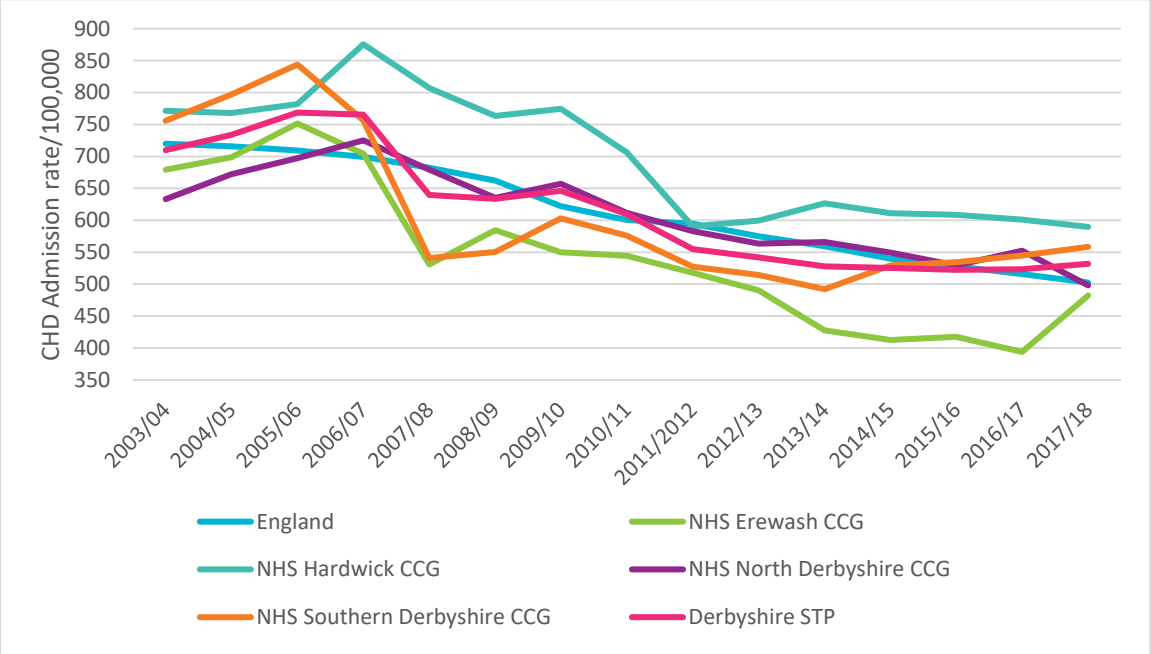
[35] https://www.nhlbi.nih.gov/health-topics/ischemic-heart-disease
[36] British Heart Foundation https://www.bhf.org.uk/informationsupport/conditions/coronary-heart-disease
[37] Moran et al, 2014. Variations in ischemic heart disease burden by age, country, and income: the Global Burden of Diseases, Injuries and Risk Factors, 2010 data. Glob Heart 2014 Mar;9(1):91-9
[38] Khamis et al, 2016 Gender Differences in Coronary Heart Disease Online: https://heart.bmj.com/content/102/14/1142



Source: Fingertips (2017/18)

Admissions Rates

Despite an overall decline in rates in recent years, ischaemic heart disease remains an important cause of hospital admissions nationwide and in Derbyshire. Between 2003/04 and 2017/18 there was a decline in the rate of CHD admissions in England, from 719.9 to 502.4 per 100,000 population. There has been a similar decline observed across the Derbyshire STP area with an average CHD admission rate of 710/100,000 in 2003/04 reducing to 532/100,000 population in 2017/18. This decline has been less marked than it has been nationwide however, meaning that ***average admission rates for heart disease are now higher in Derbyshire than the national average.***



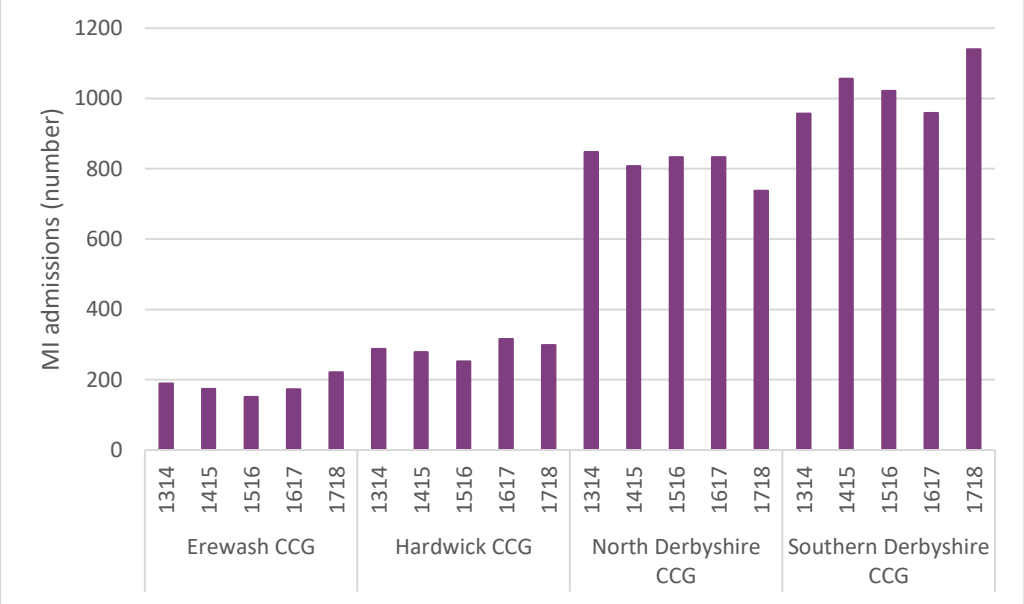
CHD Admission rates in England, the four Derbyshire CCGs and the STP region; Trend.

Source: PHE Fingertips (2017/18)

Number of Hospital Admissions

Myocardial infarction

Between 2013/14 and 2017/18 there were a total of 11,536 hospital admissions for myocardial infarction for Derbyshire CCG registered patients. Whilst there was an increase in the total number of per year hospital admissions for MI between 2013/14 and 2017/18 by 116, there was a greater increase in the number of *emergency* admissions of 236 between 2013/14 and 2017/18. This increase in emergency admissions seems to be partly tempered by the reduction in transfers in for MI over the same time period. The biggest increase by number in emergency admissions was in Southern Derbyshire CCG (189 extra admissions in 2017/18 compared with 2013/14). It is worth noting however that Southern Derbyshire also has the biggest population of the four CCGs.



MI admissions by year and CCG. Source: HES 2019

CCG/Year	Emergency	Elective	Transfers	Other	Grand Total
Erewash CCG	**863**	**10**	**35**	**0**	**908**
2013/14	181		8		189
2014/15	163	1	10		174
2015/16	143	1	7	0	151
2016/17	160	7	6		173
2017/18	216	1	4		221
Hardwick CCG	**1222**	**13**	**198**	**1**	**1434**
2013/14	231	1	56		288
2014/15	223	2	54		279
2015/16	223	6	23		252
2016/17	276	3	37		316
2017/18	269	1	28	1	299
North Derbyshire CCG	**3383**	**30**	**646**	**1**	**4060**
2013/14	682	2	164		848

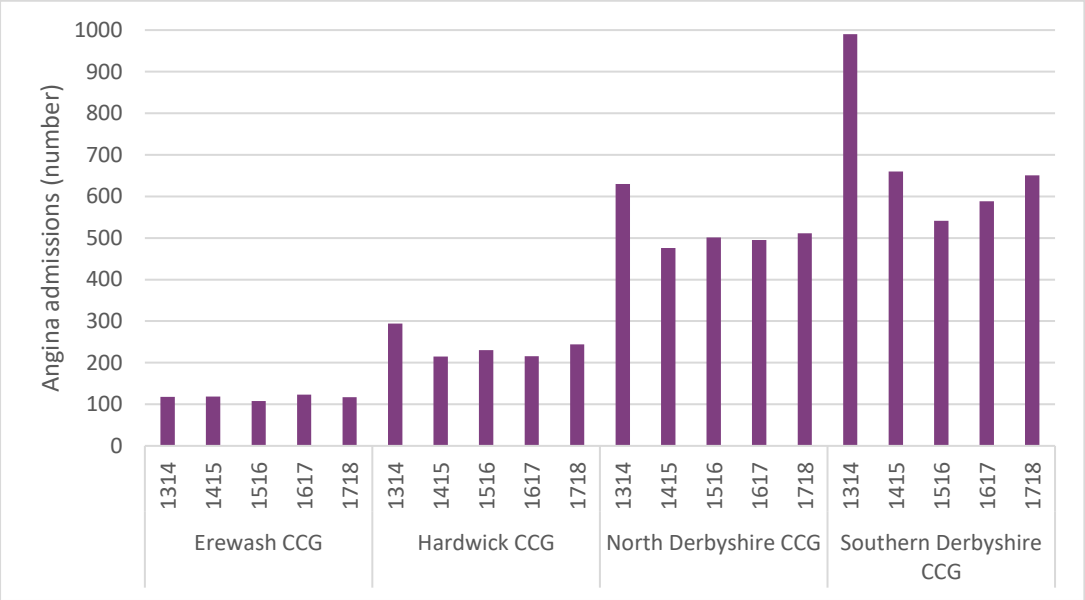
2014/15	642	12	154		808
2015/16	700	5	127	1	833
2016/17	703	9	121		833
2017/18	656	2	80		738
Southern Derbyshire CCG	**4955**	**31**	**141**	**7**	**5134**
2013/14	914	12	30	1	957
2014/15	1017	10	25	4	1056
2015/16	977	5	38	2	1022
2016/17	944	1	14		959
2017/18	1103	3	34		1140
Grand Total	10423	84	1020	9	11536

MI Admissions by type and CCG. Source: HES (2019)

Angina:

In a pooled analysis of hospital episode statistics (HES) data from 2013/14 to 2017/18 there were 8,388 admissions for angina (not MI, which is coded separately) as a primary diagnosis in Derbyshire. Between 2013/14 and 2016/17 there was a year on year decline in the number of hospital admissions for angina from 2,220 to 1,493. In 2017/18 there was then an increase in number again to 1,620 admissions.

There was a decline in total hospital admissions across all 4 CCG areas in Derbyshire by 509 admissions between 2013/14 and 2017/18. The number of emergency admissions for angina has also decreased however this decrease is smaller in magnitude than the total overall reduction due to the reduction in transfers into the region between 2013/14 and 2017/18. Southern Derbyshire CCG and North Derbyshire CCG saw the greatest reductions in number of emergency admissions, with 288 and 105 admissions respectively.



Hospital Admissions for Angina, HES data (2019)

	Emergency	Elective	Transfers	Other	Grand Total
Erewash CCG	**531**	**54**			**585**
2013/14	113	5			118
2014/15	105	14			119
2015/16	90	18			108
2016/17	113	10			123
2017/18	110	7			117
Hardwick CCG	**1082**	**110**	**7**		**1199**
2013/14	265	24	5		294
2014/15	186	28	1		215
2015/16	217	13			230
2016/17	200	16			216
2017/18	214	29	1		244
North Derbyshire CCG	**2341**	**230**	**40**	**2**	**2613**
2013/14	558	64	8		630
2014/15	410	51	13	2	476
2015/16	467	25	9		501
2016/17	453	36	6		495
2017/18	453	54	4		511
Southern Derbyshire CCG	**3227**	**181**	**19**	**3**	**3430**
2013/14	908	77	4	1	990
2014/15	621	37	2		660
2015/16	515	21	3	2	541
2016/17	563	24	1		588
2017/18	620	22	9		651
Grand Total	7181	575	66	5	7827

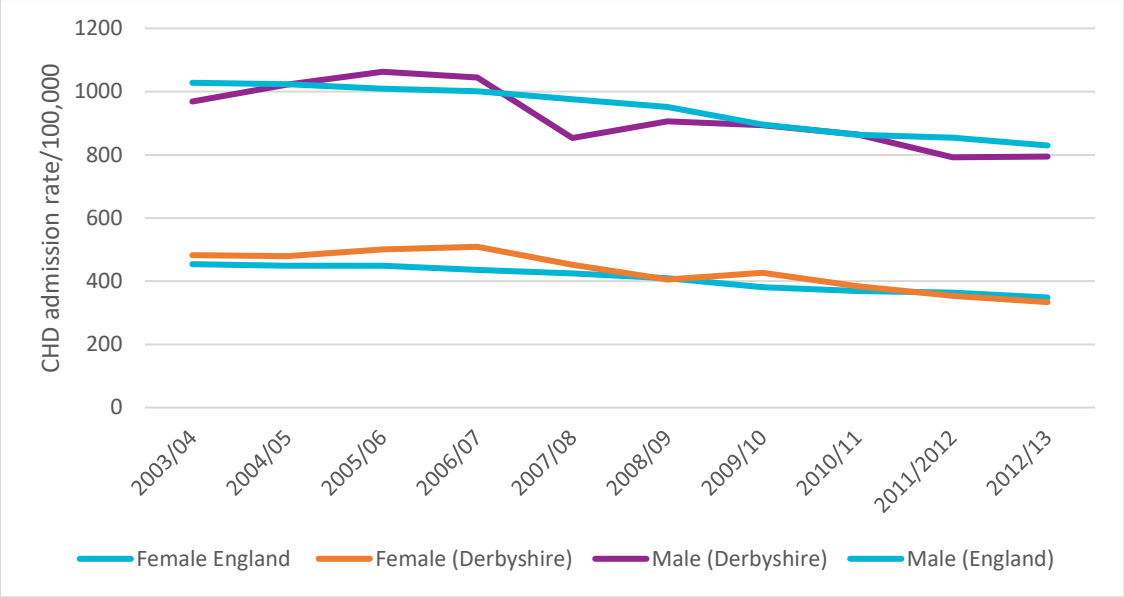
Hospital Admissions for Angina. Source: HES (2019)

3.3 Risk factors for IHD

Age and Sex

The risk of developing coronary heart disease in the UK increases with age, as does the risk of mortality from heart disease. Before the age of 60-65, the risk of CHD is higher in men than in women.

As in the rest of the UK there is a clear difference in the rate of CHD admissions between men and women in Derbyshire with consistently higher rates of admissions for men than women: 794.4/100,000 population compared to 333.7/100,000 population respectively, in 2012/13. There was a decline in CHD admission rates for both men and women of 174.3 and 148.4/100,000 population between 2003/04 and 2012/13.



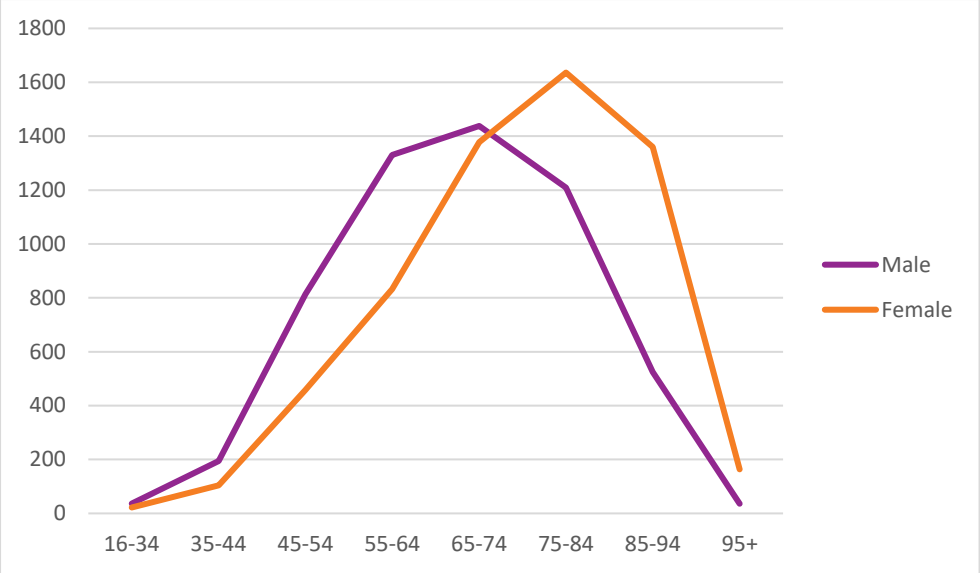
Source: PHE Fingertips

In Derbyshire both men and women have seen an increase in the number of MI admissions however the rate of increase was greater for women than for men.

Year	Male	Female	Total
2013/14	1110	1172	2282
2014/15	1117	1200	2317
2015/16	1090	1168	2258
2016/17	1113	1168	2281
2017/18	1152	1246	2398
Grand Total	5582	5954	11536

Number of hospital admissions for MI by sex. Source: HES (2019)

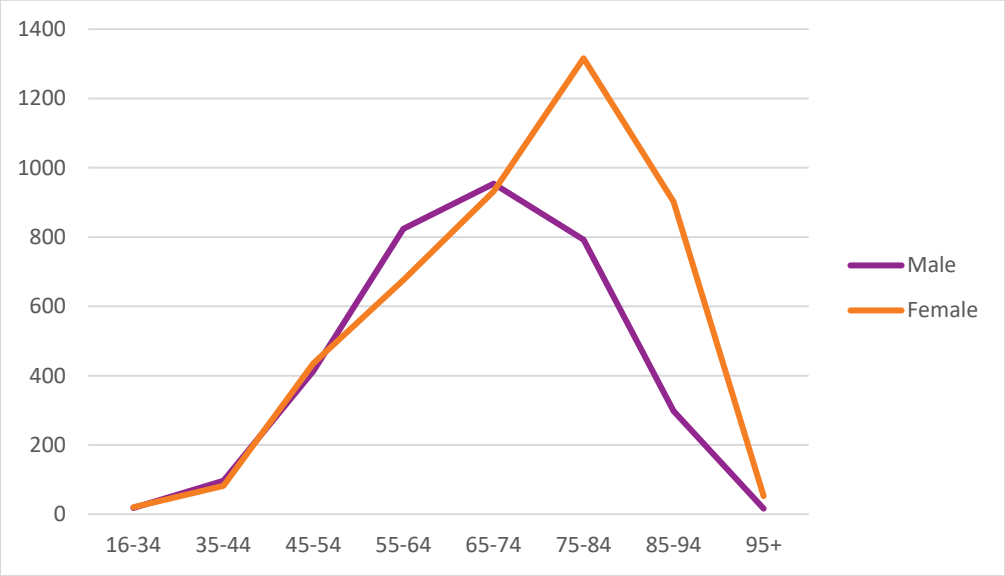
Men in Derbyshire are more likely to experience an MI episode at a younger age than women. Myocardial infarction is most prevalent in men between the ages of 65-74 years. In contrast, women are most likely to experience a MI between the ages of 75-84 years.



	16-34	35-54	45-54	55-64	65-74	75-84	85-94	95+
Male	37	194	813	1330	1438	1209	525	36
Female	22	104	458	832	1378	1636	1360	164
Grand total	59	59	298	2162	2816	2845	1885	200

Hospital Admissions for MI by age and sex. Source: HES (2019)

Interestingly, women registered with Derbyshire CCGs are more likely to be admitted to hospital with angina and are more likely to experience an admission at a later age than their male counterparts.

