

Director of Public Health Annual Report 2022

Hearts and Minds

Preventing heart disease and stroke
in Buckinghamshire



Contents

Foreword	3
How to use this report	4
1. Introduction	6
2. Risk factors for cardiovascular disease	7
2.1 Behavioural risk factors	8
2.2 Clinical risk factors	21
2.3 Social economic and environmental risk factors	23
3. Who is most at risk?	26
3.1 People living in deprived areas	27
3.2 Differences between ethnic groups	29
3.3 Differences by gender	32
3.4 People with severe mental illness	33
3.5 People with learning disabilities	33
4. The Buckinghamshire picture	34
4.1 Prevalence of conditions recorded in primary care	36
4.2 Gender differences in cardiovascular conditions recorded in primary care	38
4.3 Hospital admissions and trends	39
4.4 Death rates and trends	42
4.5 Differences by ethnic group	44
5. Summary and recommendations	47
5.1 What should we do?	48
6. Glossary	49

Foreword

This year my annual report is about cardiovascular disease in Buckinghamshire and how we can prevent it.

Cardiovascular disease causes heart disease, stroke and the second commonest type of dementia -vascular dementia. It causes 1 in 5 of all deaths in Buckinghamshire and is the major contributor to the gap in life expectancy between people living in our most deprived and least deprived areas. Whilst cardiovascular disease can affect anyone, it is more common in men, some ethnic groups, such as South Asian and black ethnic groups and people living in more deprived areas. However, cardiovascular disease is not inevitable and there is a lot we can do as individuals, communities and organisations in Buckinghamshire to prevent it.

The main modifiable risk factors for cardiovascular disease include behavioural risk factors, such as smoking, 'clinical' risk factors and social and environmental risk factors. People can take action themselves on some risk factors but there is more that organisations and society can do to help people do this.

For the behavioural risk factors a whole system approach that makes healthy choices the easy choices is more effective in changing behaviours than focusing on the individual alone.

Raising awareness of other risk factors is also important. Many people do not know they have 'clinical' risk factors, such as high blood pressure, high cholesterol or diabetes, as they may not have any symptoms. However, if these conditions are found early there are very effective treatments to manage them and reduce the risk of people developing cardiovascular disease.

Finally, the conditions in which people live and work can also impact on their risk of cardiovascular disease. The social and environmental risk factors mean that a diverse range of people and organisations can impact on our residents' risk of cardiovascular disease through their role in planning, transport, air quality, housing conditions and stress at work.

Addressing the key risk factors successfully will improve health in many additional ways, including reducing the risk of cancer, diabetes, dementia, musculoskeletal problems and poor mental health. It will also produce many other benefits, including improving child health and learning, economic productivity, improving air quality, helping to mitigate the impacts of climate change and improving quality of life for our residents. To do this we will need action from a wide range of partners, including communities and individuals themselves, local government, the NHS, voluntary sector, businesses and national government but the benefits are definitely worth it!

Dr. Jane O'Grady

*Director of Public Health and Community Safety,
Buckinghamshire Council*

Acknowledgements

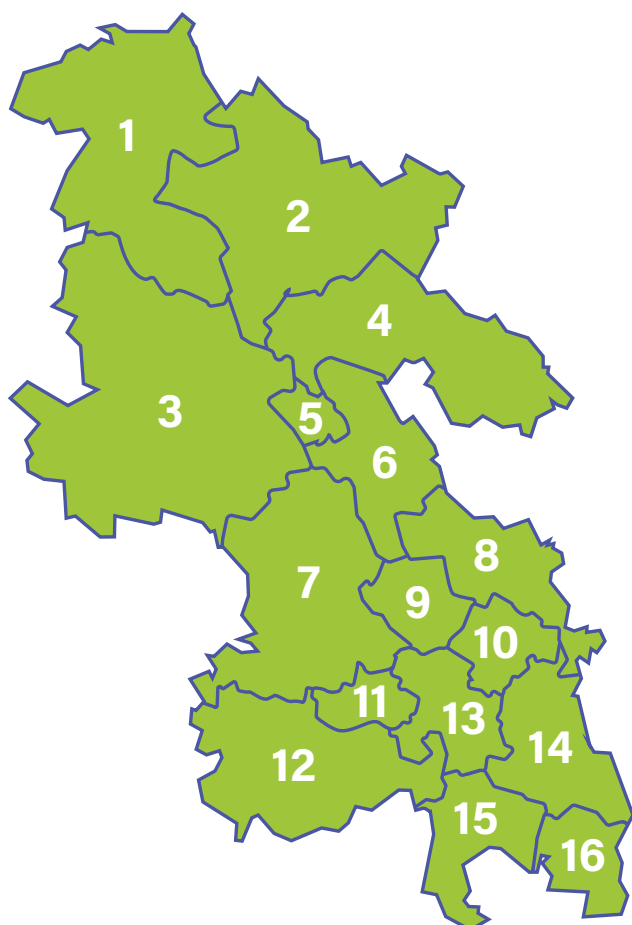
Thanks to Abigail Moffat, Caroline Thickens, David Stoye, Elizabeth Biggs, Elkie Dolling, Emma Dillner, Josiane Dyson, Layla Ravey, Louise Hurst, Lucie Smith, Michelle Baragona, Nicola Higgins, Sally Hone, Sarah Preston, Sarah Winchester, Thilina Jayatilleke, Tiffany Burch and Victoria Cooke.