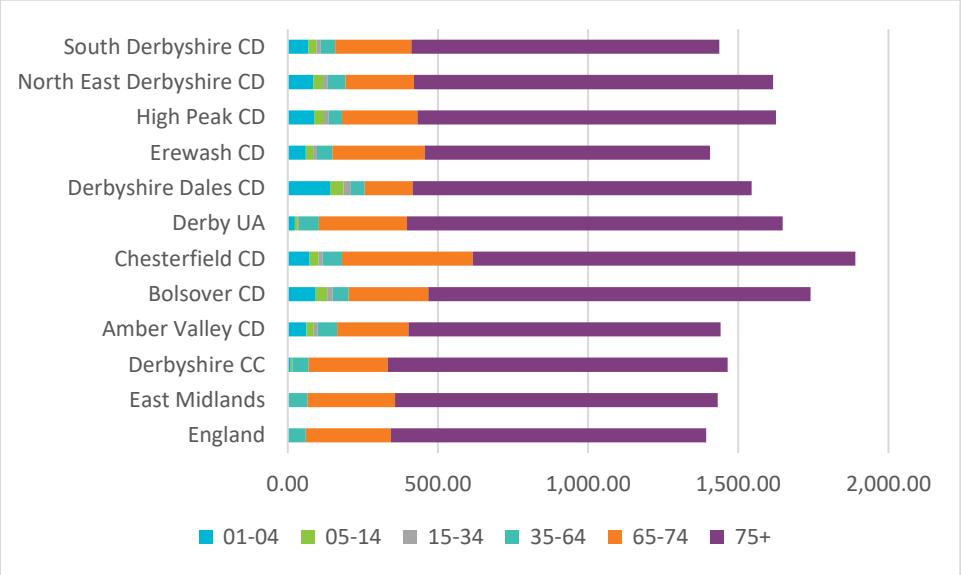


	16-34	35-44	45-54	55-64	65-74	75-84	85-94	95+
Male	18	96	413	824	954	792	298	16
Female	20	82	436	676	932	1316	902	52
Grand total	38	178	849	1500	1886	2108	1200	68

Hospital Admissions for Angina by Age and Sex. Source: HES (2019)

Trends in CHD mortality in Derbyshire are broadly in line with the picture across England: risk of CHD mortality increases with age. Analysis from 3–year pooled CHD Mortality data suggests that crude mortality rates in Derbyshire amongst males aged 65-74 years are lower than the national average, **263.4** in Derbyshire compared to **283/**100,000 population in England. There are however some outliers, the CHD mortality rates for males in Chesterfield and Erewash aged 65-74 years were higher than the England average at **435**/100,000 population and **307**/100,000 population respectively.

The mortality rates from CHD for males aged over 75 years in Derbyshire is higher than the England average 1,132/100,000 population in Derbyshire compared to 1,049/100,000 population in England. In Bolsover, Chesterfield and Derby the mortality rate is higher than the Derbyshire average.



CHD Crude Mortality by age band per 100,000 population (Source NHS Digital)

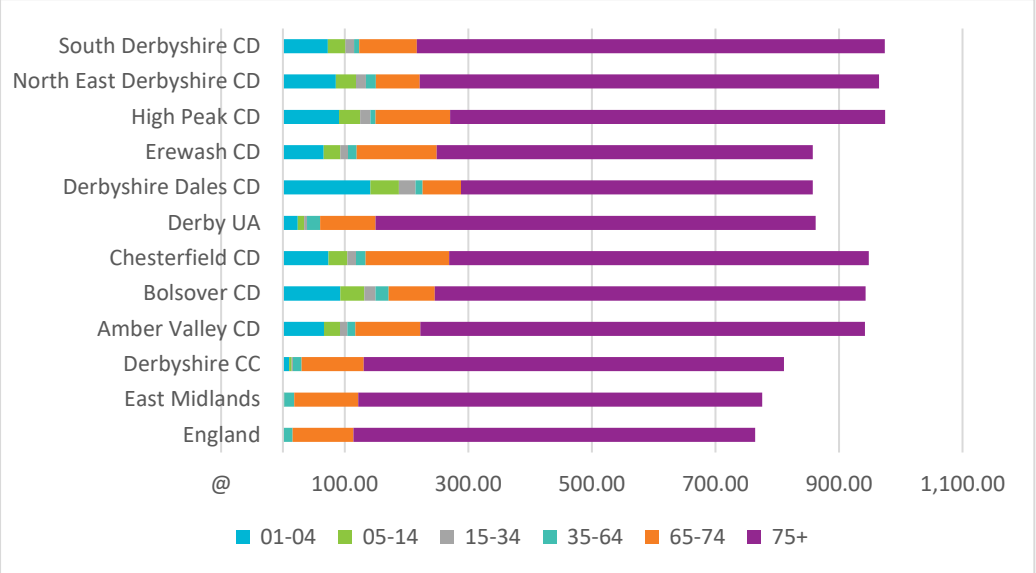
Organisation Name	01-04	05-14	15-34	35-64	65-74	75+
England	0.12	0.05	1.13	58.92	283.01	1,049.36
East Midlands	1.45	0.60	1.38	61.67	292.57	1,073.76
Derbyshire CC	9.79	3.81	1.91	53.55	263.44	1,132.35
Amber Valley CD	62.07	24.38	12.55	65.41	237.79	1,038.78
Bolsover CD	93.28	38.17	17.94	53.11	265.15	1,272.73
Chesterfield CD	72.62	30.11	13.52	63.87	435.54	1,273.89
Derby UA	23.50	9.80	4.53	65.55	293.49	1,250.51
Derbyshire Dales CD	140.85	44.88	24.58	45.43	159.74	1,129.11
Erewash CD	59.56	25.13	12.65	51.25	307.35	950.21
High Peak CD	88.03	32.51	16.13	44.04	251.41	1,192.95
North East Derbyshire CD	85.32	31.66	15.99	59.12	227.85	1,195.65
South Derbyshire CD	68.45	26.80	14.37	48.59	253.24	1,024.81

Source: NHS Digital (2019)

Women aged 35 and over in Derbyshire are far less likely to die from CHD than their male counterparts. Mortality in females is similar to the England average from 35-64 years (Derbyshire 14.37/100,000 population, England 15.30/100,000 population) and 65-74 years (Derbyshire 98.37/100,000 population, England 100.09/100,000 population).

There are however notable outliers in female CHD mortality, with **Chesterfield** (135/100,000 population), **Erewash** (129/100,000 population) and **High Peak** (120/100,000 population) experiencing much higher CHD mortality rates than the rest of Derbyshire.

In women aged over 75 years CHD mortality is higher than the England and Derbyshire average in 6 of the 9 districts. Derbyshire Dales (569.4/100,000 population) and Erewash 608.74/100,000 population) have significantly lower CHD Mortality rates than the rest of the county. The CHD mortality rates are highest in North East Derbyshire (743.71/100,000 population) and South Derbyshire (757.27/100,000 population).



Organisation Name	01-04	05-14	15-34	35-64	65-74	75+
England	0.12	0.05	0.21	15.30	98.34	650.18
East Midlands	1.52	0.63	0.28	15.95	103.72	653.92
Derbyshire CC	10.20	3.98	1.93	14.37	100.09	680.27
Amber Valley CD	66.53	25.77	12.22	12.86	104.93	719.98
Bolsover CD	92.76	39.17	18.20	21.14	74.43	697.47
Chesterfield CD	73.75	30.71	13.82	15.71	135.28	679.27
Derby UA	23.82	10.46	4.76	21.49	89.34	712.25
Derbyshire Dales CD	141.64	46.00	27.29	11.03	62.31	569.40
Erewash CD	66.14	26.83	12.34	14.27	129.53	608.74
High Peak CD	90.91	33.97	16.60	8.64	120.48	703.96
North East Derbyshire CD	85.69	32.45	16.26	16.17	70.84	743.71
South Derbyshire CD	72.52	28.53	14.28	7.91	93.72	757.27

Source: NHS Digital (2019)

Crude mortality rates as reported above use number of deaths attributed to heart disease as their numerator and the population estimate (according to census data) as the denominator. However, this measure does not take into account the age structure of the population in question. Directly standardised mortality rates on the other hand, do take into account this variable and when applied to Derbyshire data, still show higher rates than the England Average, though the difference is less marked than when comparing crude rates as indicated by the confidence intervals:

	England Directly Standardised Mortality Rate per 100,000 pop (95% CI)	Derbyshire Directly Standardised Mortality Rate per 100,000 pop (95% CI)
Men	**153.77** (152.80-154.74)	**156.96** (149.27-164.93)
Women	**70.34** (69.79-70.89)	**72.75** (68.41-77.30)
All	**107.12** (106.60-107.64)	**109.74** (105.64-113.98)

Smoking

The link between smoking and CHD risk has long been established [39] and is a modifiable lifestyle factor that can reduce CHD risk. In a recent study Schnohr et al. (2015) ranked smoking as the greatest risk factor for women (≥15 g tobacco/day vs. never smoker, HR 1.74), and fifth highest for men (≥15 g tobacco per day, HR 1.91)[40].

Similarly, in a pooled analysis of CHD risk in all age groups over 40 years and amongst both men and women, where smoking was present, this was the main cause of CHD, the greatest risk being in those aged 40-49yrs with 81% of CHD cases attributed to smoking[41].

Stopping smoking also acts as a protective factor against CHD risk. A Cochrane review estimated that there was a 36% reduction in crude relative risk of mortality for those with CHD who quit smoking compare to those who continued to smoke. There was also a reduction in non-fatal myocardial infarctions[42].

Physical activity

The 2002 World Health Report estimated that over 20% of CHD in developed countries was due to physical inactivity[43]. Physical activity has also been seen to act as a protective factor against CHD, the Cardiovascular Health Study followed the patient journey of 5,201 males and females aged over 65yrs over a 10 year period. It was noted that low level frequent physical activity reduced overall CHD risk by 36%[44].

Obesity

Obesity is an independent risk factor for the development and progression of coronary heart disease (CHD) in addition to being associated with other risk factors of CHD including

[39] Wilhelmsson et al, 1975 Smoking and myocardial infarction. Lancet 1975;1(7904):415–20
[40] Schnohr et al, 2015 Ranking of psychological and traditional risk factors in coronary heart disease; the Copenhagen City Heart study. European Heart Journal 36, 1385–1393
[41] Tolstrup et al, 2014 'Smoking and the risk of Coronary Heart Disease in Adults' Am J Public Health. 2014 Jan;104(1):96-102
[42] Critchley 2003, Smoking Cessation for the secondary Prevention of Coronary Heart Disease, Cochrane Library, 2003 Issue 4
[43] Guilbert JJ; The world health report 2002 - reducing risks, promoting healthy life. Educ Health (Abingdon). 2003 Jul16(2):230.
[44] Soares-Miranda et al, 2016, Physical Activity and Risk of Coronary Heart Disease and Stroke in Older Adults: The Cardiovascular Health StudyCirculation. 2016 Jan 12; 133(2): 147–155.

hypertension, dyslipidaemias and Type 2 diabetes[45]. When controlling for other known risk factors, CHD is most strongly associated with fatal as opposed to non-fatal CHD events[46].

It has also been noted that CHD risk is significantly reduced in patients who undertook weight management support and predicted lower incidence of CHD over 4 years[47].

Family history

A positive family history of CHD is directly associated with elevated CHD risk. The Reykjavik Cohort Study followed a total of 9,328 males and 10,062 females, aged 33–81 years, between the periods of 1967 to 1996 in a prospective cohort study. Family history of myocardial infarction was thought to contribute to 15.1% of all cases of coronary heart disease in men and 16.6% in women, independent of other known risk factors. A positive family history in the whole cohort was associated with about a 75% increase of risk in men and an 84% increase in women[48].

Ethnicity

The Health Survey for England (2004) assessed the prevalence of CHD across a number of different ethnic groups. Prevalence was 17% higher amongst Pakistani males than in the general population, and in women was most prevalent in people of Indian decent, whose prevalence was 4% higher than the general population[49].

	% Prevalence Male			
	16-34	35-54	55+	all ages
Black Caribbean		2	13	4
Black African	0		5	1
Indian		3	24	6
Pakistani		8	35	8
Bangladeshi		6	17	4
Chinese		1	7	2
Irish	0	3	12	6
General population		2	18	6

[45] Ades et al, 2017 'Obesity in Coronary Heart Disease: An Unaddressed Behavioural Risk Factor' Prev Med. 2017 November ; 104: 117–119

[46] Logue et al, 2011 'Obesity is associated with fatal coronary heart disease independently of traditional risk factors and deprivation' BMJ Heart vol 97 Issue 7

[47] Ailet-Adar S 2005 Association of intentional changes in body weight with coronary heart disease event rates in overweight subjects who have an additional coronary risk factor. Am J Epidemiology Feb 15;161(4):352-8.

[48] Andresdottir et al 2002, '15% of myocardial infarctions explained by family history…The Reykjavik Cohort Study' Euro Heart Journal 23, 1655–1663

[49] NHS Health Survey for England, 2004. Online: https://files.digital.nhs.uk/publicationimport/pub01xxx/pub01170/hea-surv-ethn-min-eng-2004-rep-v3.pdf

	% Prevalence Female			
	16-34	35-54	55+	all ages
Black Caribbean	0	2	6	2
Black African	0	1		1
Indian		2	15	3
Pakistani	1	2	14	3
Bangladeshi		3	13	2
Chinese		0	8	1
Irish		1	7	3
General population	0	1	11	4

Source: Health Survey for England (2004)

3.4 Management of Ischaemic Heart Disease

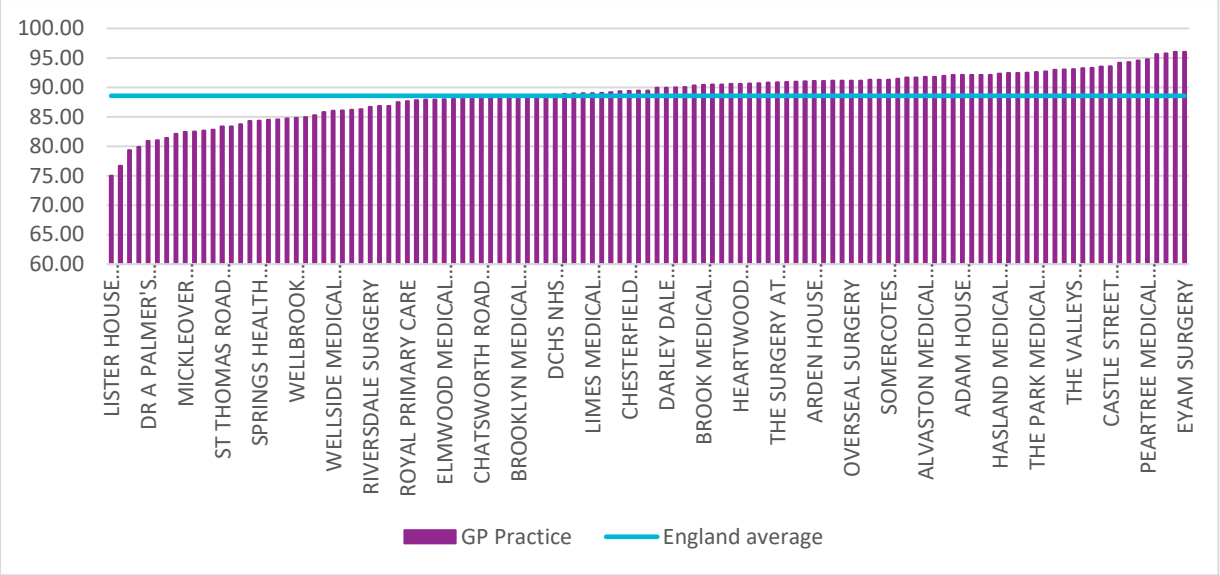
Stable Angina

NICE guidance on managing stable angina (updated February 2019)[50] states that patients should be given information and advice on managing angina, including managing exacerbating factors. Practitioners should assess the person's need for lifestyle advice (for example about exercise, stopping smoking, diet and weight control) and psychological support, and offer interventions as necessary. Adequate control of blood pressure is an important part of secondary prevention in CHD. Accordingly, QOF (The Quality outcomes Framework) has recommendations for BP targets.

The *'mean percentage of patients with CHD in whom the last BP reading is 150/90mmHg or less'* for GP Practices in Derbyshire is 88.91% (±4.1%) this is consistent with the England average of 88.56%. 50 GP Practices were below the Derbyshire average.

GP Practices in Derbyshire on average had an exception reporting rate of 2.1% (± 1.8%) there were some outliers with an exception reporting above 10%. Exception reporting is undertaken for various reasons, but larger than average exception reporting rates can indicate difficulties engaging with/accessing some of the patient population. Often rates are higher in practices in areas of higher socioeconomic deprivation, or large numbers of patients from hard-to-reach groups. It is important to keep this fact in mind and to ensure that it doesn't result in widening inequalities in these populations.

[50] NICE, 2011. CG126 Stable Angina Management. Online: https://www.nice.org.uk/guidance/cg126

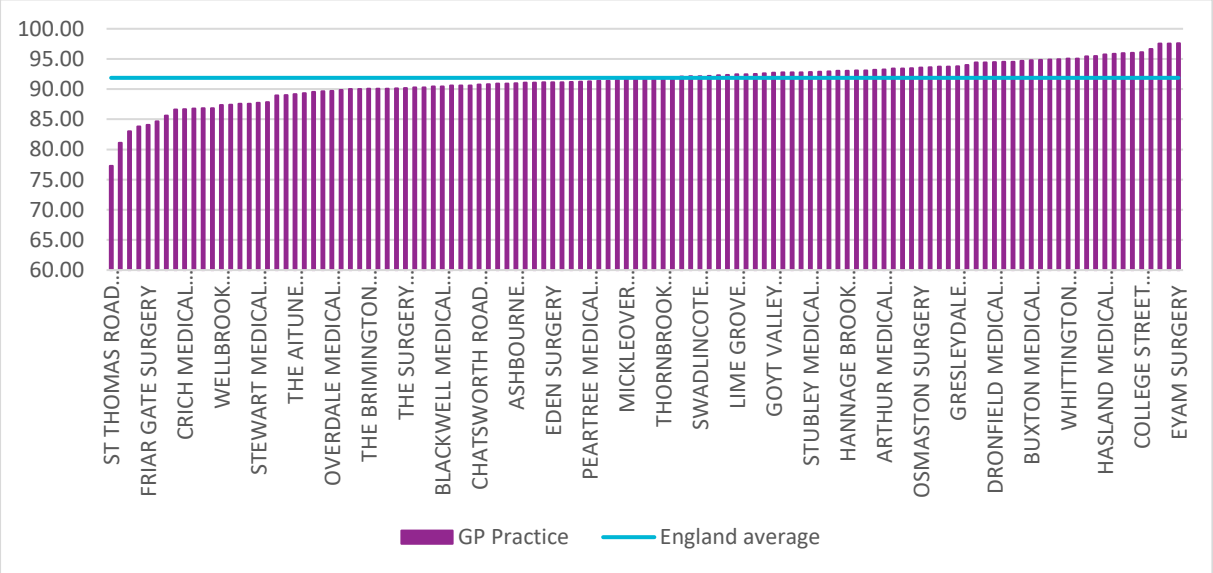


Source: QOF (2019)

In terms of drug treatment for stable angina NICE guidance recommends offering a short-acting nitrate for preventing and treating episodes of angina.

For the purposes of secondary prevention in CVD, NICE recommend aspirin 75 mg daily for people with stable angina. The mean proportion of CHD patients receiving either aspirin, an alternative anti-platelet therapy, or an anti-coagulant according to QOF (2017/18) by Derbyshire GP Practices is 91.43% (±3.4%), slightly below the England average of 91.87%. There are currently 62 GP Practices in Derbyshire below the Derbyshire average.

The mean exception reporting rate for GP Practices in Derbyshire was 5% (± 2.7%).



Source: QOF (2019)

For patients with satisfactorily controlled stable angina whose but coronary angiography indicates left main stem disease or proximal three-vessel disease. NICE recommends considering coronary artery bypass grafting.

NICE also suggests consideration of revascularisation procedures (CABG or PCI) for people with stable angina whose symptoms are not satisfactorily controlled with optimal medical treatment. However, this treatment strategy should be guided by coronary angiography. Ensure that there is a regular multidisciplinary team meeting to discuss the risks and benefits of continuing drug treatment or revascularisation strategy (CABG or PCI) for people with stable angina. The team should include cardiac surgeons and interventional cardiologists. Provision of these services across Derbyshire varies by geography, for example with patients in the north of the region often undergoing inpatient revascularisation procedures at hospitals outside the region such as in Sheffield and Manchester. Within the Derbyshire region, most of these procedures are done at University Hospitals of Derby and Burton.

In total there were 1,418 inpatient procedures undertaken in 2018/19 of which 47% of undertaken at University Hospitals of Derby and Burton with a further 18% at Chesterfield Royal Hospital and 35% being undertaken at hospitals outside of Derbyshire. This represents a significant burden on services, though the top three inpatient procedures being carried out (see below) are those generally associated with a shorter bed stay than the larger coronary artery bypass grafting operations.

Top 3 inpatient procedures carried out	Activity
Standard percutaneous transluminal coronary angioplasty with cc score 0-3	217
Percutaneous transluminal angioplasty of single blood vessel with cc score 3-5	66
Percutaneous transluminal angioplasty of multiple blood vessels with cc score 6+	56

There were 1,564 outpatient cardiac procedures undertaken for Derbyshire residents in the same period, 83% of all outpatient activity took place at Sheffield Teaching Hospital and all comprised of testing of Cardiac Pacemakers or Cardioverter Defibrillators.

Acute Myocardial Infarction

According to NICE, patients who have had an MI should be offered the following drug therapy for secondary prevention:

- ACE (angiotensin-converting enzyme)
- inhibitor dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- beta-blocker
- statin

Nice clinical guideline 'Myocardial infarction: cardiac rehabilitation and prevention of further cardiovascular disease' (2013) outlines best practice standards for cardiac rehabilitation services after a MI event:

'After an acute MI, clinicians should commence cardiac rehabilitation as soon as possible after admission and before discharge from hospital. Invite the person to a cardiac rehabilitation session which should start within 10 days of their discharge from hospital.'

There is limited data available regarding cardiac rehab across Derbyshire. Across Derbyshire over 18 weeks to April 2019 there were **321** referrals for treatment, an increase of 94 from the same time period as the year before. The sum of the activity at Chesterfield Royal Hospital in 2018/19 was 1665, at Royal Derby Hospital it was 1877.

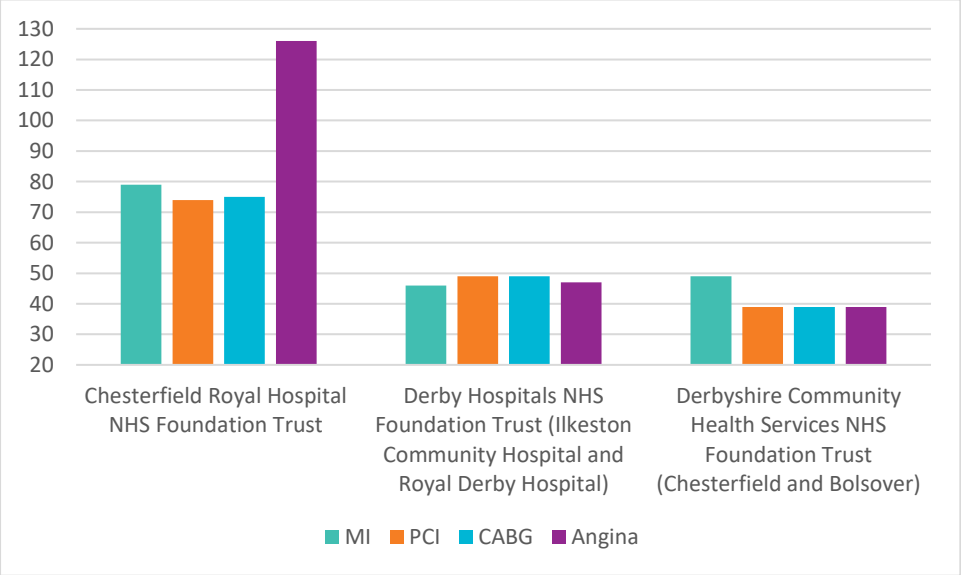
The National Audit of Cardiac Rehabilitation (2018) states that the national average wait time is 27 days for patient's post-MI/PCI (MI and/or PCI) and 40 days for CABG patients in England. There were three providers in Derbyshire community Health Service were above the England average for both MI and CABG patients.

Trust Name	MI/PCI	CABG
Chesterfield Royal Hospital NHS Foundation Trust	27	47
Derbyshire Community Health Services	34	74

Average waiting time in Days for Cardiac Rehabilitation. Source: National Audit for Cardiac Rehabilitation (2018)

The median duration of CR engagement in 2017 was 71 days, or 10 weeks and is two weeks above the BACPR minimum recommendation of eight weeks. Only Chesterfield Royal meets the BACP minimum recommended duration.

Duration of Cardiac Rehabilitation (days)



Trust Name	MI	PCI	CABG	Angina	Mean duration
Chesterfield Royal Hospital NHS Foundation Trust	79	74	75	126	88.5
Derby Hospitals NHS Foundation Trust (Ilkeston Community Hospital and Royal Derby Hospital)	46	49	49	47	47.8
Derbyshire Community Health Services NHS Foundation Trust (Chesterfield and Bolsover)	49	39	39	39	41.5

Source: National Audit for Cardiac Rehabilitation (2018)

Proportionately there are more males engaging with Cardiac Rehab in Derbyshire than females, this is consistent with the picture across England where women make up only 29% of those undergoing cardiac rehab at any one time. Though this partly reflects the

epidemiology of the condition (more men than women affected) this does not necessarily fully explain the difference, and merits further exploration.

On average males who engaged with CR are older than the England average of 56 years. Females in Derbyshire tend to match the England average age for CR engagement at 67 years.

Trust name	Mean age (Male)	%Male	Mean age (Female)	% Females
Chesterfield Royal Hospital NHS Foundation Trust	67	65.5	73	34.5
Derby Hospitals NHS Foundation Trust (Ilkeston Community Hospital and Royal Derby Hospital)	64	70.3	67	29.7
Derbyshire Community Health Services NHS Foundation Trust (Chesterfield and Bolsover)	67	73.8	69	26.2

Average age of Cardiac Rehab participants by NHS provider and sex. Source: National Audit for Cardiac Rehabilitation (2018)

According to the National Audit for Cardiac Rehabilitation (2018), 44% of patients met the recommendation of 150 minutes physical activity per week as they entered CR. This increased to 73.1% after CR completion. The mean percentage increase for England was 27.9%, in Derbyshire both Chesterfield Royal and DCHS saw significant increases in physical activity rates of 44% and 35% respectively. Derby Hospital NHS Foundation trust is a clear outlier in the data, however, this may be to do with the way that this data is collected.

	Pre	Post	Change
Derby Hospitals NHS Foundation Trust (Ilkeston Community Hospital and Royal Derby Hospital)	3%	3%	0%
Chesterfield Royal Hospital NHS Foundation Trust	34%	79%	44%
Derbyshire Community Health Services NHS Foundation Trust (Chesterfield and Bolsover)	48%	84%	35%
East Midlands	35%	53%	18%

% of patients meeting 150minute recommendation, pre- and post-rehab. Source: National Audit for Cardiac Rehabilitation (2018)

3.5 Recommendations for Practice

- Early identification of risk factors for CHD is vital for successful prevention. It is important to make use of opportunities such as NHS health checks to identify those at increased risk and manage them appropriately. Improving uptake of NHS health checks should therefore be a priority.

- Ensure lifestyle services (including physical activity, weight management and smoking cessation) are well integrated into care pathways and that primary and secondary care staff who come into contact with IHD patients are aware of them and know how to use them.

- At a wider societal level, make use of social prescribing/prescribers to generate activity towards healthier lifestyle and/or wider determinants services including exercise by referral services.

- Risk of morbidity and mortality from IHD increases with increasing age. There is therefore a potential important link to be made between IHD care pathways and commissioning physical activity services for healthy ageing. This links in with other work on frailty and falls prevention.

- Cardiac rehabilitation is important for recovery following cardiac events, however it is important to also ensure onward referral and maintenance of physical activity, weight loss, smoking cessation support when engagement with CR has ended.

- There are significant waiting times for access to cardiac rehabilitation across the region and additionally it was difficult to obtain exact data on this. Some further work to map services and demand may be useful here, particularly in the areas where CHD mortality is higher than average such as in Chesterfield and Erewash.

4. Hypercholesterolemia

4.1 Importance for cardiovascular health

Hypercholesterolemia refers to raised levels of a fatty substance known as cholesterol in the blood. This is associated with increased risk of cardiovascular disease due to its influence on the process of atherosclerosis: the formation of fatty, fibrous plaques within the arteries and blood vessels. This process is described in more detail in the introduction above (see 'What is Cardiovascular Disease?'). Consequently, total cholesterol levels are an important predictor of cardiovascular disease events, and further differentiating types of cholesterol within that reading allows further risk assessment. Types of cholesterol include high density lipoprotein (HDL) cholesterol, the so-called 'good' cholesterol because it helps to remove 'bad' cholesterol from the body. Previously, low density lipoprotein or LDL cholesterol was referred to as this 'bad' cholesterol, but now all non-HDL cholesterol is considered in this measure because it has been recognised that more types than just LDL can be harmful.

Because it is such an important predictor of cardiovascular disease, and is largely asymptomatic and therefore under-diagnosed, PHE chose to optimise detection and management of high cholesterol as one of its major CVD prevention focusses in 2018/19. Following a feasibility study, it is set to form part of a national primary care CVD prevention audit if commissioned by NHS England. There are other fatty molecules in the blood known as triglycerides which also increase risk of cardiovascular disease. Together with cholesterol, these substances are sometimes known as blood lipids, and NICE refers to their management in risk reduction as 'lipid modification'. Due to this association with cardiovascular events, lipid monitoring and modification forms an integral part of cardiovascular risk reduction strategies in many other important risk conditions, such as hypertension, diabetes and chronic kidney disease. Consequently, most data on cholesterol levels is collected in this context, and can be seen referred to in the other chapters of this needs assessment.

4.2 Detection and Diagnosis

Point of care testing can be used to obtain a total cholesterol level reading at the time of consultation, for example, as part of a health check. However, the NICE guideline on lipid modification (CG181)[51] is clear that before starting any lipid modification therapy for primary prevention of CVD, a full lipid profile must be measured including total cholesterol, HDL (high density lipoprotein) cholesterol, non-HDL cholesterol and triglycerides. Previously, cholesterol was measured as HDL and LDL, however, since the recognition that other types of cholesterol can be harmful other than just LDL, the figure now used is [total cholesterol minus - HDL cholesterol = non-HDL cholesterol]. This measure also has the advantage over directly measuring LDL because it does not require the patient to be fasted and the result is not affected by the triglyceride levels. The European guidance however still refers to 'LDL' cholesterol.

There is no specific diagnostic threshold for what cholesterol level is 'too high' since the result is interpreted in the context of an individual's risk profile and the ratio of HDL to non-HDL cholesterol. The aim is, within the total cholesterol measurement, to have higher levels of HDL cholesterol and lower levels of non-HDL cholesterol. The ratio of these values forms part of the QRISK-2 CVD risk assessment. According to the European Guidelines on Cardiovascular Disease Prevention in Clinical Practice[52] in general, total blood cholesterol level should be

[51] NICE CG181, Cardiovascular disease: risk assessment and reduction, including lipid modification, last updated September 2016, https://www.nice.org.uk/guidance/cg181

[52] Piepoli et al, 2016 European Heart Journal Advance Access published May 23, 2016

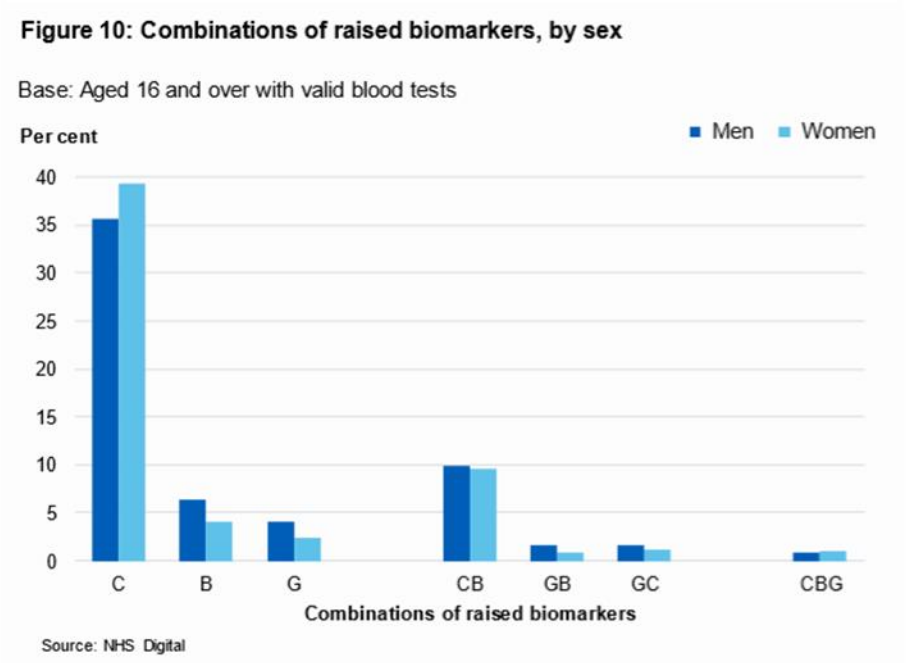
less than 5mmol/L and LDL cholesterol should be less than 3mmol/L. However, in individuals with high CVD risk, treatment goals should be lower and NICE recommends aiming for a greater than 40% reduction in non-HDL cholesterol.

Prevalence Data

The UK has some of the highest rates of hypercholesterolemia in the world, with the Department of Health estimating that around 2 out of 3 UK adults have a serum cholesterol level of ≥ 5 mmol/L. Worldwide, the average figure is estimated at 39%[53].

The Health Survey for England[54] measures raised cholesterol as one of its biomarker disease risk factors. It found the prevalence of multiple biomarkers (including glycated haemoglobin which is a marker of blood sugar control and of interest in diabetes) by sex as follows:

Figure 10: Combinations of raised biomarkers, by sex



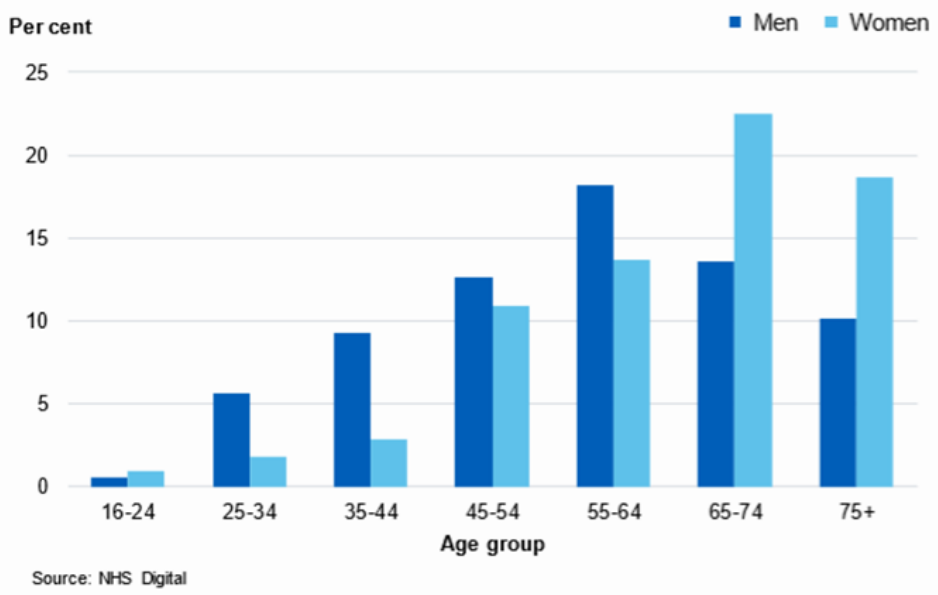
C: Raised total **C**holesterol; B: Raised **B**lood pressure; G: Raised **G**lycated haemoglobin

The prevalence of raised total cholesterol was the most commonly found risk factor in this survey by some margin. The survey also looked at the combination of raised cholesterol and raised blood pressure by age bracket:

[53] Global Health Observatory data, 2008 https://www.who.int/gho/ncd/risk_factors/cholesterol_text/en/
[54] NHS Digital, Health Survey for England 2017, Published Jan 2018

Figure 11: Prevalence of raised blood pressure and raised total cholesterol, by age and sex

Base: Aged 16 and over with valid blood tests



Source: NHS Digital

When standardised for age, the prevalence of multiple raised biomarkers were found to be similar across all regions of England, and so it is likely that these are a reasonable approximation of the Derbyshire figures for the same markers.

4.3 Management (Primary and Secondary Prevention in CVD)

The most commonly used class of lipid lowering drugs are the statins, and these can be used for either primary or secondary prevention of cardiovascular disease, as well as treatment of identified hypercholesterolemia.