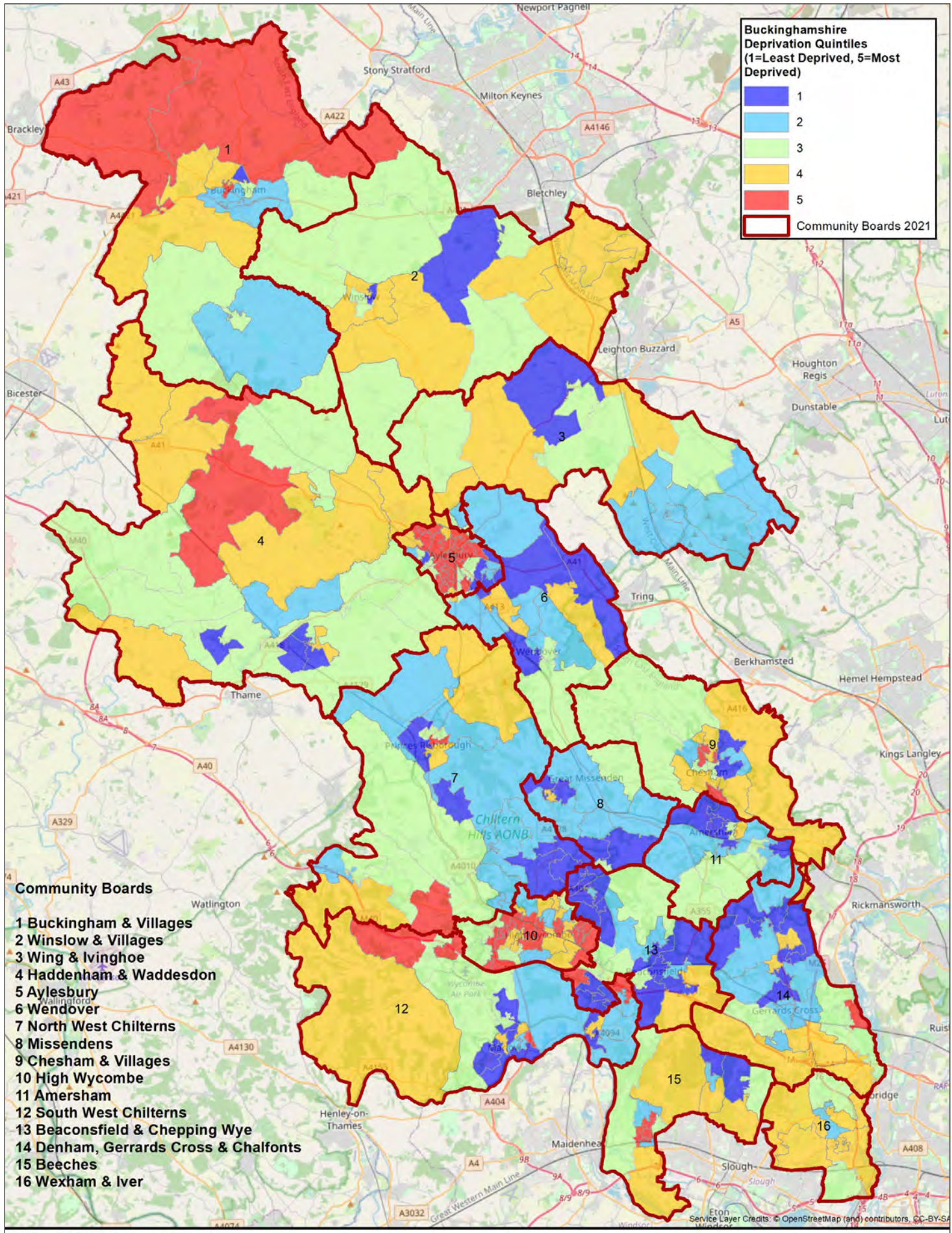
How to use this report

In addition to the report, there are a few tools to help with understanding the content.

- A glossary is available at the end of the document to clarify some of the technical language used.
- Analysis in this report sometimes mentions 'deprivation,' 'least deprived' and 'most deprived.' Deprivation in England is measured using the Index of Multiple Deprivation (IMD). It is an official measure of relative deprivation and defines deprivation to include a wide range of an individual's living conditions. Within Buckinghamshire, the population for our county is split into five even groups (quintiles) containing 20% of the population each, based on the deprivation score of the areas they live in. When the term 'least deprived' is used, it means the 20% of the Buckinghamshire population who live in the least deprived areas within the county using the Index of Multiple Deprivation. The 'most deprived' means the 20% of the Buckinghamshire resident who live in the most deprived areas within the county using the Index of Multiple Deprivation. A map of deprivation quintiles for the county is on the next page.
- Some of the analysis also mentions community boards. These are boards that allow council members and communities to come together to address local issues that matter to them. There are 16 community boards across the county. A map for the boards is below.