Statins are often grouped into different intensity categories according to the percentage reduction in blood LDL-c they produce. NICE, in its guideline on lipid modification, groups them as follows:

- Low intensity- reduction of 20-30%
- Medium intensity- reduction of 31-40%
- High intensity- reduction of over 40%

Use in CVD prevention

Statins can be used as primary prevention by lowering HDL-c levels in patients who are judged to be at high risk of CVD as measured by an appropriate tool. For example, NICE recommends offering treatment with 20mg atorvastatin for patients with a 10yr CVD risk of 10% or greater[55]. This should be done in discussion with the patient about their personal risk profile, the relative risks and benefits of statin therapy and knowledge of their existing medication and history.

Statins can also be used for secondary prevention (to prevent further events or complications like heart attacks or strokes) in people who already have a diagnosis of cardiovascular disease. In this case, it is prescribed at a higher dose: NICE recommends atorvastatin 80mg.

[55] NICE CG181, Cardiovascular disease: risk assessment and reduction, including lipid modification, last updated September 2016, https://www.nice.org.uk/guidance/cg181

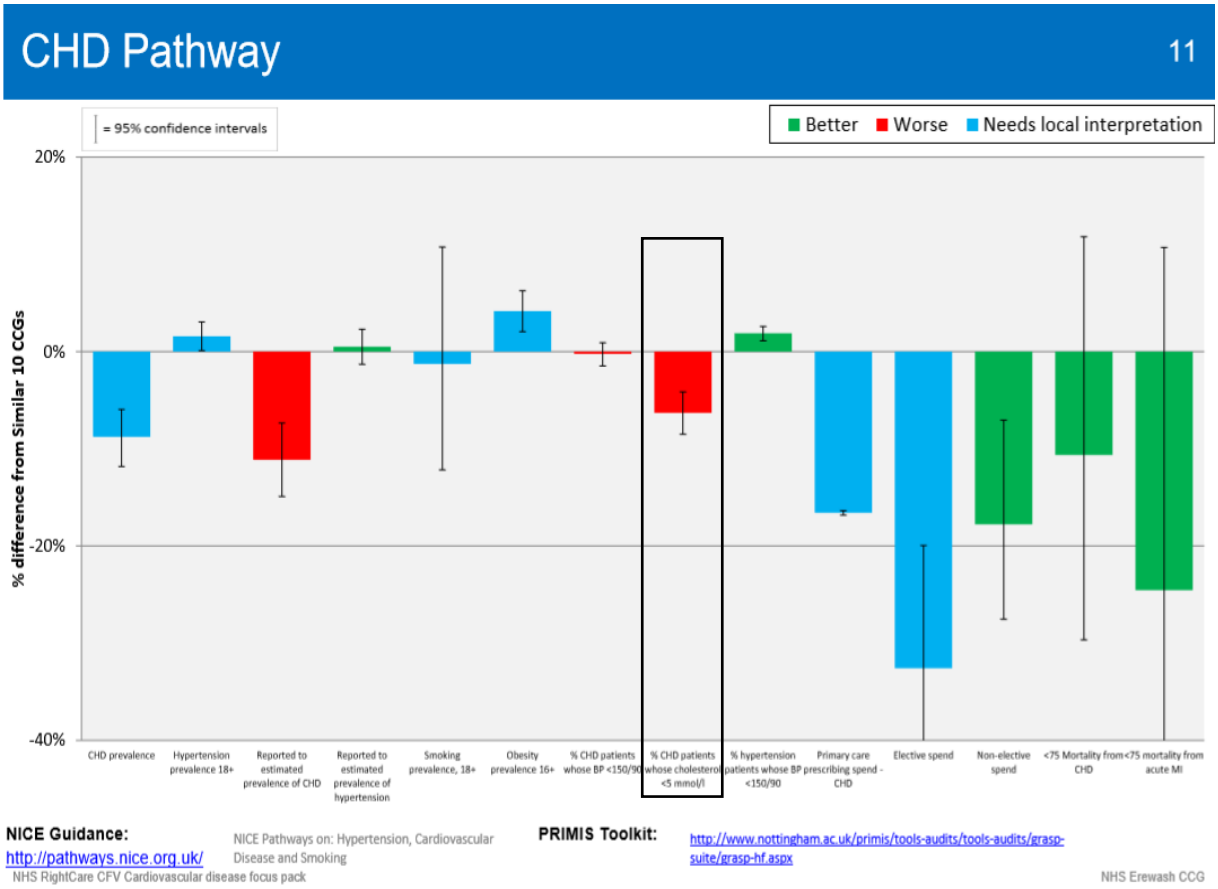
In both cases, lipid-lowering treatment should be aiming for at least a 40% reduction in non-HDL cholesterol using a high-intensity, low-acquisition cost statin such as atorvastatin.

According to EBM Datalab data from March 2019 (OpenPrescribing.net) around 103,188 people are currently being prescribed some kind of statin in the Derbyshire STP area. This number is an increase from the 90,818 prescriptions in the same month in 2014.

Derbyshire prescribing data also shows that whilst levels of prescribing of low and medium intensity statins as a percentage of all statins is decreasing, the Derbyshire STP remains on the 95th centile compared with the rest of England: with 52.4% of all statin items prescribed being low- or medium-intensity.[56]

When this data is further broken down into CCGs, it reveals that NHS South Derbyshire, North Derbyshire and Hardwick CCGs are all above the 90th centile when it comes to proportion of less effective statins prescribed as a percentage of all statins prescribed. NHS Erewash CCG is the only exception to this, with only 44% of prescriptions at low or medium intensity, which puts it on the 35th centile overall.

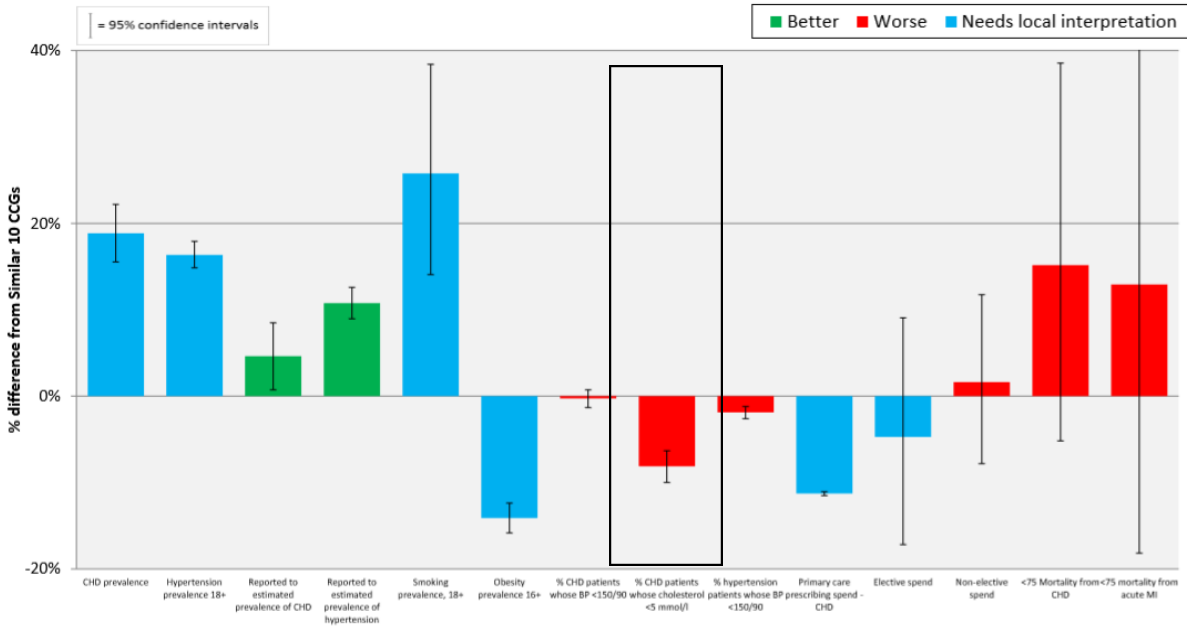
The graphs below are obtained from the NHS Rightcare Cardiovascular Disease Focus Packs and show a range of indicators for various disease pathways CCG (see bottom right of graph). The boxed value shows the % CHD patients whose documented cholesterol is less than 5mmol/L and **all Derbyshire CCGs** are red i.e. worse than average for England.



[56] Openprescribing.net March 2019 data Available online via: https://openprescribing.net/measure/statinintensity/stp/E54000012/#statinintensity

CHD Pathway

11



NICE Guidance: http://pathways.nice.org.uk/ NICE Pathways on: Hypertension, Cardiovascular Disease and Smoking

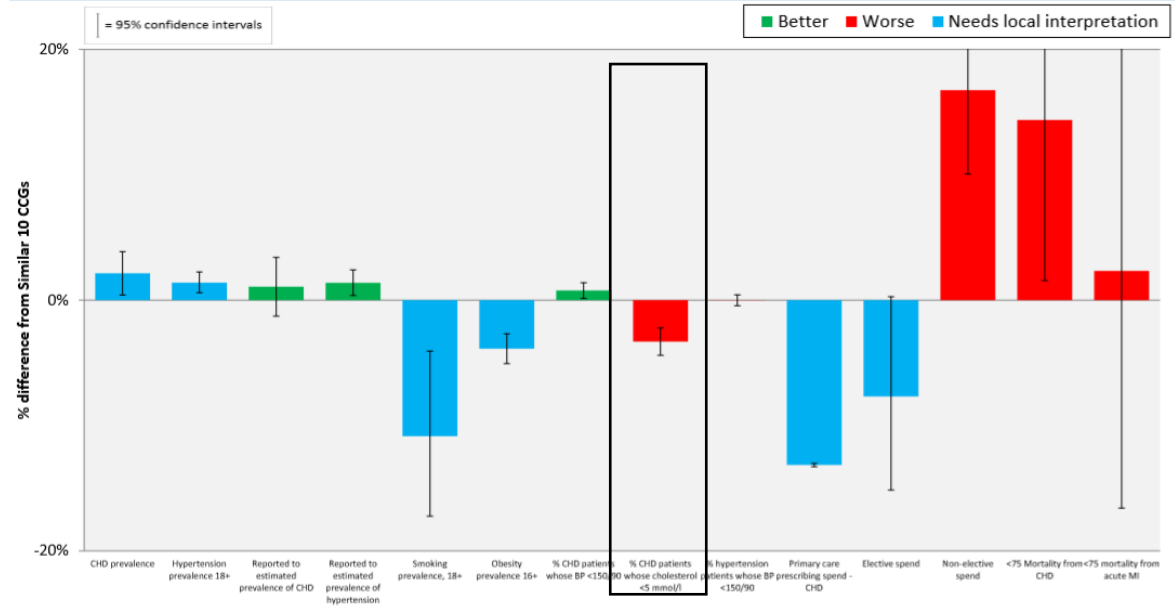
PRIMIS Toolkit: http://www.nottingham.ac.uk/primis/tools-audits/tools-audits/grasp-suite/grasp-hf.aspx

NHS RightCare CFV Cardiovascular disease focus pack

NHS Hardwick CCG

CHD Pathway

11

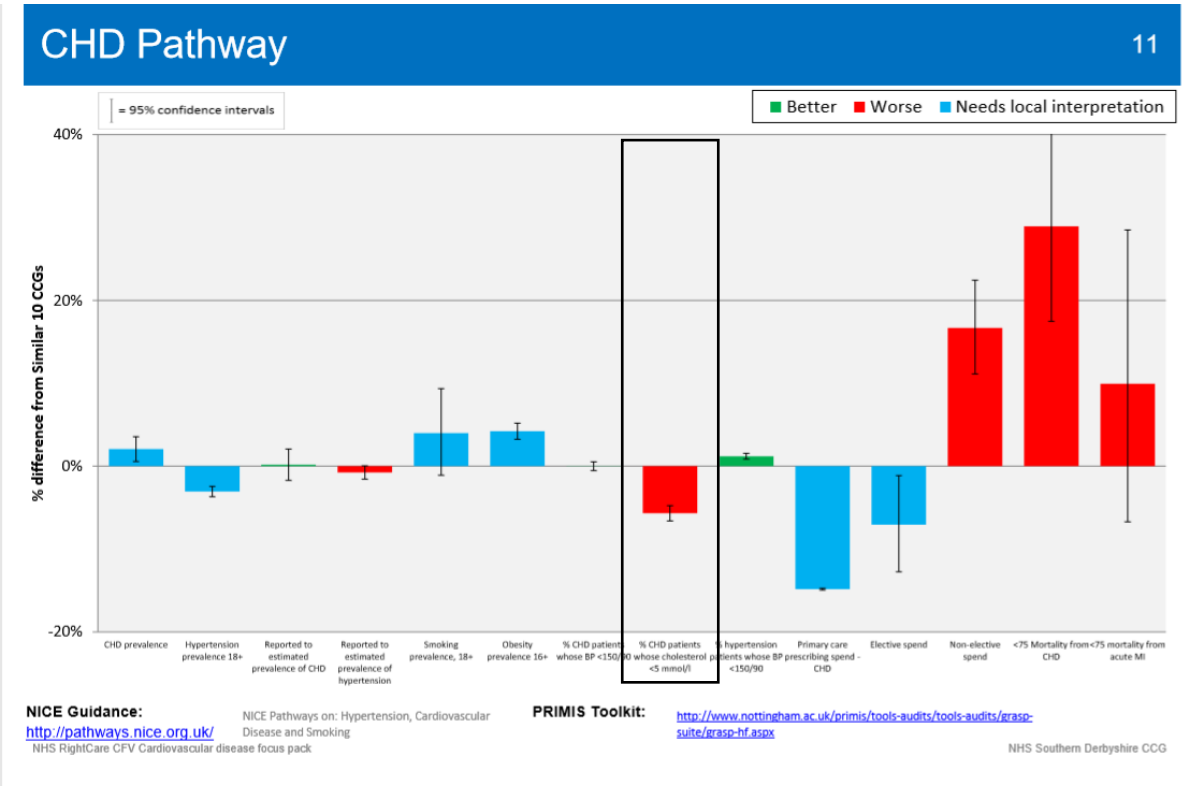


NICE Guidance: http://pathways.nice.org.uk/ NICE Pathways on: Hypertension, Cardiovascular Disease and Smoking

PRIMIS Toolkit: http://www.nottingham.ac.uk/primis/tools-audits/tools-audits/grasp-suite/grasp-hf.aspx

NHS RightCare CFV Cardiovascular disease focus pack

NHS North Derbyshire CCG



4.4 Familial Hypercholesterolemia

Familial hypercholesterolemia (FH) is a form of high cholesterol that runs in families; it is a genetic predisposition to high levels of cholesterol from birth. It affects approximately 1 in 500 people in the UK[57] however most of those who have it are undiagnosed and therefore untreated[58]. It can be treated with a statin in the same way as non-familial hypercholesterolemia, but at a higher dose.

It is important that those with familial hypercholesterolemia are identified and treated, as they are at higher risk of developing cardiovascular disease. Approximately 50% of men and 30% of women with FH will develop coronary heart disease by the age of 55. On average, 1 person a day in the UK with FH has a heart attack.[59]

NICE recommends that doctors should suspect FH in a patient if they have a personal or family history of coronary heart disease before the age of 60, and/or a total cholesterol level of greater than 7.5mmol/l. This has been taken into account in the NHS health check, which states that all patients with that high a cholesterol level should be seen by their GP. It also recommends that primary care records should be routinely searched to try to identify those at risk of FH.[60]

The Simon Broome criteria should be used to make a clinical diagnosis of FH and to assess if a patient should be referred to the FH specialist service for DNA testing. The patient's family should then also be tested. Children with a parent affected should also be tested by the age of 10 (as per NICE CG71).

[57] NHS Conditions, online: https://www.nhs.uk/conditions/high-cholesterol/causes/
[58] NHS conditions, online: https://www.nhs.uk/conditions/high-cholesterol/diagnosis/
[59] British Heart Foundation online: https://www.bhf.org.uk/informationsupport/heart-matters-magazine/medical/familial-hypercholesterolaemia
[60] NICE CG71 Familial Hypercholesterolemia 2017 Online: https://www.nice.org.uk/guidance/cg71

Box 1: Simon Broome criteria for a diagnosis of FH[61]

Diagnose a person with **definite** FH if they have:

- Cholesterol concentrations as defined in the table below and tendon xanthomas, or evidence of these signs in first- or second- degree relative

or

- DNA-based evidence of an LDL-receptor mutation, familial defective apo B-100, or a PCSK9 mutation

Diagnose a person with **possible** FH if they have cholesterol concentrations as defined in the table below and at least one of the following:

- Family history of myocardial infarction: aged younger than 50 years in second-degree relative or aged younger than 60 years in first-degree relative
- Family history of raised total cholesterol: greater than 7.5 mmol/l in adult first- or second-degree relative, or greater than 6.7 mmol/l in child, brother, or sister aged younger than 16 years

Cholesterol levels to be used as diagnostic criteria for the index individual (either pre-treatment, or highest on treatment)

	Total cholesterol (mmol/l)	**LDL-C (mmol/l)**
Child/young person (aged <16 years)	>6.7	>4.0
Adult (aged 16 years or over)	>7.5	>4.9

FH=familial hypercholesterolaemia; LDL-C=low-density lipoprotein cholesterol
National Institute for Health and Care Excellence (NICE) (2008) CG71. *Identification and management of familial hypercholesterolaemia*. London: NICE. Reproduced with kind permission. Available at: www.nice.org.uk/CG71

4.5 Conclusions and Recommendations

- Raised blood HDL cholesterol is an important risk factor for the development of atherosclerosis and consequently, cardiovascular disease. Cholesterol testing should therefore form a vital part of CVD risk assessment. **Stakeholders should have a strategic approach to identification and testing of at risk patients rather than just relying on opportunistic testing.**

[61] Guidelines in Practice, 2018. Online: https://www.guidelinesinpractice.co.uk/cardiovascular/the-simon-broome-criteria-should-be-used-to-detect-fh/311781.article

- When deciding on whether to prescribe lipid modification therapy, it is important to **consider the individual in the context of their personal CVD risk**, as measured by a validated tool such as QRISK, and that treatment should be offered in consultation with the patient after a risk/benefit discussion. This may occur as part of an NHS health check for example. **NHS Health Check training should therefore include some discussion of cardiovascular risk and how to talk about it with patients and relatives.**
- Lipid-lowering medications should be prescribed at an appropriate dose and intensity as per the NICE guidance. **Normally this would be a high intensity statin since the aim of treatment is to produce a 40% reduction or greater in non-HDL cholesterol. Three out of four Derbyshire CCGs are currently above the 90th centile for prescribing low or medium intensity statins instead of high.**
- Familial hypercholesterolemia is a genetic pre-disposition to raised blood cholesterol and a risk factor for CVD. Many people do not know they are affected and so **a careful family history (including premature CHD) is an important part of risk assessment,** and a means of identifying those at risk.
- It is important to remember that many of the CVD **risk assessment tools such as QRISK-2 will underestimate the 10 year CVD risk in patients with FH** and other inherited blood lipid disorders.
- A survey by Benecol[62] found that whilst UK adults have a reasonable understanding of the implications of a raised cholesterol level and its impact on the risk of heart attacks and strokes, almost all of them vastly underestimate how common raised cholesterol is in the population. Good communication is therefore important, even opportunistically, in helping people understand the importance of getting their cholesterol checked and managed.

[62] https://www.prnewswire.co.uk/news-releases/brits-unaware-of-prevalence-of-high-cholesterol-in-the-uk-144772275.html published 2011, last accessed 28/5/19

5. Peripheral Arterial Disease (PAD)

5.1 Introduction

Peripheral arterial disease (PAD) is a common condition in which fatty deposits build up in the arteries, reducing blood flow to the legs and feet. The most common symptom is pain in leg when walking, known as intermittent claudication, although it is frequently symptomless.

The incidence of PAD increases with age, and population studies have found that about 20% of people aged over 60 years have some degree of PAD[63].

Smoking is the most important risk factor for PAD; other risk factors include diabetes, high cholesterol and high blood pressure.

PAD is also a marker for an 3 to 4 fold increased risk of other cardiovascular morbidity and mortality (such as heart attack and ischaemic stroke), even if it is asymptomatic. Blood pressure monitoring/treatment and treatment of PAD can reduce the risk of other forms of CVD.

For most people with intermittent claudication their symptoms will remain stable, but approximately 20% will develop critical limb ischaemia[64]. Of those who develop critical limb ischaemia, approximately 5-10% will undergo amputation[65]. PAD is the largest single cause of lower limb amputation in the UK[66].

5.2 Peripheral Arterial Disease in Derbyshire

Derbyshire STP (comprising the area covering the upper-tier local authorities of Derby City Council and Derbyshire County Council) had a statistically significant higher registered PAD prevalence[67] (0.7%) than the England average (0.6%) during 2015/16 and 2016/17. Southern Derbyshire CCG was the only individual CCG area in which the prevalence was similar to the England average. In 2016/17, the count of those with PAD was 7,327.

The modelled estimated prevalence of PAD (including both diagnosed and undiagnosed) in people aged 55-79 in Derbyshire in 2015 and for England as a whole was 1.16%. For Derby City, the estimated prevalence was 1.30%. This works out at approximately 715 cases in Derby City and 3,480 in Derbyshire.

For each CCG in Derbyshire, the proportion of PAD patients in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less has been **similar to the England average** in the years from 2013/14 to 2016/17. In 2016/17, the STP figure was 86.2%.

For each CCG in Derbyshire, the percentage of PAD patients recorded as taking aspirin or an alternative anti-platelet in the preceding 12 months has been **similar to the England average** in the years from 2014/15 to 2016/17. In 2016/17, the STP figure was 87.9%.

[63] NICE, Peripheral Arterial Disease: Diagnosis and Management (CG147), Feb 2018
[64] Ibid
[65] Morley, Sharma, Horsch, BMJ 2018;360:j5842
[66] NICE, 2018
[67] As recorded on GP practice registers

5.3 Diagnosis

NICE advice assessing people for the presence of peripheral arterial disease if they:

- have symptoms suggestive of peripheral arterial disease **or**
- have diabetes, non-healing wounds on the legs or feet or unexplained leg pain **or**
- are being considered for interventions to the leg or foot **or**
- need to use compression hosiery[68]

5.4 Management

NICE recommends that every person with intermittent claudication should be offered a supervised exercise programme. The costing report for NICE clinical guideline 147 estimated the cost of a supervised exercise programme for two hours a week over three months to be £255 per person[69]. Supervised exercise interventions have a similar efficacy to angioplasty but are more cost effective.

An angioplasty should be offered if the supervised exercise programme does not lead to a satisfactory improvement in symptoms **and** the following conditions are met:

- advice on the benefits of modifying risk factors has been reinforced **and**
- imaging has confirmed that angioplasty is suitable for the person

Bypass surgery should be offered if angioplasty has been unsuccessful or unsuitable and imaging confirms this is suitable.

Naftidrofuryl oxalate should be considered if supervised exercise has not led to satisfactory improvement and the person prefers not to be referred for angioplasty or bypass surgery.

5.5 Secondary Prevention

Patients with peripheral artery disease have persistently worse outcomes if they continue to smoke. Patients who still smoke have a higher risk of amputation and their chance of surviving five years from diagnosis is halved compared with non-smokers[70]. Smokers should be informed of the risks and consistently offered referrals to local smoking cessation services.

NICE also recommend that patients are offered information, advice, support and treatment for the other standard forms of secondary prevention of CVD, including:

- diet, weight management and exercise
- lipid modification and statin therapy
- the prevention, diagnosis and management of diabetes
- the prevention, diagnosis and management of high blood pressure
- antiplatelet therapy

[68] NICE, Peripheral Arterial Disease: Diagnosis and Management (CG147), Feb 2018

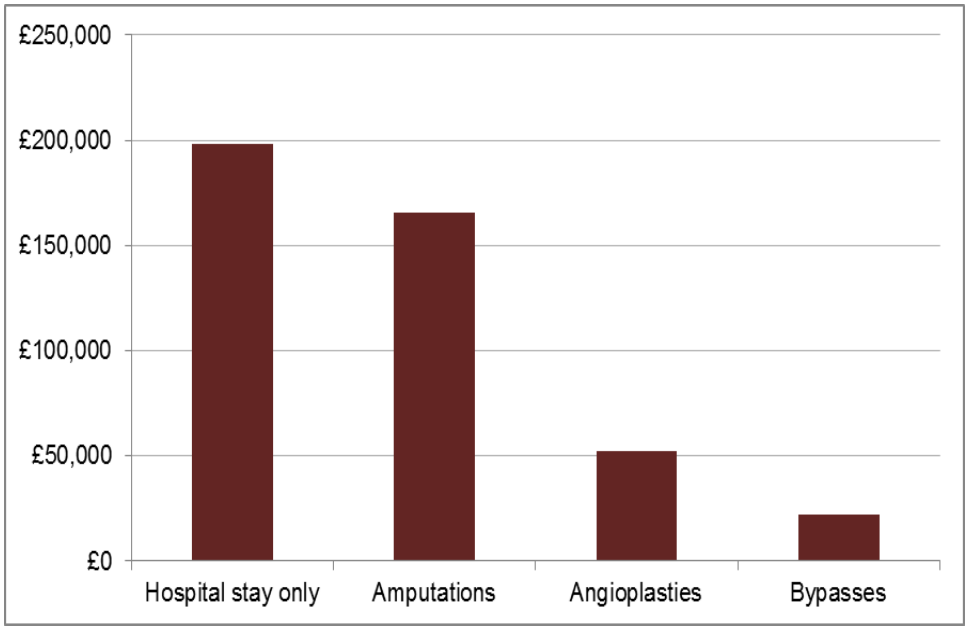
[69] NICE, Peripheral Arterial Disease: Diagnosis and Management (CG147), Feb 2018

[70] Willigendael EM, Teijink JA, Bartelink ML, et al. Influence of smoking on incidence and prevalence of peripheral arterial disease. *J Vasc Surg* 2004;40:1158-65.

5.6 Activity and Costs

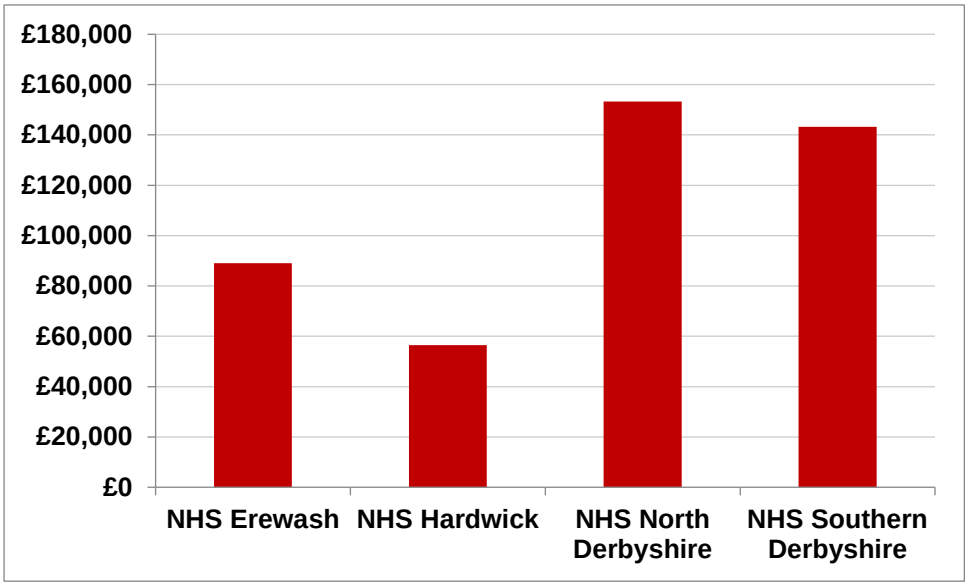
Across Derby and Derbyshire, in the years of 2015/16, 2016/17 and 2017/18, there were 140 angioplasty, bypass and amputation procedures a year on average for those with a diagnosis of PAD across 2015/16, 2016/17 and 2017/18.

Average yearly cost of selected procedures and activities for patients with PAD as a primary diagnosis for 2015/16 - 2017/18, all Derbyshire CCGs



Source: Derbyshire CCGs data via NECS CSU

Average yearly cost of hospital stay only, amputations, angioplasties and bypasses for patients with PAD as a primary diagnosis, 2015/16 – 2017/18



Source: Derbyshire CCGs data via NECS CSU

Cost and volume of selected procedures for PAD, 2015/16, 2016/17, 2018/19

	Total cost	Number
Hospital stay only	£594,075	255
Amputations	£495,947	47
Angioplasty	£157,233	63
Bypasses	£66,929	9
Total	£1,314,184	374

Source: Derbyshire CCGs data via NECS CSU

By comparison, NICE guidance suggests that supervised exercise programmes, such as the scheme in Salford[71], induce an average staffing cost of £255 and are as effective as angioplasties. Submissions to the NICE shared learning database suggest that full costs involving a service located within a local cardiac rehabilitation service could be higher, at around £400-500 per patient; this higher figure is still five times cheaper than the average angioplasty carried out in Derbyshire. The cost of sending each person who had a procedure on a supervised exercise programme, at £500 per person, works out at £20,000 a year.

[71] https://www.nice.org.uk/contents/item/display/30821

6. Diabetes

6.1 What is Diabetes?

Diabetes is a metabolic condition in which the body does not produce sufficient insulin to regulate blood glucose levels, or where the insulin produced is unable to work effectively. Almost 4.6 million people in the UK and 8.8% of people over the age of 16 in Derbyshire have diabetes. There are two main types of diabetes with significantly different aetiologies.

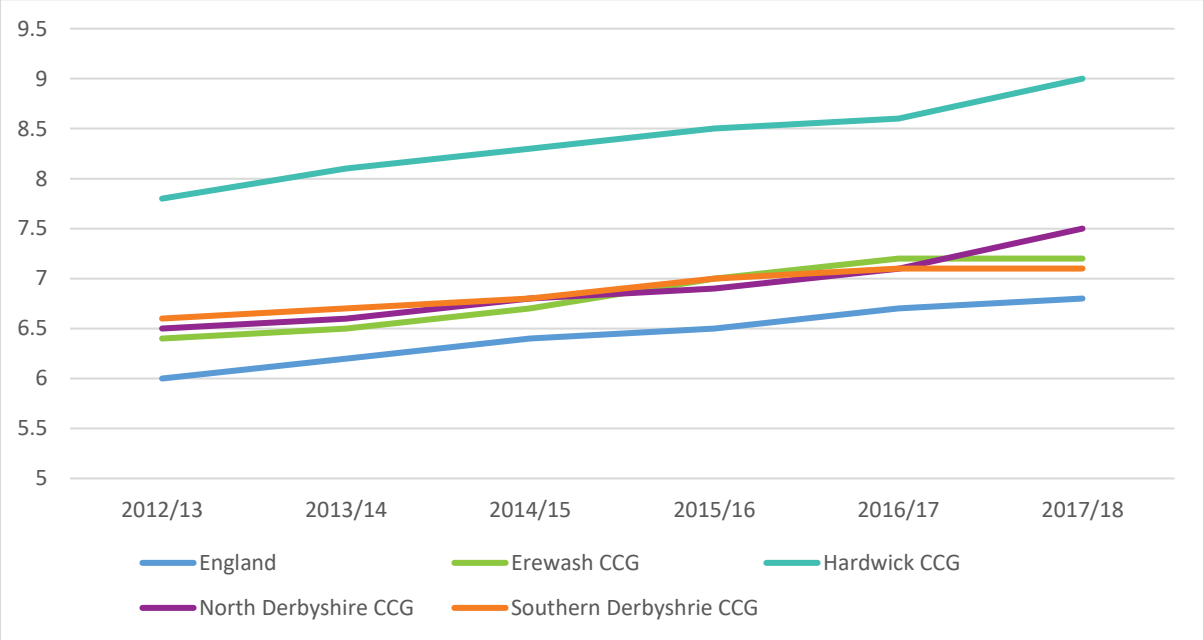
Type 1 diabetes is an auto-immune condition characterised by selective destruction of pancreatic β-cells and low or absent insulin secretion requiring lifelong treatment with injected insulin[72].

Type 2 diabetes is a progressive condition which occurs when the body either ceases producing enough insulin or becomes resistant to the effect of insulin produced. Type 2 diabetes requires lifestyle management (diet and exercise) at all stages and over time most people with type 2 diabetes will require oral hypoglycaemic drugs and/or insulin therapy. Type 2 diabetes may remain undetected for many years[73]

6.2 Prevalence of Diabetes

Of the two types, type two diabetes is by far the more common. Approximately 10% of all adults with diabetes in the UK have type 1 and 90% of diabetes patients in the UK have type 2 [74]

Since 2012/13 there has been an observed increase in prevalence of adults with diabetes (types 1 and 2) across all CCG areas within the Derbyshire STP footprint. Whilst this is true of the general trend in the rest of the country, all Derbyshire CCG areas currently have a higher prevalence of diabetes than the England average:



[72] Cahill GF Jr, McDevitt HO (1981) Insulin-dependent diabetes mellitus: the initial lesion. N Engl J Med 204:1454-1456

[73] Meigs JB et al. The natural history of progression from normal glucose tolerance to type 2 diabetes in the Baltimore Longitudinal Study of Aging. Diabetes. 2003 Jun;52(6):1475-84.

[74] Online: https://www.diabetes.org.uk/resources-s3/2017-11/diabetes-key-stats-guidelines-april2014.pdf

Period	England (%)	Erewash CCG (%)	Hardwick CCG (%)	North Derbyshire CCG (%)	Southern Derbyshire CCG (%)
2012/13	6	6.4	7.8	6.5	6.6
2013/14	6.2	6.5	8.1	6.6	6.7
2014/15	6.4	6.7	8.3	6.8	6.8
2015/16	6.5	7	8.5	6.9	7
2016/17	6.7	7.2	8.6	7.1	7.1
2017/18	6.8	7.2	9	7.5	7.1

Trend in % prevalence of diabetes (types 1 and 2) by CCG

Age

In Derbyshire the trend in prevalence of Type 1 Diabetes consistently mirrors the England average, with higher rates amongst the under 40s and 40-64yrs age groups with a significant decline over the age of 65yrs.

Age profile of type 1 diabetes patients in Derbyshire 2016/17

	Under 40 (%)	40-64yrs (%)	65-79yrs (%)	Over 80yrs (%)
NHS Southern Derbyshire CCG	45.1	41.7	7.4	1.6
NHS Erewash CCG	43.5	44.6	6.5	2.2
NHS Hardwick CCG	40.9	44.5	10	2.7
NHS North Derbyshire CCG	41.3	43.5	11.8	1.8
England	44.8	40.4	10.4	2.1

Source: PHE Fingertips

Similarly, the age profile trends in type two diabetes also mirror the England average. Across all CCG areas, the cohort with the greatest prevalence of type 2 diabetes is those aged 65-79 years with all individual CCG areas having a higher prevalence (range 39-43%) than the overall England average of 38%.

Age profile of type 2 diabetes patients in Derbyshire 2016/17

	Under 40 (%)	40-64 (%)	65-79 (%)	80+ (%)
NHS Southern Derbyshire CCG	3.6	40.6	39	14.7
NHS Erewash CCG	2.9	40.2	40.2	15.5
NHS Hardwick CCG	3.1	41.1	41.7	13.2
NHS North Derbyshire CCG	2.5	37	43	15.9
England	3.9	42.8	38	13.8

Source: Fingertips

Gender

Across Derbyshire the gender differences in terms of diabetes prevalence are in line with the England average, which is that of slightly higher rates in males than in females.

CCG	Male	Female
England	55.8	44.2
Southern Derbyshire CCG	56	44
North Derbyshire CCG	56.4	43.6
Erewash CCG	56.1	43.9
Hardwick CCG	56.1	43.8

Diabetes prevalence by % M/F by CCG. Source: PHE Fingertips

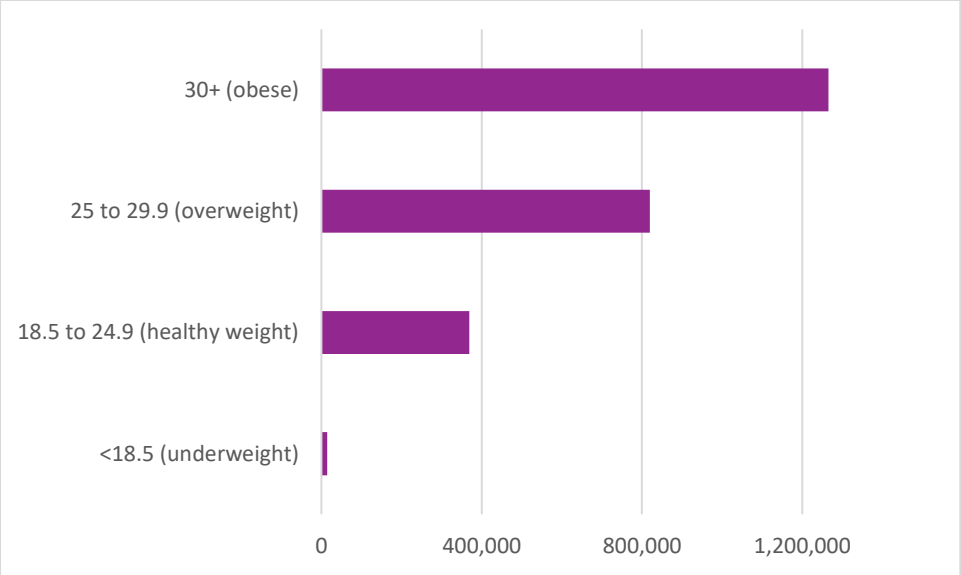
6.3 Risk factors for type 2 diabetes

There are a number of genetic, environmental and personal factors that increase an individual's risk of developing type 2 diabetes.