- 1 Buckingham & Villages**
- 2 Winslow & Villages**
- 3 Haddenham & Waddesdon**
- 4 Wing & Ivinghoe**
- 5 Aylesbury**
- 6 Wendover**
- 7 North West Chilterns**
- 8 Chesham & Villages**
- 9 Missendens**
- 10 Amersham**
- 11 High Wycombe**
- 12 South West Chilterns**
- 13 Beaconsfield & Chepping Wye**
- 14 Denham, Gerrards Cross & Chalfonts**
- 15 Beeches**
- 16 Wexham & The Ivers**



1. Introduction

Cardiovascular disease describes diseases of the heart and blood vessels. It includes heart disease, stroke, transient ischaemic attacks (mini-strokes) and can cause heart attacks, heart failure, chronic kidney disease, peripheral arterial disease and vascular dementia which is the second most common type of dementia. Cardiovascular disease costs the NHS in England £7.4 billion and the wider economy £15.8 billion every year. It is responsible for 1 in 4 premature deaths in the UK and is the biggest contributor to the gap in life expectancy between those living in the most and least deprived areas.

Buckinghamshire is one of least deprived and consequently healthiest counties in England. However, our residents still suffer from a significant burden of preventable diseases, including cardiovascular disease. Although our death rates from cardiovascular disease are lower than the national average, cardiovascular disease is a significant cause of ill health and disability in Buckinghamshire. It causes 1 in 5 deaths in Buckinghamshire and is the biggest contributor to the gap in life expectancy between people living in our most and least deprived areas.

The good news is that most cardiovascular disease can be prevented.



2. Risk factors for cardiovascular disease

The risk of cardiovascular disease is determined by a range of interlinked factors. Some risk factors are personal characteristics that cannot be changed, such as age and ethnicity. Modifiable risk factors include health-related behaviours such as smoking or biological or clinical risk factors such as high blood pressure. The physical, social and economic environment in which people live, learn and work also has a profound impact on their risk of cardiovascular disease. These broader determinants of health affect people's stress levels, ability to adopt healthy behaviours or avoid exposure to harmful environmental conditions such as poor air quality which all impact on their cardiovascular health.

The risk factors are dealt with in turn in the following sections.



2.1 Behavioural risk factors

2.1.1 The challenge of changing behaviour and best practice

The health behaviours that increase the risk of cardiovascular disease are smoking, unhealthy eating, drinking too much alcohol and being insufficiently physically active. These risk factors increase the risk of cardiovascular disease but also contribute to the development of clinical risk factors such as high blood pressure, obesity, diabetes and high cholesterol that also increase the risk of cardiovascular disease. Addressing these risk factors holistically would also decrease the risk of many other diseases, including cancer and dementia, and improve many other aspects of life from birth to old age, increase economic productivity and contribute to a better quality of life for residents.

However, changing behaviours is hard and these behaviours do not occur in a vacuum. These behaviours are influenced by the social, economic, cultural and physical environment in which people live. For a person to change their behaviour they must have the Capacity (including knowledge, skills and ability), Opportunity and Motivation to perform the desired Behaviour – known as the COM-B model of behaviour change. For instance, it is hard to eat healthily if you do not have enough money. It has been shown that families from the poorest tenth of the population need to spend 75% of their disposable income to eat the recommended healthy diet. Likewise, if there are not safe places to play, safe walking or cycling routes to school, work or shops it is harder to build in the required level of physical activity into the day.

In addition, most health-related behaviours are shaped in childhood and adolescence and are influenced by a wide range of factors when we are an impressionable age. The health behaviours of young people are strongly influenced by the people they see around them, including parents, other adults and their peers. For instance, we know that children who have parents who smoke are more likely to become smokers themselves. The pricing, advertising and availability of food and alcohol

affect consumption significantly and the food and alcohol industry spend many millions on advertising their products to influence cultural norms and consumption. The density of fast food outlets is higher in more deprived areas. For all these reasons the prevalence of health promoting or health harming behaviours varies across the population and over time. Changing behaviour requires much more than a focus on the individual and their behaviour but a whole system approach that supports the individual to make healthy choices and makes healthy choices the easy choices.

Stopping smoking is a good example of the variety of interventions needed to change behaviour: legislation creates 'smoke free' environments making it harder to smoke in public places, cigarettes are less affordable because of taxation, pictures on packaging show the real effect on people bodies, cigarettes are less visible within society due to a lack of advertising, and smoking cessation services support people develop skills to stop smoking.

To enable people to live healthy lives we must understand their barriers to making behaviour change and what would help them make a change. This differs for diverse groups of people. The best way to do this is to use co-design to involve people in shaping and testing and evaluating services and interventions that they will want to use. Co-production takes this process one step further where communities and individuals help deliver the service or intervention themselves. Effective behaviour change also requires that we understand people's views on the wider environmental changes that would be necessary to enable behaviour change.

Evidence shows that interventions that alter our environments to promote health, such as structural changes that require little or no action from individuals, see the largest population health gains and gains in the most vulnerable communities compared to individual-based approaches. For example, more than 50% of the population are overweight or obese. A strategy that focuses solely on changing the behaviour of individuals one person at a time cannot reverse this epidemic. A whole system approach at population level is required that addresses a

wide range of factors such as food formulation, pricing, advertising, availability of healthy food and social norms.

2.1.2 What we are doing

Recognising the importance of effective behaviour change, we are training teams in the council, NHS and wider partners in the use of the COM-B model described above to co-design services with communities.

We are also rolling out the Making Every Contact Count programme to support behaviour change across the council and partners. Making Every Contact Count (MECC) is an evidence-based approach to behaviour change which uses the day-to-day interactions people and organisations have with others to cascade health and wellbeing messages and information, whilst supporting people to make plans and identify actions that will improve their health. MECC gives people the skills to have 'healthy conversations' with their friends, family and community which can help sow the seeds of change and improve health and wellbeing

Public Health and partners have trained 245 people in MECC, including people from several organisations including adult social care staff and social care providers, voluntary and community organisations, schools, food banks, housing trusts and parish councils.

We are also working with partners across Buckinghamshire to produce multiagency strategies and action plans on the four risk factors that consider the impact of the wider environment on health behaviours. This includes strategies and plans on:

- [Physical activity](#).
- [Tobacco control](#).
- Whole systems approach to healthy weight.
- The Buckinghamshire Drug and Alcohol Strategy is being reviewed and updated by the local multi agency partnership in 2022.

The next section looks at each of these behavioural risk factors in turn and highlights what we can do about them locally.



2.1.3 Smoking and tobacco

Smoking and cardiovascular disease risk

Smoking is a major cause of cardiovascular disease (CVD) and accounts for approximately one of every four deaths from cardiovascular disease nationally. Smoking is also the single biggest driver of inequality in death rates between the least and most deprived communities. Over half the difference in the risk of premature death between the least and most deprived is due to smoking.¹ Most smokers started smoking in their teenage years and the addictive nature of tobacco makes it more difficult to stop.

Smokers are two to four times more likely to get heart disease compared to people who do not smoke, and smoking doubles the risk of a stroke and the risk of dying from a stroke.

People who smoke are also 30-40% more likely to develop type 2 diabetes and need more insulin to regulate their blood sugar.² Dementia is also more likely to develop in smokers than people who have never smoked.³

The risk of cardiovascular disease increases with the number of cigarettes smoked per day and the numbers of years people have been smoking. Even people who smoke fewer than five cigarettes a day may show signs of early cardiovascular disease. People who smoke 20

cigarettes a day are six times more likely to have a stroke compared to non-smokers. Exposure to second-hand smoke can also cause heart disease, heart attacks and strokes in non-smokers.

Smoking rates have been falling nationally for many years and during the COVID pandemic in 2020, in England at least 300,000 people quit smoking successfully. Over two million people cut down on the number of cigarettes they smoke each day.⁴ However, during the first lockdown in 2020, a study found that there was a 25% rise in 18 to 34-year-olds who smoke - resulting in more than 652,000 new smokers among this age group.⁵

Smoking prevalence in Buckinghamshire

In Buckinghamshire, it is estimated that about 11.3% of adults smoked in 2019. While the prevalence of smoking in Buckinghamshire has been falling and is lower than the national average, unfortunately our smoking rates have increased since 2017 when 9.6% of adults were smokers in Buckinghamshire.

The prevalence of smoking varies across residents in Buckinghamshire. Men have higher smoking rates than women. One in five people living in our most deprived areas are smokers compared to one in ten in our least deprived areas. Residents in routine and manual occupations are 2.5 times more likely to smoke in Buckinghamshire compared to people in managerial and professional occupations. Almost three in ten unemployed residents smoke compared to one in ten employed residents.

Residents with serious mental illness are three times more likely to smoke (three in ten smoke) compared to other residents (one in ten).

In England, residents from minority ethnic groups are less likely to smoke compared to residents from predominantly white ethnic groups (9.7% of black adults and 10.8% of Asian adults smoke compared to 14.7% of white adults). Within all ethnic groups, women are less likely to smoke compared to men - 15.9% of men in England smoke compared to 12.5% of women.⁶ When looking at some minority ethnic

groups the difference is larger. For example, 13.9% of Asian men smoke compared to 2.9% of Asian women.⁷

Smoking and the NHS

One in every 20 NHS hospital beds are occupied by someone with a smoking-related illness.

In Buckinghamshire in 2019/20 there were 3,085 hospital admissions attributable to smoking resulting in a rate of 957 per 100,000 which is lower than the England average of 1,398 per 100,000.⁸ An audit in 2016 of admissions in the local hospital found that one in four were smokers but the majority were not asked if they would like to quit smoking. People who smoke are more likely to have complications after surgery, such as infections or delayed healing, and need to stay longer in hospital.