Obesity

There is a well-documented linear association between body weight and type 2 diabetes prevalence in the UK population. People with severe obesity are at greater risk of type 2 diabetes than people with a lower BMI and a BMI of 30 or above increases diabetes risk significantly. Currently 84% of adults with type 2 diabetes are also overweight or obese, this rises to 90% for overweight and obese adults in Derbyshire[75] [76]

Type 2 Diabetes prevalence by BMI UK (National Diabetes Audit, 2018)



The risk of developing type 2 diabetes is associated with incremental increases in body weight in early adulthood[77]. In addition, duration of obesity has also been found to increase risk of

[75] Online https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/report-1-care-processes-and-treatment-targets-2017-18-short-report
[76] https://joinedupcarederbyshire.co.uk/application/files
[77] Online The Lancet https://www.thelancet.com/action/showPdf

developing type 2 diabetes, with greater risk among people who have been obese for longer periods of time[78].

Similarly, a large waist circumference is allied with increased likelihood of developing Type 2 Diabetes. Men are at higher risk of type 2 diabetes if they have a waist circumference of 94-102cm and are at very high risk if it is more than 102cm. Women are at higher risk if they have a waist circumference of 80-88cm and at very high risk if it is more than 88cm[79]

Lifestyle factors

In a systematic review of physical activity levels and sedentary behaviour in type 2 diabetes and non-type 2 diabetes patients, physical activity was significantly lower and sedentary behaviour significantly higher in patients with type 2 diabetes, with only 9% of type 2 diabetes patients meeting the 150 minutes of moderate to vigorous physical activity per week. It was also highlighted that in type 2 diabetes patients 70% of the day was spent being sedentary[80].

Globally smoking status has been linked to an increase in Type 2 Diabetes risk by up to 10.3%. A meta-analysis conducted by Pan et al. (2016) concluded that smoking intensity and duration were confounding factors in increasing Type 2 Diabetes risks and increased in groups with high levels of type 2 diabetes prevalence e.g. middle aged and elderly population groups. Similarly smoking status in type 2 diabetes patients aggravates micro and macro-vascular complications, elevating a person's risk of developing CVD[81].

Social deprivation

In England, Type 2 Diabetes is 40% more common among people in the most deprived quintile compared with those in least deprived quintile. Similarly people in the most deprived communities are more likely to have undiagnosed diabetes than those living in the least deprived communities[82].

Ethnicity

Evidence suggests that compared to white European populations, people from black, Asian and other minority ethnic groups are at higher risk of Type 2 Diabetes at equivalent BMI levels. A recent UK study found that non-white adults aged 40-69 years were two to four times more likely to have diabetes compared to white adults. Diabetes prevalence in South Asian groups with a BMI of 22kg/m^2 was equivalent to diabetes prevalence in white groups with a BMI of 30kg/m^2 [83].

6.4 CVD risk in Diabetes

Diabetes confers around a two-fold excess risk for a wide range of vascular diseases, independent of other risk factors. Strokes and CHD (myocardial infarction [MI], sudden death, and angina pectoris) are at least twofold more common in patients with Type 2 Diabetes than

[78] Laakso M et al, 1997. Epidemiology of macrovascular disease in diabetes. *Diabetes Review*;5:294–315
[79] Online http://care.diabetesjournals.org/content/diacare/early/2014/06/05/dc13-2966.full.pdf
[80] Kennerley and Kirk, 2018 'Physical Activity and Sedentary Behaviour of adults with Type 2 Diabetes; a systematic review' *Practical Diabetes*; 35(3): 86–89
[81] Online: https://www.diabetes.org.uk/resources-s3/2017-11/diabetes_in_the_uk_2010.pdf
[82] The NHS Information Centre for Health and Social Care. National Diabetes Audit Executive Summary 2009-2010, 2011
[83] Online: http://care.diabetesjournals.org/content/diacare/early/2014/06/05/dc13-2966.full.pdf

in nondiabetic patients. Similarly, after an acute MI, mortality rates at 1 year are higher in patients with type 2 diabetes than in non-diabetics.[84,85]

Evidence suggests that major risk factors for CVD such as elevated high total and LDL cholesterol, low HDL cholesterol, elevated blood pressure and smoking are present in both Type 2 Diabetes and non-diabetic groups however diabetic patients are still at greater risk of CVD events that their non-diabetic counterparts.[86]

The National Diabetes Audit between 2005 and 2015 mapped death rates in the diabetic population compared to the general population. Whilst a downward trend in CVD deaths was observed across the two cohorts of 8.1% in diabetic patients and 7.4% in non-diabetic patients, CVD deaths were 4.9% higher in those with diabetes than those without in 2015. [87]

Causes of death in the NDA cohort and general population, 2015

	NDA population	General population
Number of deaths	102,010	503,138
All Cancers	24.40%	28%
All Vascular Outcomes	33.40%	28.50%
All non-cancer, non-vascular outcomes	40.90%	41%
All unknown causes	1.20%	2.40%

Source: *National Diabetes Audit (2015)*

People with diabetes constitute about 5% of the adult population in the UK however they account for 25-30% of admissions for cardiovascular complications. The age distribution of people admitted to hospital with CVD complications indicates that patients with Type 1 diabetes are younger at admission than those without. The age distribution of type 2 diabetic patients is similar to that in the general population[88].

[84] Laakso M, Lehto S. Epidemiology of ma cardiovascular disease in diabetes. Diabetes Rev 1997;5:294–315

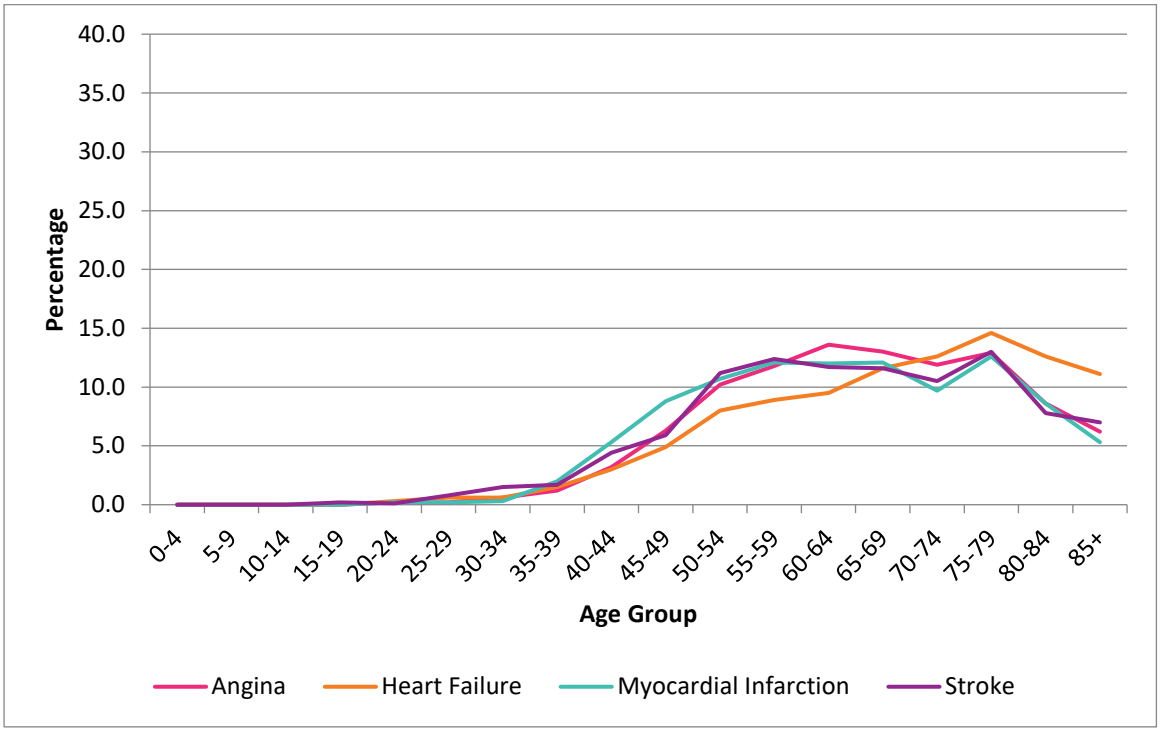
[85] Miettinen H et al. Impact of diabetes on mortality after the first myocardial infarction. Diabetes Care 1998;21:69–75

[86] Stamler J et al. Diabetes, other risk factors, and 12-yr cardiovascular mortality for men screened in the Multiple Risk Factor Intervention Trial. Diabetes Care 1993;16:434–444

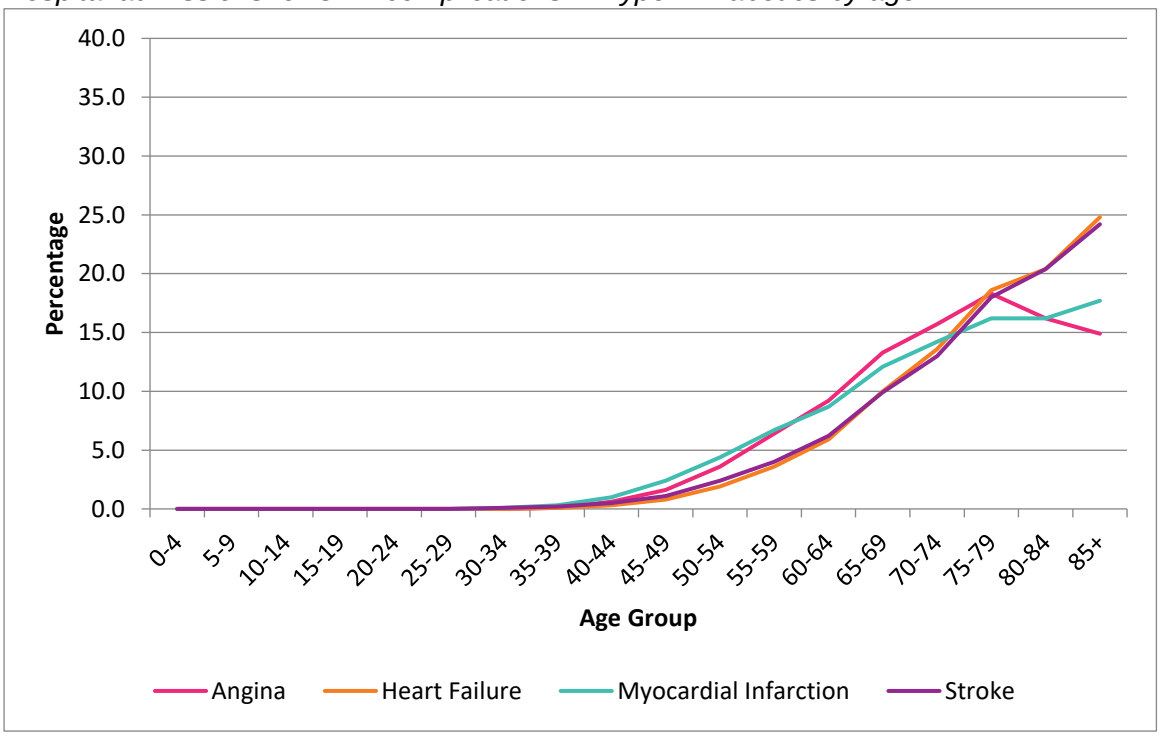
[87] National Diabetes Audit Report 2017. Report 2a: Complications and Mortality. Online: https://files.digital.nhs.uk/pdf/4/t/national_diabetes_audit__2015-16__report_2a.pdf

[88] National Diabetes Audit 2016 Online: https://files.digital.nhs.uk/pdf/4/t/national_diabetes_audit__2015-16__report_2a.pdf

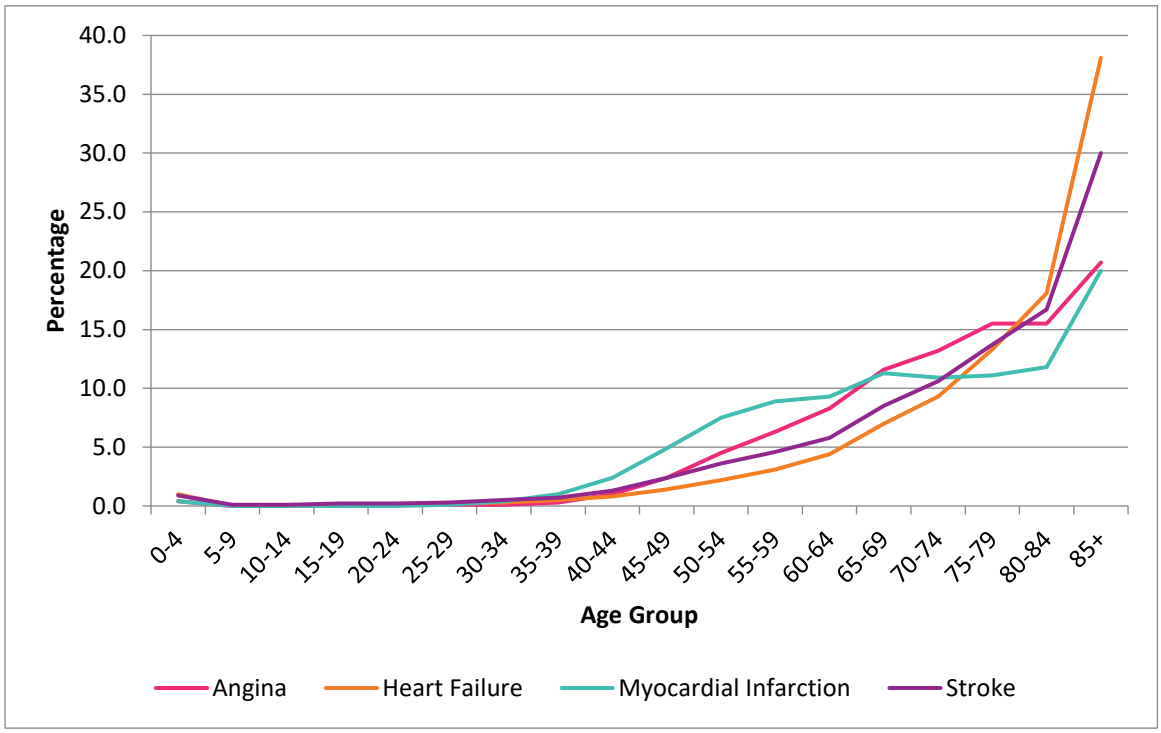
Hospital admissions for CVD complications in Type 1 Diabetic patients by age



Hospital admissions for CVD complications in Type 2 Diabetics by age



Hospital Admissions for CVD complications in non-diabetics by age



Source: National Diabetes Audit Report

In England and Wales, the National Diabetes Audit (2015/16) calculated the elevated risk of CVD related complications at between 3.5-4.5 times greater for people with Type 1 diabetes and 2-2.5 times greater for people with type 2 diabetes.

In Derbyshire, whilst this pattern of higher CVD risk in diabetic patients persists, the standardised risk ratios for angina, heart failure, MI and stroke are lower than the England and Wales averages. These results may indicate a smaller disparity in risk between diabetic patients and their non-diabetic counterparts in Derbyshire compared with nationally.

Management of CVD risk in Type 2 Diabetes

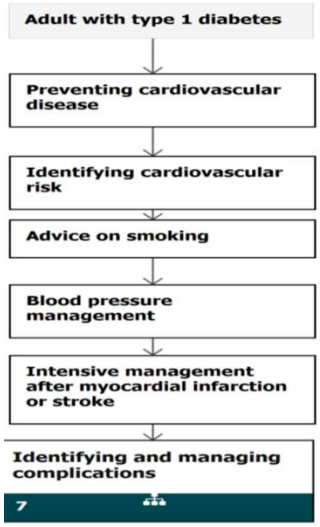
Patients with type 2 diabetes have a significantly higher risk of developing CVD than their non-diabetic counterparts. There is little published guidance explicitly on managing macrovascular complications (large vessel disease such as CVD as opposed to small vessel complications such as retinopathy or nephropathy) in type 2 diabetics. Outcomes pertaining to elevated macrovascular risk are however integrated into the NICE guideline 'the management of type 2 diabetes in adults' to ensure that prevention and management of risk is integrated into the treatment pathway for all T2D patients [89]

The guidance contains recommendations on structured patient education, blood pressure control (including aiming for a blood pressure of less than 140/80mmHg or lower in the case of existing eye or kidney complications), and blood glucose management (aiming for an HbA1c of 53 mmol/mol or 7.0%). All the recommendations have a focus on involving the patient in the discussions about these measures and understanding their risk and how to moderate it.

[89] NICE, 2015. NG28 'Type 2 Diabetes in Adults: Management' online https://www.nice.org.uk/guidance/ng28/resources/type-2-diabetes-in-adults-management-pdf-1837338615493

Management of CVD risk in Type 1 Diabetes

NICE has produced specific guidance on the management of CVD risk in Type 1 diabetic patients and the summary flow chart for this can be seen below[90]. The guidance is based on risk identification and management with regular updates to ensure there are no changes in risk status.



The cardiovascular risk factors the guidance recommends assessing annually are:

- albuminuria (protein in the urine, indicative of kidney damage)
- smoking
- blood glucose control
- blood pressure
- full lipid profile (including HDL and LDL cholesterol and triglycerides)
- age
- family history of cardiovascular disease
- abdominal adiposity/waist circumference.

Smoking

Adults with type 1 diabetes who smoke should be given advice on smoking cessation and use of smoking cessation services, including NICE guidance-recommended therapies, and these messages should be reinforced annually for people who currently do not plan to stop smoking. This discussion should also be had at all clinical contacts where appropriate if there is a prospect of the person stopping. Young adult non-smokers should be advised never to start smoking.

[90] NICE, 2018 Pathways 'Managing cardiovascular risk in adults with type 1 diabetes' online: https://pathways.nice.org.uk/pathways/type-1-diabetes-in-adults/managing-cardiovascular-risk-in-adults-with-type-1-diabetes

Blood pressure management

Intervention levels for recommending blood pressure management should be 135/85 mmHg unless the adult with type 1 diabetes has albuminuria, or two or more features of metabolic syndrome, in which case it should be 130/80 mmHg.