Evidence shows that smoking cessation interventions delivered as routine within hospitals could have a major impact on the number of smokers making a quit attempt.

The NHS Long Term Plan has set a goal to support people in contact with NHS services to quit smoking. This is based on an evidence-based model already implemented in Canada (Ottawa model) and Manchester (CURE model).

The model relies on health care professionals identifying patients who smoke at the time of admission. Patients then receive brief advice from that health care professional before being referred to a tobacco dependency advisor in the hospital. Patients receive appropriate nicotine replacement therapy and counselling to aid them to quit. The Ottawa Model can improve long-term quit rates by 11% and could save the NHS nearly 100,000 admissions by the end of 2023/24.

The CURE project is also estimated to save 30,880 bed days per year across England.

By applying the Ottawa Model outcomes to the that in Buckinghamshire population, the following benefits over five years:

- 284 lives saved.
- 9,429 extra quitters.
- A net saving of £5,490,884.

Quitting smoking

The best thing all smokers can do for their heart and general health is to quit smoking. Even long-term smokers can see rapid health improvements when they quit. Within one year of quitting smoking, the risk of a heart attack drops significantly. In addition, within five years of quitting smoking, smokers lower their risk of a stroke to almost that of a person who has never smoked.

People's success at quitting smoking varies 44.5% of people under 18 years old report successful quitting compared to 61.4% of people aged over 60 years old.⁹ Men are also more likely to quit successfully at 62% compared to women at 54%. Residents in the most deprived areas are just as likely to try to quit smoking, but they often find it harder to stop smoking compared to people in less deprived areas.¹⁰ Data from ONS (Office for National Statistics) 2012 showed that of all those people who had ever smoked (current and ex-smokers), men and women in the most deprived fifth of areas were less likely to have given up smoking (46.5% and 48.5% respectively) than those in the least deprived fifth (74.0% and 76.0% respectively).¹¹ Ethnicity does not seem to impact on a person's chances of quitting.

What we are doing in Buckinghamshire

A wide range of partner organisations in Buckinghamshire, including public and voluntary sectors, are working together to help people to stop smoking and reduce the harm from tobacco. The [Buckinghamshire Tobacco Control Strategy](#) sets out our ambitions to achieve a smokefree future for residents. The three main aims of the strategy are to:

1. Continue to reduce smoking prevalence rates and inequalities caused by smoking for adults, children and young people.
2. Reduce the harms associated with second-hand smoke.
3. Reduce the supply and demand of illicit tobacco.

Partners are now working together as the Buckinghamshire Tobacco Control Alliance to implement the annual action plan against the four themes of the strategy: Prevention first,

Supporting smokers to quit, Eliminate variations in smoking rates and Effective enforcement.

Work which is taking place to support this includes:

Smoking cessation support and e-cigarette pilot: Buckinghamshire's Stop Smoking Service, Live Well Stay Well, offers free stop smoking support to residents in Buckinghamshire. They have launched a new e-cigarette pilot so that clients can choose this method to support them to quit smoking.

Surgery waiting lists: Increase the number of patients on surgical waiting lists who quit smoking while waiting for their operation, including training staff in Making Every Contact Count (MECC).

NHS Long Term Plan – tobacco dependency services: A dedicated inpatient model that will ensure that all inpatients for acute, maternity and mental health services are screened for their smoking status, offered in-house support services to quit, including access to stop smoking aids such as nicotine replacement therapy, and then discharged into community services. Services must have a fully functioning service, with a trained workforce and appropriate IT systems and processes in place by 2023/24.

Dedicated campaigns: Promoting national campaign such as Stoptober, No Smoking Day and Better Health. Partners are encouraged to also share messages through their own channels. Smokefree Sidelines – a grass roots football campaign aimed at encouraging parents and spectators not to smoke around the pitch sidelines in front of children and young people.



2.1.4 Physical activity

Regular physical activity can reduce the risk of heart disease and stroke by 25%.¹² It also reduces the risk factors that lead to an increased risk of these diseases¹³ such as high blood pressure and type 2 diabetes by one third. Regular physical activity can improve cholesterol levels by raising your HDL ('good') cholesterol levels and simultaneously lower your LDL ('bad') levels.¹⁴

Recommended levels of physical activity are at least 150 minutes a week of moderate-intensity physical activity or at least 75 minutes a week¹⁵ of vigorous-intensity physical activity.

Physical inactivity (defined as less than 30 minutes moderate physical activity per week) increases the risk of high blood pressure, high cholesterol levels and increase the chances of being overweight or obese and having diabetes, all of which are risk factors for cardiovascular disease. Increasing levels of activity in inactive adults in England to just 30 minutes per week could increase overall life expectancy of inactive adults by three years.¹⁴

Sitting down for long periods also increases the risk of heart disease, high cholesterol, type 2 diabetes, obesity and even some cancers.¹⁶ Increased sitting time is associated with an increased risk of death regardless of physical activity levels, and therefore is now recognised as an independent risk factor in addition to lack of exercise.

The Buckinghamshire picture

In 2020 67.5% of people in Buckinghamshire said they met the recommended physical activity levels which is a slight increase over the last four years. However, studies show that people often overestimate the amount of activity they do. More than one in five adults are currently inactive and this has not improved over this period. The greatest health gains will be made by increasing activity levels in inactive people. If we increased physical activity levels from current 67.5% of adults meeting national guidelines to 71% of Buckinghamshire adults,

163 deaths could be avoided and 59 cases of diabetes prevented over five years (Source: Revised Health Impact of Physical Inactivity Model [2013], 2018).

Who is less active?

National data show that men and women have similar activity levels with 62% and 60% respectively reporting that they meet physical activity guidelines.³ Activity levels generally fall with age, the sharpest decrease coming at age 75+ years. Those who are long-term unemployed or have never worked are the least likely to be active (52%).¹⁵ There are also significant differences in activity levels based on ethnic background with 63% white adults, 52% black adults and 48% South Asian adults¹⁵ reporting that they meet the physical activity guidelines.

COVID and physical activity

COVID and lockdown had a significant impact on activity levels and the impact has been greater on those with long term conditions, older adults and people from black, Asian and minority ethnic groups.¹⁵ The largest fall in activity levels was seen in those with the lowest activity levels initially and so the inequalities in physical activity have widened. Adult physical activity levels decrease as deprivation increases, and if you live within a deprived area, you are almost four times more likely to die early than someone in the least deprived area.¹⁴

What we are doing in Buckinghamshire

A wide range of partners are working together to help people to increase their physical activity levels and have developed the [Buckinghamshire Physical Activity Strategy 2018-2023](#). There is an annual action plan delivering the four pillars of the strategy: Active Environments, Active Communities, Skilled Workforce and Working Collaboratively.

Two subgroups focusing on older adults (Live Longer Better Alliance) and disabilities (The Sport and Physical Activity for All Network) have also been developed. Work which is taking place includes:

Skilled workforce: [Active Medicine](#) – free training for frontline workers and volunteers

to improve knowledge, skills and confidence to promote physical activity and empower patients/residents to be more active. A total of 1,301 people have been trained via 68 training sessions.

Managing long-term conditions – providing specialist training for instructors to develop physical activity interventions to support residents to manage their long-term condition(s).

Active Communities and reducing sedentary behaviour: Active Movement is a whole school approach to inspire children and families to sit less and move more. The 12 month programme educates and empowers teachers to include movement into everyday class routines. Four Buckinghamshire schools took part in phase one, involving 1,579 pupils and two more schools joined in January 2022. Schools have reported benefits such as improved concentration levels and better engagement from pupils. For more details on how to implement this programme into your school, home and/or office contact the Public Health team.

The [Active Communities](#) pilot launched in May 2021 for wards in Aylesbury (Aylesbury northwest) and Wycombe (Abbey; Booker; Cressex & Castlefield; West Wycombe) to encourage residents to sit less and move more. The programme has been designed to take a whole community approach to help everyone make small changes to increase movement in our daily routine. Within the first six months the project has engaged with 2,777 residents, introduced four [Active Park Walks](#) with 575 walkers so far and has linked with over [50](#)

care homes, nurseries, schools, faith settings and community centres. These settings have introduced a range of healthier changes.

Active Environments: [Simply Walk](#) – offering over 60 volunteer-led walks across the county, all walkers are welcome whether fit and active, require a walking aid or new to exercise. The service runs all year round, in all weathers, giving the opportunity for residents to meet new people improve physical activity levels and general wellbeing. All walks are led by trained volunteers and range from 30 minutes to over 90 minutes. Walkers can either [book online](#) or just turn up and complete a registration form with a walk leader. A map of walk locations can be found [here](#).

Active Travel – multiagency working to increase the number of residents cycling and walking as part of the Active Travel Fund actions of Tranche one and two and supporting schools to achieve the mode shift award as part of the national school travel awards scheme.

Play Streets - implementing temporary road closures on residential roads, to allow for chaperoned children's play and community connection on the street.

Working collaboratively: Increasing awareness of local activity opportunities – all partners supporting the use of the Bucks Online Directory and the Bucks Family Information Service to stakeholders and residents.

We are working together to support the Buckinghamshire leisure strategy and health



Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

Check the label on packaged foods

Each serving (150g) contains

Energy	Fat	Saturated	Sugars	Salt
1046kJ 250kcal	3.0g	1.3g	34g	0.9g
	LOW	LOW	HIGH	MED
13%	4%	7%	38%	15%

of an adult's reference intake

Typical values (as sold) per 100g: 697kJ/167kcal

Choose foods lower in fat, salt and sugars

Eat at least 5 portions of a variety of fruit and vegetables every day

Fruit and vegetables



Eat less often and in small amounts

Choose wholegrain or higher fibre versions with less added fat, salt and sugar

Potatoes, bread, rice, pasta and other starchy carbohydrates



6-8 a day

Water, lower fat milk, sugar-free drinks including tea and coffee all count.