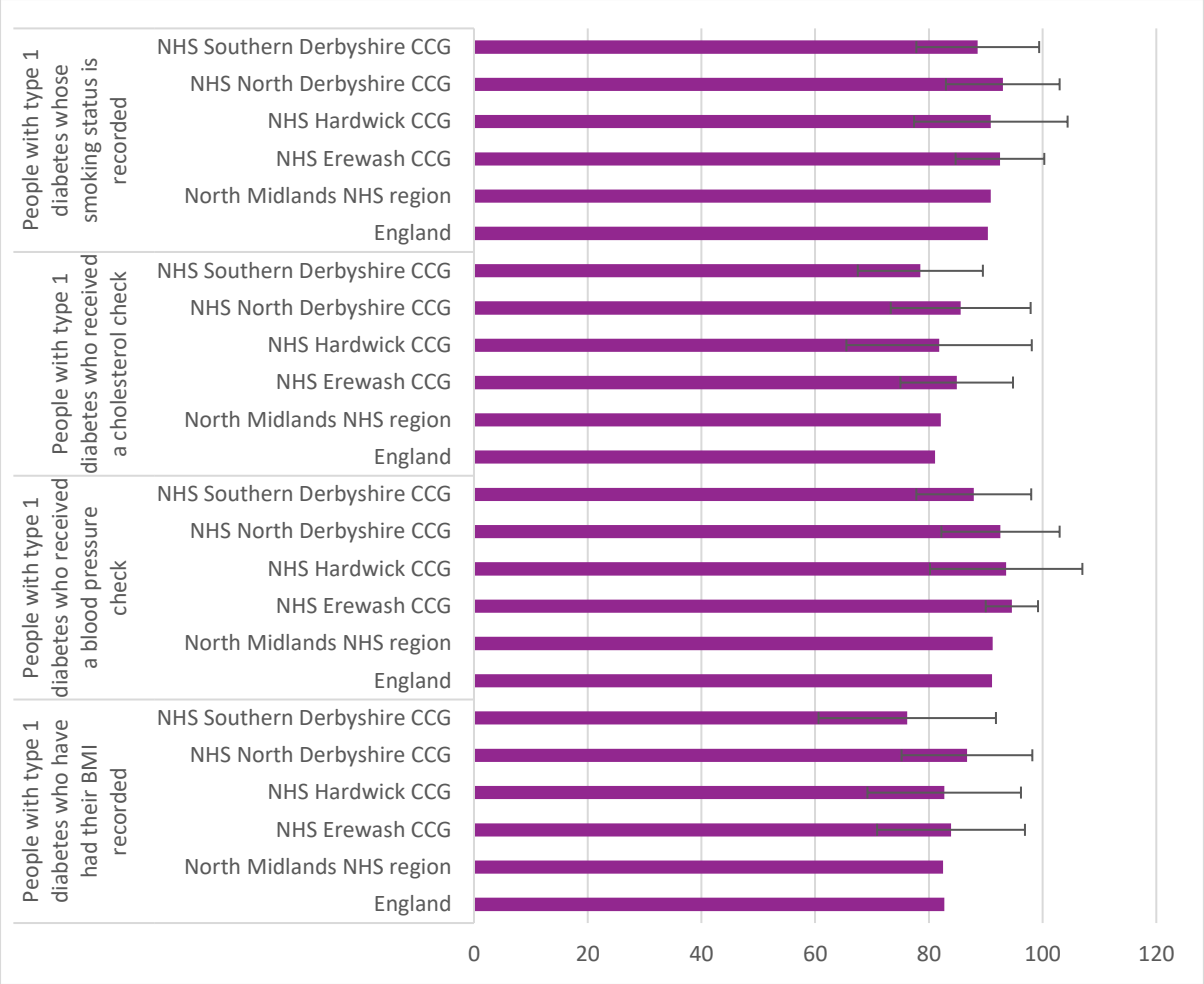
Treatment targets

There are 8 care processes recommended by NICE that each individual aged over 12 years old should receive: HBA1c test, urine albumin/creatinine ratio test, foot risk surveillance, serum creatinine test, BP monitoring, BMI assessment, smoking status recorded, serum cholesterol assessment.

Across Derbyshire 43 GP surgeries performed below the England average of 42.95% of patients receiving all 8 care processes in 2017/18 for patients with Type 1 Diabetes.

Of the eight care processes named by NICE, the NDA (2015/16) states that 4 pertain directly to CVD: Blood Pressure, BMI, Smoking and Cholesterol.

The graph below highlights these four care processes for type 1 diabetes patients at CCG level and compares them to the England average. Across the Derbyshire STP footprint the CCGs oscillate around the England average. However Southern Derbyshire CCG falls below the England average on all 4 care processes, contrasted with Erewash CCG and North Derbyshire CCG who above the England average in all 4 care processes. However the large standard deviations across the four care pathways suggest that some GP Practices outperform others in these areas.



Proportion of Type 1 Diabetic Patients undergoing the 4 care processes pertaining to CVD, by CCG, source NDA

The Quality Outcomes Framework (2017/18) also contains diabetes indicators relevant to CVD risk. In Derbyshire there were 36 GP Practices that recorded the proportion of patients with diabetes as having a BP reading of 150/90mmHg or less as below the England average of 91.5% of patients. The majority of these GP Practices are in Southern Derbyshire CCG area, 18 which represents 33% of Southern Derbyshire CCG GP Practices.

Across Derbyshire the average percentage of registered diabetes patients whose last measured total cholesterol was 5mmol/l or less (in 2017/18) was 81.7%, slightly higher than the England average of 80%. However, 36 of GP Practices in Derbyshire currently fall below the England average.

6.5 Summary and recommendations

Patients with diabetes (both type 1 and type 2) are at significantly increased risk of CVD related morbidity and mortality, independently of other risk factors. Diabetic patients account for up to 30% of all CVD related admissions.

90% of adult patients with diabetes have type 2 diabetes, prevalence of which is associated with obesity. Patients with type 2 diabetes are not only more likely to suffer from MI and other CVD complications, but they are also more likely to die from these complications than their non-diabetic counterparts.

Around 8.8% of the population of Derbyshire over age 16 have diabetes, the majority of which have type 2 diabetes. 90% of type two diabetes patients in Derbyshire are overweight or obese, compared with 84% nationally.

NICE recommends eight care processes in the optimum management of diabetes, of which 4 pertain directly to CVD outcomes: blood pressure, BMI, smoking status and cholesterol. Locally, South Derbyshire CCG remains below the national average for attainment of these four care processes, however, data indicates possible large inter-practice variation.

These four processes should provide an area of focus for those looking to improve CVD outcomes for diabetic patients in Derbyshire. Specifically, the importance of smoking and obesity as risk factors underlines the need for proper integration of lifestyle services into care pathways so that this becomes as much a part of a patient's treatment as, for example, the prescription of hypoglycaemic medications.

Recommendations:

- 90% of adults with type 2 diabetes in Derbyshire are overweight or obese which also emphasizes the need for integrating lifestyle services into the care pathways for diabetic patients.
- Access and referral to lifestyle services is equally important for diabetic patients who smoke, since smoking status significantly increases micro and macrovascular complications of diabetes. As in peripheral arterial disease patients, smoking status should be discussed and referral for cessation offered at all clinical contacts where appropriate.
- Although the BAME population is small in Derbyshire County, it is larger in Derby city. Type 2 diabetes is more common in this population and also associated with lower BMIs than in the white British population. This not only necessitates lower thresholds for intervention in these patients but also emphasises the importance of culturally sensitive lifestyle interventions in these populations.

7. Stroke/TIA

7.1 Introduction

A stroke, sometimes referred to as a cerebrovascular accident or CVA, is a serious life-threatening medical condition that occurs when the blood supply to part of the brain is interrupted. They are a medical emergency and urgent treatment is essential since the sooner a person receives treatment for a stroke, the less lasting damage is likely to happen.

A transient ischaemic attack (TIA) or "mini stroke" is caused by a temporary disruption in the blood supply to part of the brain. This can cause sudden symptoms similar to a stroke, such as speech and visual disturbance, and numbness or weakness in the face, arms and legs. However, in contrast to a stroke, the effects of a TIA are transient, often only lasting for a few minutes or hours and usually fully resolve within 24 hours.

Symptoms depend on the part of the brain affected and the extent of the damage. Common and readily recognised symptoms include: drooping of the face on one side, weakness or numbness on one side of the body, slurred or garbled speech.

There are two main types of stroke – ischaemic strokes and haemorrhagic strokes. They affect the brain in different ways and can have different causes.

Ischaemic strokes are the most common type of stroke. They occur when a blood clot blocks the flow of blood and oxygen to the brain. These blood clots typically form in areas where the arteries have been narrowed or blocked over time by fatty deposits known as plaques, a process known as atherosclerosis. With ageing, the arteries can naturally narrow, but certain risk factors accelerate the process. These include: smoking, high blood pressure (hypertension), obesity, high cholesterol levels, diabetes, excessive alcohol intake. Another possible cause of ischaemic stroke is the heart condition atrial fibrillation where the heart beats irregularly. This can cause blood clots in the heart that break up and escape from the heart and become lodged in the blood vessels supplying the brain.

Haemorrhagic strokes – also known as cerebral haemorrhages or intracranial haemorrhages – are less common than ischaemic strokes, accounting for around 15% of strokes. These occur when a blood vessel within the skull bursts and bleeds into and around the brain. A major risk factor for haemorrhagic stroke is high blood pressure, which can weaken the arteries in the brain and make them prone to split or rupture. Factors that increase the risk of high blood pressure include: being overweight or obese, drinking excessive amounts of alcohol, smoking, lack of exercise, stress - which may cause a temporary rise in blood pressure.

Haemorrhagic strokes can also occur as the result of the rupture of a balloon-like expansion of a blood vessel (brain aneurysm) or abnormally formed blood vessels in the brain.

Some stroke risk factors are non-modifiable. These include: age – stroke is more common in over 65 year olds, although about a quarter of strokes happen in younger people and it is the third most common cause of premature (under 75 year old) mortality; family history; ethnicity – there is a higher risk in people of south Asian, African or Caribbean descent; personal medical history – previous stroke, transient ischaemic attack (TIA) or heart attack increases the risk.

7.2 Stroke/TIA in Derbyshire

The latest recorded prevalence of stroke or TIA in the Derbyshire STP is 2.2% of the registered population, equating to just under 22,000 patients. This is significantly higher than in England as a whole (1.8%) and is rising. Prevalence in all 4 constituent CCGs was also significantly higher than for England, although Southern Derbyshire CCG had a significantly lower prevalence individually than for the STP as a whole which may reflect size of population and demographic differences.

Public Health England estimates put the prevalence of stroke/TIA at age 55-79 years in Derbyshire at around 3.81% and in Derby at 3.74%, or around 8,500 and 2,150 people respectively. The estimated prevalence of England as a whole is very similar at 3.72%.

84.6% of patients diagnosed with stroke/TIA had a latest blood pressure reading lower than or equal to 150/90, a significantly greater proportion than for England as a whole (83.5%). Hardwick CCG (86.9%) had a proportion significantly higher than both the England and STP averages; North Derbyshire CCG (85.1%) also had a proportion higher than England's.
92.0% of patients in the STP were recorded as taking an anti-platelet agent or anticoagulant. England and all of the constituent CCGs recorded similar proportions.
84.1% of patients diagnosed with stroke/TIA were referred for further investigation between 3 months before and 1 month after the latest occurrence, similar to the proportion in England as a whole. The proportion referred in Erewash CCG (74.9%) was significantly lower than for both England and the STP. The proportion referred in Hardwick CCG (87.6%) was significantly higher than for England.
78.6% of patients diagnosed with stroke/TIA received influenza immunisation, significantly more than in England as a whole (76.3%). A significantly greater proportion where immunised in Erewash CCG (81.3%) than in both the STP and England as a whole. The proportion immunised in North Derbyshire CCG (80.1%) was also greater than for the STP as a whole.

The latest recorded prevalence of atrial fibrillation in the Derbyshire STP is 2.11% of the registered population, equating to just over 22,800 patients. This is higher than in England as a whole (1.98%). Prevalence in all CCGs but Southern Derbyshire, which was lower than both, was also higher than for England and the STP.

95.1% percent of patients with atrial fibrillation had their stroke risk assessed using the CHADS2DS2-VASc score risk stratification scoring system in the preceding 12 months, significantly more than in England as a whole. The proportion assessed in Southern Derbyshire CCG (96.0%) was significantly higher than for both the STP and England.

7.3 Diagnosis

There is evidence that rapid treatment improves outcome after stroke or TIA.

NICE recommends the following for the rapid diagnosis of people with a sudden onset of symptoms indicative of stroke/TIA:

- outside of hospital a validated tool, such as FAST (Face Arm Speech Test), should be used to screen for a diagnosis of stroke or TIA;
- In people with sudden onset of neurological symptoms, hypoglycaemia (low blood sugar) should be excluded as the cause of these symptoms;
- People who are admitted to accident and emergency (A&E) with a suspected stroke or TIA should have the diagnosis established rapidly using a validated tool, such as ROSIER (Recognition of Stroke in the Emergency Room).

7.4 Management

NICE recommends that:

- People who have had a suspected TIA who are at high risk of stroke (that is, with an ABCD2 score of 4 or above) should have:
  - aspirin (300 mg daily) started immediately;
  - specialist assessment and investigation within 24 hours of onset of symptoms;
  - measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors.
- People with crescendo TIA (two or more TIAs in a week) should be treated as being at high risk of stroke, even though they may have an ABCD2 score of 3 or below;
- All people with suspected stroke should be admitted directly to a specialist acute stroke unit following initial assessment, either from the community or from the A&E department;
- Brain imaging should be performed immediately for people with acute stroke if any of the following apply:
  - indications for thrombolysis or early anticoagulation treatment;
  - on anticoagulant treatment;
  - a known bleeding tendency;
  - a depressed level of consciousness;
  - unexplained progressive or fluctuating symptoms;
  - papilledema, neck stiffness or fever;
  - severe headache at onset of stroke symptoms.
- On admission, people with acute stroke should have their swallowing screened by an appropriately trained healthcare professional before being given any oral food, fluid or medication.

NICE recommends that people with atrial fibrillation should be assessed using the CHA2DS2-VASc stroke risk score.

7.5 Hospital Activity

In 2017/18 there were over 3,000 admissions with a primary diagnosis of stroke/TIA (ICD10 I60-I69) in the Derbyshire STP area, 88% of which were emergencies. Over 75% underwent diagnostic imaging procedures, with computed tomography being most common – for over 50%. Magnetic resonance imaging was second at 15% but was twice as frequently used at Chesterfield than at Derby hospital. Over 14% commenced rehabilitation in the admission episode. Less than 5% received fibrinolytic or other high cost cardiovascular drugs. 10% of patients died while in hospital; over 40% remained in hospital at the end of their admission episode.

7.6 Summary and Recommendations

- Stroke prevalence in Derbyshire is higher than the England average, possibly due higher prevalence of atrial fibrillation in the population.
- Rapid diagnosis using a validated tool and management of stroke is of paramount importance to allow for better outcomes.
- Adequate assessment and management of TIA is essential to prevent the development of stroke.
- Personal risk factors should be considered when planning treatment.

- There are a considerable number of admissions with stroke in Derbyshire mostly as emergencies with a significant proportion remaining in hospital at the end of their admission episode.
- There should be emphasis on people with atrial fibrillation receiving assessment using the CHA2DS2-VASc stroke risk score (see chapter 2).
- Preventive interventions to address the controllable risk factors - e.g. smoking, high blood pressure (hypertension), obesity, high cholesterol levels, diabetes and excessive alcohol intake - remain the cornerstone of decreasing morbidity and mortality from stroke.

8. Heart Failure

8.1 Introduction

Heart failure creates a large demand on the NHS, leading to over 67,000 admissions in England and Wales per year and is the leading cause of hospital admission in people over 65 years.[91]

Heart failure is a clinical syndrome resulting from the loss of effective heart structure or function. Patients experience variable symptoms and disease severity. The main features are fatigue, impaired exercise tolerance, shortness of breath and lower limb swelling. There is no unequivocal criteria for diagnosing heart failure. Heart Failure causes are multifactorial, but are largely caused by a combination of ischemic, hypertensive and valvular disease. Occasionally, it is caused by inherited or rarer pathology such as cardiomyopathies. Risk factors for developing heart failure are the same as those for coronary artery disease.

Acute Heart Failure is a severe and immediate onset of symptoms resulting in a life-threatening clinical state requiring hospital admission. Most patients suffer from **Chronic Heart Failure** a persistent set of the above symptoms affecting quality of life, slowly progressing and requiring long term management in the community. Patients with **Chronic Heart Failure** are vulnerable to becoming unwell. They have reduced heart function and can easily decompensate into **Acute on Chronic Heart Failure**. This is life threatening and often requires urgent hospital management.

The aims of management are to effectively control symptoms and improve prognosis by slowing disease progression. This is largely achieved through pharmacological treatments including angiotensin-converting enzyme inhibitor (ACE-I) and B-blockers (BB) and life style optimisation. Valvar surgery, percutaneous intervention and implantable device therapies have a role depending on the underlying cause.

Heart failure is a progressive disease, nationally the mortality rate at one year was 40% for people requiring admission.[91,92]

This chapter aims to consider the needs of Heart Failure patients in the Derbyshire STP footprint by considering the treatment and management of both **Acute and Chronic Heart Failure** as per the latest NICE guidance. Both are part of the same disease process and affect the same people but require different managements. As such they have separate but interlinked NICE guidance protocols. For the purposes of this needs assessment, we will consider the management of heart failure for people in the community the **Chronic Heart Failure** suffers, and people in Secondary Care the **Acute and Acute on Chronic Heart Failure** admissions.

8.2 Derbyshire STP area.

Heart failure (HF) affects a large population: 485,561 in England, with 11,276 identified cases in Derbyshire. In Derbyshire, there is an estimated prevalence of 1.07% compared to the national average of 0.8%.[93] Derbyshire has 4 Clinical Commissioning Groups (CCGS), Erewash CCG, Hardwick CCG, North Derbyshire CCG and South Derbyshire CCG (correct at

[91] NICE Chronic heart failure in adults: diagnosis and management. Clinical guideline [NG106] (updated September 2018) https://www.nice.org.uk/guidance/ng106 (Accessed March 2019)
[92] NICE Acute heart failure: diagnosis and management Clinical guideline [CG187] Published date: October 2014 https://www.nice.org.uk/guidance/cg187/chapter/1-Recommendations (Accessed March 2019)
[93] PHE Fingertips Data

time of writing, this has subsequently changed), the prevalence of Heart failure is consistent 1 to 1.2 % prevalence with no statistically significant variation between CCGS.[1] Secondary care services are provided by Chesterfield Royal Hospital (CRH) Royal Derby Hospital (RDH). Derbyshire healthcare system manages a large number of people with heart failure (table).

Total Number of Registered Heart Failure diagnosis 2017-18					
England	Derbyshire STP	NHS Erewash CCG	NHS Hardwick CCG	NHS North Derbyshire CCG	NHS South Derbyshire CCG
485,561	11,276	1,117	1,122	3,514	5,523

Source PHE Fingertips

8.3 Heart Failure in the Community

Diagnosis

Chronic Heart Failure is diagnosed in the community using specialist investigations and referral, the recent NICE guideline [NG106] (updated September 2018) recommends thorough clinical assessment and specific investigations summarised below to make a positive diagnosis.

1. Measure serum N-terminal pro-B-type natriuretic peptide (N-BNP) and referral times according to level.
2. If N-BNP >2000: consider urgent 2 week cardiology referral
3. If BNP 400 to 2000: specialist assessment and transthoracic echocardiography within 6 weeks.
4. Perform transthoracic echocardiography to exclude important valve disease, assess the systolic (and diastolic) function of the (left) ventricle, and detect intra-cardiac shunts.

In addition to investigation for alternative diagnosis according to the diagnosing clinician.

CRH (Chesterfield Royal Hospital) and RDH (Royal Derby Hospital) are the laboratories for the region, both offer N-BNP peptide as opposed to B-type natriuretic peptide in line with NICE guidance.