Limit fruit juice and/or smoothies to a total of 150ml a day.

Beans, pulses, fish, eggs, meat and other proteins

Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat

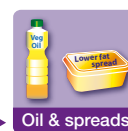


Dairy and alternatives

Choose lower fat and lower sugar options



Choose unsaturated oils and use in small amounts



Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS

Figure 1: Eatwell Guide

Healthy Eating

A healthy diet can reduce the risk of heart disease and stroke significantly. A poor diet is one of the biggest risk factors for preventable ill health in England.¹⁷

The Eatwell Guide (Figure 1) shows the different types of foods and drinks we should be eating – and in what portions to have a healthy balanced diet.¹⁸ Foods high in salt, fat and sugar lead to conditions such as high blood pressure, high cholesterol and obesity, all of which are risk factors for cardiovascular disease.

Eating at least five portions of a variety of fruit and vegetables a day could reduce the risk of deaths from chronic diseases, such as heart disease, stroke and cancer by up to 20%,¹⁹ with each increase of one portion of fruit or vegetables a day lowering the risk of coronary

heart disease by 4% and the risk of stroke by 6%.²⁰ There are variations in fruit and vegetables consumption across communities and only 20% of adults meet the recommended five-a-day guideline in the most deprived areas.²¹

Currently, only 55.4% of adults in England eat the recommended five portions a day, with Buckinghamshire slightly higher at 58.4% (2019/20),²² with fewer men than women meeting the guideline.²³ However, other data sources put the figure even lower, according to Health Survey for England data only 28% of adults and 18% of children are eating the recommended five portions of fruit and vegetables per day, with fewer men than women meeting the guideline.¹

Too much salt in our diet leads to high blood pressure, which is a major cause of heart disease and 69% of adults in England are estimated to be eating too much salt. For every gram of salt we remove from the average UK diet, we can reduce deaths from heart attacks

and strokes and save 4,147 lives per year. Up to 75% of the salt we eat comes from processed foods (e.g., bread, cheese, meat products like bacon) and food eaten out of the home.²⁴

Eating away from home

More than one quarter of adults and one fifth of children in England are eating food from out-of-home food outlets (restaurants and takeaways) at least once a week.²⁵ These meals tend to have higher fat, saturated fats, sugar and salt, and lower levels of healthy nutrients. Often eating meals prepared away from home is linked with cardiovascular disease, with those regularly eating two meals or more per day prepared away from the home having a greater risk of death from cardiovascular disease and cancer.²⁶ Fast food outlets (including chip shops, burger bars and pizza places) account for more than a quarter of all eateries in England. More deprived areas tend to have higher concentrations of fast-food outlets, with five times more outlets found in these areas than in the most affluent areas.²⁷

Food insecurity

Food insecurity is when people cannot afford enough food to meet their basic needs.

The poorest 20% of UK households would need to spend 39% of their disposable income on food to meet the NHS Eatwell Guide costs and the poorest 10% would have to spend 75%. This is in contrast to just 8% for the richest 20%.²⁸

COVID-19 has increased the number of people in food insecurity and the numbers of people using food banks. Pre-COVID 7.6% of the UK population were facing food insecurity, increasing to 9.9% (5.2 million adults) between February and July 2021.²⁹ The priority for people

affected by food insecurity is to put food on the table that is filling, rather than focusing on the nutritional value of the food.

Eating habits during the pandemic

During the COVID-19 pandemic 40% of adults gained on average half a stone (one stone is the same as 14 pounds in weight).³⁰ Eating habits during the pandemic changed with a third of people reporting snacking on unhealthy food and drinks at least once a day (35%), an increase from 26% pre-pandemic. Sales data also showed an increase of 15% in take-home snack foods, such as crisps, sweets and biscuits. A quarter of alcohol drinkers also said their intake had increased since the second lockdown, with sales showing a 28% increase in shops compared to 2019.³¹ In Buckinghamshire food bank use during the pandemic increased significantly compared to pre-pandemic levels. There are six food banks in Buckinghamshire with the number of food parcels distributed increasing from 16,158 in 2019 to 26,514 in 2021.

2.1.5 Body weight

A healthy weight is defined using a measure called by a Body Mass Index (BMI).³² A BMI of more than 25 is defined as being overweight and over 30 as being obese.

Obesity and being overweight is one of the leading risk factors for cardiovascular disease, particularly where people carry excess weight around their waist.³³ In the UK, around one in six heart and circulatory disease deaths are associated with being overweight.³⁴



Obese people are also more likely to develop other risk factors for cardiovascular disease. They are more likely to develop high blood pressure and type 2 diabetes than those with a normal range BMI.³⁵ People who are obese are also 30% more likely to develop dementia than those with normal range BMIs.³⁶

The risk of developing cardiovascular disease increases the more overweight a person is.³⁷ Waist circumference is also an important indicator of the risk of cardiovascular disease. Adults with a very high waist measurement (Men: more than 102cm. Women: more than 88cm) have an increased risk of cardiovascular disease compared to adults with the 'ideal' waist circumference (Men: less than 94cm. Women: less than 80cm).