The proportion of heart failure diagnosis confirmed by echocardiogram/specialist according QOF data is 90.7% and 91.0% for Derbyshire and England respectively. Note the data does not differentiate the proportion undergoing BNP, echocardiograms or specialist referral separately. Within the Derbyshire STP Erewash CCG is significantly below the national average at 88% Hardwick is above the national standard at 93.4 % (see table below).[94]

QOF data HF002- Proportion. Table2 'Heart failure diagnosis confirmed by ECG/specialist assessment. (den. incl. exceptions)'					
England	Derbyshire STP	NHS Erewash CCG	NHS Hardwick CCG	NHS North Derbyshire CCG	NHS South Derbyshire CCG
91.0%	90.69%	88.16%	93.39%	90.85%	90.57%

Source: QOF via PHE Fingertips

HF outpatient services are split between CRH and RDH, both are separate trusts with separate cardiology referral pathways and variations in practice.

[94] PHE Fingertips Data

CRH does not offer an urgent or routine HF appointments according to BNP level: heart failure is primarily managed by GPs with open access to echocardiograms, BNP and both Cardiology Nurse and Consultant support. Note a BNP test is not mandatory before requesting an echocardiogram. Patients can be referred to the specialist HF clinic or general cardiology clinic (anecdotal reported waiting time of around 3 months), if the GPs feel further support is needed, this is open access without a requirement for an echocardiogram or BNP cut off. Unfortunately, no formal data for waiting times for clinic or echo was obtained, these figures are estimates from Cardiology MDT colleagues in Chesterfield.

RDH has recently finalised a diagnostic and management pathway for heart failure which offers two routes into the service, dependent upon whether the patient initially presents to primary care, or via an acute admission. For primary care presentations, it does suggest BNP testing and offer a threshold for BNP levels that should trigger a referral (≥ 300ng/L, or ≥ 360pmol/L).

The available QOF and HES data obtained does not distinguish the proportion of HF diagnosis confirmed by echocardiogram. In Derbyshire however, the numbers indicate that patients with HF are undergoing echo. In 2017/18, RDH performed 7709, CRH 2977 and Burton Hospital 717, with a small number done by out of area trusts. Again estimates from the MDT are a 3 month wait for echocardiograms across the Derbyshire STP area.[95] **Whilst more data is required, these figures may indicate that demand in the region is stretching capacity in the echocardiography service.** This is in-keeping with the national picture: a recent workforce review identified a national shortage in the Cardio-physiology workforce.[96]

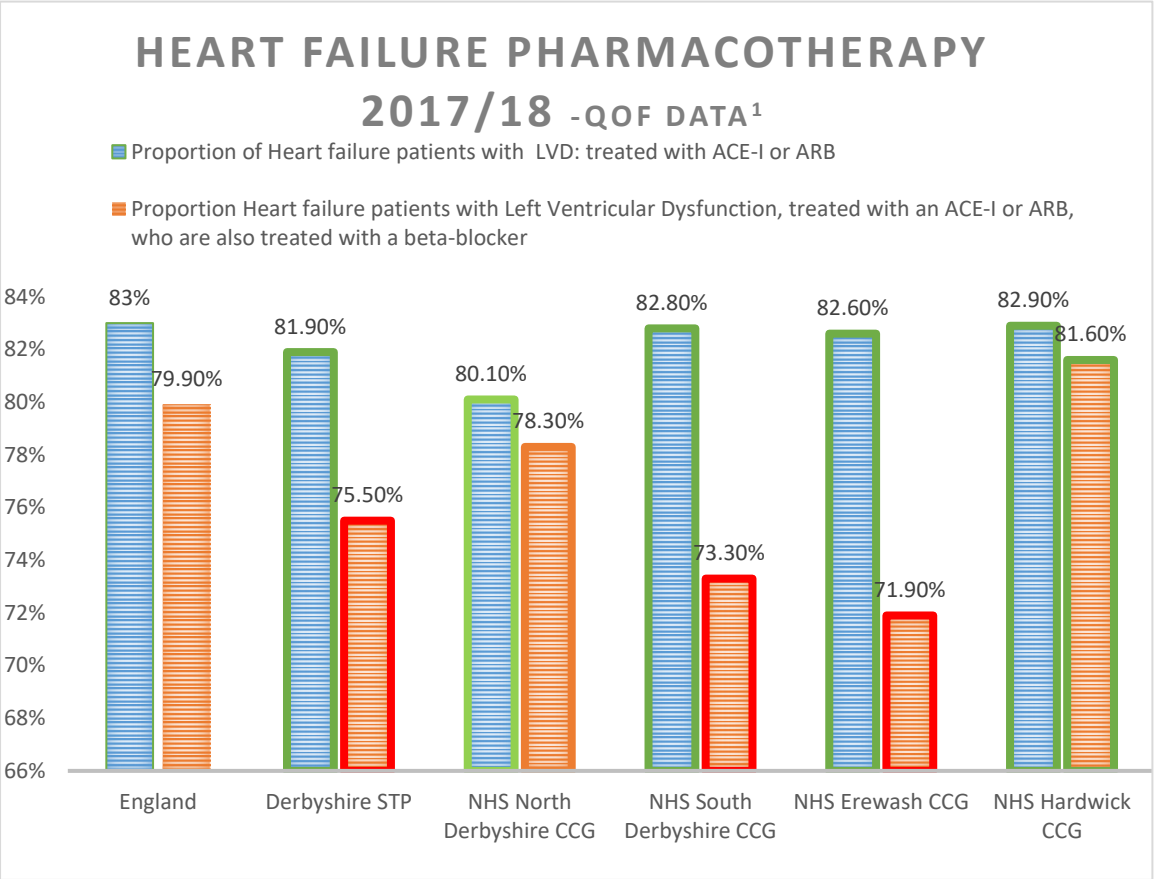
Management in the Derbyshire Community

NICE guideline [NG106] updated September 2018 outlines HF management, and non-specialist pharmacological management key points summarised below.

- Offer an ACE inhibitor and a beta‑blocker licensed for heart failure to people who have heart failure with reduced ejection fraction (ejection fraction refers to the amount of blood, expressed as a percentage of the amount of blood in the chamber, that the left ventricle pumps out with each contraction).
- Consider an Angiotensin II receptor blocker (ARB) for heart failure as an alternative to an ACE inhibitor for people who have HF with reduced ejection fraction and intolerable side effects with ACE inhibitors

[95] Hospital Episode Statistics Data 2018
[96] Simpson IA et al Strategic Review of Cardiac Physiology Services. 2015, and Centre for Workforce Intelligence Healthcare Scientists Training Capacity Survey. 2015.

Add in Mineralocorticoid receptor antagonist (MRA) if still symptomatic with the above.



ACE-I or ABRS have a good evidence base and are important medications to significantly reduce symptoms and improve prognosis in heart failure patients.[97] According to QOF data following exemptions nationally 83% of heart failure patients are on an ACE-I or ARB, and the Derbyshire STP achieves a similar proportion 81.9% (figure 1). Of the included CCGs only North Derbyshire is significantly below the national average at 80.1%, this represents approximately 100 people (figure 1)[98]. The provision of ACE-I /ARBS is comparable to national standards but **Derbyshire patients would benefit from greater levels of prescribing** and comparable CCGS such as North Staffordshire and South Cheshire achieve in excess of 86%.

B-Blockers also have a beneficial effect on prognosis and symptoms. Of those patient treated with ACE-1 or ARBs, 79.9% nationally and 75.5% in Derbyshire are also treated with B-Blockers. Notable variation exists between Derbyshire CCGs: **Southern Derbyshire and Erewash are at a statistically significantly lower proportion of B-Blocker usage 73.3% and 71.9% respectively**, compared to 78.3% and 81.6% at North Derbyshire and Hardwick respectively CCG respectively. Within CCG variation exists further between individual General Practices. There is a **significant opportunity to increase the prescribing of B-blockers in Derbyshire** to improve the prognosis and symptoms.

[97] NICE NG106
[98] PHE Fingertips

A confounder here is potentially incomplete records and missing exemption. Additionally, a significant group missing from the data are those on B-Blocker monotherapy. The existing data identified does not allow interrogation for this group nor does it assess MRA usage.

- **Derbyshire is doing well with ACEi, ARB prescription but there is significant opportunity to improve in co-prescription of B-Blockers.**

Additionally, NICE recommends life-style advice and cardiac rehabilitation (providing an exercise-based cardiac rehabilitation programme), unless their condition is unstable. No identified data available regards the use of these services in Derbyshire.

8.4 Heart Failure in Secondary Care in Derbyshire

HF patient requiring admission are managed by medical teams at CRH and RDH in the Derbyshire STP area. Stabilisation of HF requires close monitoring and medical treatment. Largely this is provided on medical wards the majority of patients require fluid restriction, intravenous diuretics and nursing support. Some patients require escalation to High Dependency beds (level 2 or greater) for intensive pharmacotherapy including powerful heart medication such as inotropes or vasopressors and non-pharmacological therapies including non-invasive and invasive ventilation and rarely ultrafiltration. Heart failure is a progressive and often terminal diagnosis. People dying with heart failure can develop extreme symptoms including severe breathlessness and associated panic. These symptoms can be difficult to manage and often require palliative care input either in the community or secondary care.

Admissions

Nationally heart failure admissions have been increasing since 2010, Derbyshire is no exception. HES data records admissions with primary diagnosis of HF, elective or emergency. Nationally admission rates have risen from 130.5 to 161.7 per 100,000 population from 2010/11 to 2017/18: an increase of **24%.** In 2017//18 Derbyshire matched the national average with 161.7 per 100,000 population.

Heart failure Admission data- QOF/HES data public health finger tips accessed March 2019 -Table 3		
Area	**Rate Per 100,000 population**	**Admission Count 2017/18**
England	161.7	-
Derbyshire STP	161.7	-
Erewash CCG	164.7	158 Admissions
Hardwick CCG	181.9	205 Admissions
North Derbyshire CCG	153.1	484 Admissions
South Derbyshire CCG	172.4	870 Admissions
Variation from national average not statistically significant.		

The HES data above suggest the **Derbyshire STP is detecting and admitting an appropriate number of HF patients**, this data represents the primary reason for an admission. This data does not accurately represent the total amount of inpatient work due to HF. HF makes patients vulnerable to other diseases and exacerbates their effects for instance pneumonia, chronic obstructive pulmonary disease and influenza. As such increasing and extending admissions beyond the scope of this data.

Inpatient Organisation of Care

NICE Clinical guideline [CG187] published October 2014 and reviewed December 2017 sets the standard for **acute heart failure** diagnosis and management. Recommending a dedicated Heart failure team with outreach services in all hospitals caring for HF patients. **Both CRH and RDH provide dedicated inpatient Heart Failure MDT teams**. NICE recommend ongoing and early input from the HF team for all HF admissions. In both hospitals a data set

or audit was not identified to establish the location, HF MDT input or parent treating team for all HF admissions over a given time. However, in both hospitals patients are manged on Cardiology and General Medicine wards requiring the caring parent medical team to refer to cardiology for ongoing advice and assistance. Once stabilisation is achieved NICE recommends a 2-week HF team follow up. Again an appropriate data set was not identified. IN CRH HF team assess patients before organising follow up prioritising early follow up for those in greatest need, anecdotally in practice most patients wait more than 2 weeks according to the HF team. NICE recommend subsequent follow up as per chronic heart failure post discharge.

Inpatient Diagnosis

NICE recommend inpatient BNP testing and Echocardiogram within 48 hours of admission. A dataset was not identified to establish the proportion of patients receiving this care. HF MDT and physicians in both hospitals report it is rare for a stable patient to receive an echogram within 48 hours reporting most patients and managed based on clinical suspicion, many patients are discharged with a clinical diagnosis awaiting echocardiogram confirmation as an outpatient. Whilst again anecdotal, this evidence suggests that **inpatient echocardiography may also an over stretched resource.**

Inpatient management

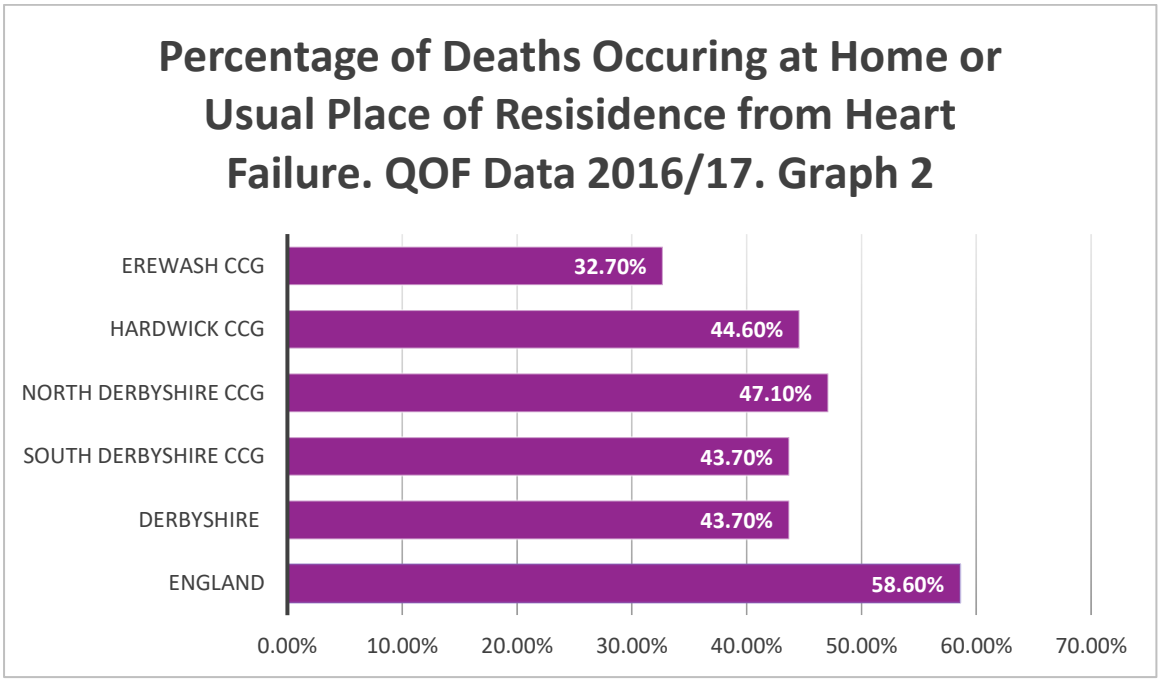
The use of pharmacological and non-pharmacological management of decompensated HF patients cannot be effectively considered due to a lack of identified data. Whilst the specific management compared to NICE standards is unknown we do know Derbyshire STP is admitting and treating comparable rate to the NHS nationally (Table 3). Additionally, HES data identified over 17990 procedures performed for patients with a primary diagnosis of heart failure in the Derbyshire STP, whilst these are largely not HF treatments specifically this illustrates these patients are comorbid and require a large amount of clinical input[2]. Smaller numbers of patients will require costly and highly specialist therapies including valve replacement, cardiac mechanical assist devices, implantable cardioverter defibrillators, cardiac resynchronisation therapy and even transplants.

8.5 Palliative care and Heart failure

NICE have identified a national need for palliative care in heart failure, noting that 40% of patients will die within 12 months of diagnosis and may well have a poor quality of life during this time. Additionally, NICE states that most patients would rather die at home given the appropriate support and opportunity.[99] Derbyshire is currently performing well below the national average in this across all CCGs: only 43.7 % of HF patients die at home compared to 58.6% nationally and as low as 32.7% in the Erewash CCG. **Significantly fewer Derbyshire patients with heart failure die at home than nationally** (Graph 2).

[99] Public health England CVD profiles- Heart disease-December 2018. Accessed: Public health finger tips.

Percentage of deaths occurring at home or usual place of residence from heart failure



According to HES/QOF data the patients who are not dying at home are dying in the NHS care providers, rather than hospices or other locations. Nationally there is a need for palliative support for heart failure patients and locally the needs are greater. Further investigation is required to identify why so few patients are able to at home, hypothetically this could be due to multiple reasons. The data available does not identify the cause but raises further questions and considerations including.

- How is provision of community palliative care nurses and home visits?
- What is the confidence and experience of teams managing palliative heart failure patients in the community?
- How do we go about the recognition of and planning for End of Life in Heart Failure?
- Provision of out of hours' support
- Patient education, culture and choice
- Suitability of local housing
- NHS and private care provision
- Geographical area, isolation and rurality
- Availability of hospice places
- Are Derbyshire patients accessing alternative support elsewhere?

NICE recommend the involvement or advice from HF MDT or a palliative care needs assessment if symptoms are worsening despite optimal specialist management. Inpatient services and GPs have open access to the HF MDT in Derbyshire**,** CRH has recently expanded the MDT to include a specialist palliative care nurse with access to consultant support to meet this need**.**

8.6 Key Points and Recommendations

- Derbyshire STP appears to be detecting and admitting an appropriate number of HF patients, with prevalence and admissions rates comparable to the national averages.
- Initial assessment suggest inpatient and outpatient echocardiography is an over stretched resource in keeping with the national picture.
- Significant opportunity exists to increase the prescribing of B-blockers in Derbyshire for people with Chronic Heart Failure.
- The provision of ACE-I/ARBS (ACE inhibitor or angiotensin receptor blocker medications) is comparable to national standards for people with heart failure but people would benefit from even higher levels of prescribing.
- There is a national and local need to allow people at the end of life suffering from heart failure to die at home if they wish. In Derbyshire the needs are greater with significantly less people able to do so. *Further assessment of end of life care and heart failure is needed*.

9. Conclusion and Recommendations

Cardiovascular disease remains an important cause of morbidity and mortality both nationally and in Derbyshire. The cornerstone of prevention remains the addressing of the risk factors that cause atherosclerosis - the underlying disease process. These include smoking, obesity, physical inactivity, hypertension and diabetes. As such the integration of lifestyle service contacts and referral into care pathways is a recurring theme throughout this needs assessment and appears in the recommendations for almost every chapter. Those this needs assessment describes eight discrete conditions, it is clear that they are all inextricably related by the underlying processes and risk factors. Many patients will be affected by more than one of these different conditions and so when planning preventative interventions it is sensible to take an overview of them all as well as specific individual measures.

Derbyshire is keeping up with the national average in many aspects of CVD care such as rates of blood pressure checks in all patients over 45 and anticoagulation treatment for patients at high risk of stroke.

There are however specific areas of management locally that could be improved, such as:

- Prescribing of high intensity statins in preference to less effective ones for people at risk of developing CVD or CVD complications.
- The prescription of beta-blocker medications to improve prognosis in heart failure patients.
- The provision and uptake of NHS health checks in the eligible population as an important opportunity for risk assessment and promotion of lifestyle interventions.
- Integration of an exercise programme to treat those with PAD within a large and well-resourced cardiac rehabilitation service (both for patients with IHD and heart failure) which would go a long way towards improving morbidity of CVD sufferers in the region.