Most adults in the UK are overweight or obese: almost seven in ten men and six in ten women are overweight or obese. Furthermore, 26% of men and 29% of women are obese. Unfortunately, during the COVID-19 pandemic 40% of adults gained on average half a stone in weight, of whom 21% gained a stone or more.³⁸ Children who are obese are more likely to be obese as adults.^{39, 40} One in five children aged ten to 11 are classified as obese.⁴¹

Overweight and obesity in Buckinghamshire

In Buckinghamshire six in ten adults (63.1%) are overweight or obese, and the numbers who are obese has been increasing since 2017/18. Almost one in five (18.2%) of four to five-year-olds and almost one in three (31%) of ten to 11-year-olds are also overweight or obese. Childhood obesity has also increased since 2017/18 in children aged ten to 11 years.⁴²

Both cardiovascular disease and obesity are strongly associated with health inequalities. Both adults and children in the most deprived areas have almost double the chance of being obese compared with the least deprived.^{43, 44} In the ward of Micklefield in High Wycombe, one in four Reception age children are overweight or obese, increasing to two in five in Year 6. Likewise, in Southcourt one in five Reception age children are overweight or obese, increasing to two in five in Year 6. This is in comparison to the more affluent area of Greater Marlow

where one in seven Reception age children are overweight or obese, increasing to one in five in Year 6. People of South Asian ethnicity also have an increased risk of cardiovascular disease and diabetes at a lower weight compared with white groups.⁴⁵

What are we doing to support healthy eating and a healthy weight?

Obesity is difficult to address, affected by a mixture of social, economic, biological and environmental factors that shape how we live and our individual behaviours. By creating healthier places to live and addressing other factors that affect our health and choices, such as education, employment and income, the quality and safety of the environment and the places we live and work in, it will help people maintain a healthy weight and improve overall health.

Whilst eating a healthy diet and maintaining calorie balance is down to individuals, the availability of food high in calories is now making it much harder for people to maintain healthier lifestyles. It is important the food environment supports people to improve their health. Improving the nutrient content of the food and drink we buy, cook and eat must be a priority at both a national and local level. We can take practical steps at a local level to enhance the healthy eating options available.

We also need to create an environment which provides people with the opportunity to be active and move more throughout their day. The built environment (e.g., housing, estates, workplaces etc.) can play a significant role in increasing the opportunities for people to be active and can impact on both physical and mental wellbeing. By protecting and enhancing green spaces for allotments, park runs and children's play areas we can create an environment that helps to shape people's preferences and behaviours to encourage activity.

Whole system approach to obesity

Within Buckinghamshire we have recently started taking a 'whole systems approach to obesity'. This brings together partners from a wide variety of backgrounds, such as housing, planning, transport, leisure, schools and local

communities, to develop and agree on a shared action plan to address obesity, looking at these wider environmental factors.

- **Food knowledge and environment** – improving the food environment to support people to make healthier choices and improve food knowledge and understanding.
- **Transport** – reducing sedentary behaviour and encourage communities to increase active transport and travel options to increase physical activity levels.
- **Physical activity** – increasing physical activity uptake through promotion and increasing the range of activities offered.
- **Schools** – enabling schools to contribute to children and young people achieving a healthy weight, creating consistent messages on food and physical activity for both pupils and parents.

Some examples of community projects we are delivering with communities and partners to increase people's access to fresh fruit and vegetables, improve their knowledge to cook their own nutritious meals and try their hand at growing their own produce are included below:

Grow to Give

Grow to Give encourages people to grow more food in their gardens and allotments and donate this surplus to food banks and community fridges in their local area to support people experiencing food insecurity. It was set up by residents Justine Hamer and Sheila Bees in Aylesbury and Wycombe in 2019. With support and funds from Buckinghamshire Council and Feedback the scheme has gone from strength to strength with 14 allotment sites and 200 community growers now participating.



In 2021 the community of growers donated 3.22 tonnes of produce for food parcels that supported over 600 families, that is the same weight as 403 baskets of fruit and vegetables, three giraffes or two family sized cars.



In 2022 the project will partner with five new allotment sites in the Chesham and Iver/ Wexham area in addition to the 14 existing sites in Aylesbury and High Wycombe. The project relies on the generosity of local food growers and champions at each allotment site, helping to keep the scheme running on the ground. We are also keen to expand to as many plot holders as possible so even more produce could be donated.

The project has also developed 20 recipe cards and videos to ensure people receiving the produce get healthy and simple recipe ideas to use the donated food. It also helped develop a community of eco-friendly growers and held eco-growing master classes to support growers get the most out of their site, engaging 100 people in the sessions.

Starting your own scheme is a simple, fun and healthy way to bring your community together while helping those in need. On the [Grow to Give website](#) there are free downloadable resources including a how to guide, posters to advertise the scheme at your allotment or in your local community.

Adam Townsend, Foodbank Manager at the Aylesbury Vineyard Storehouse commented:

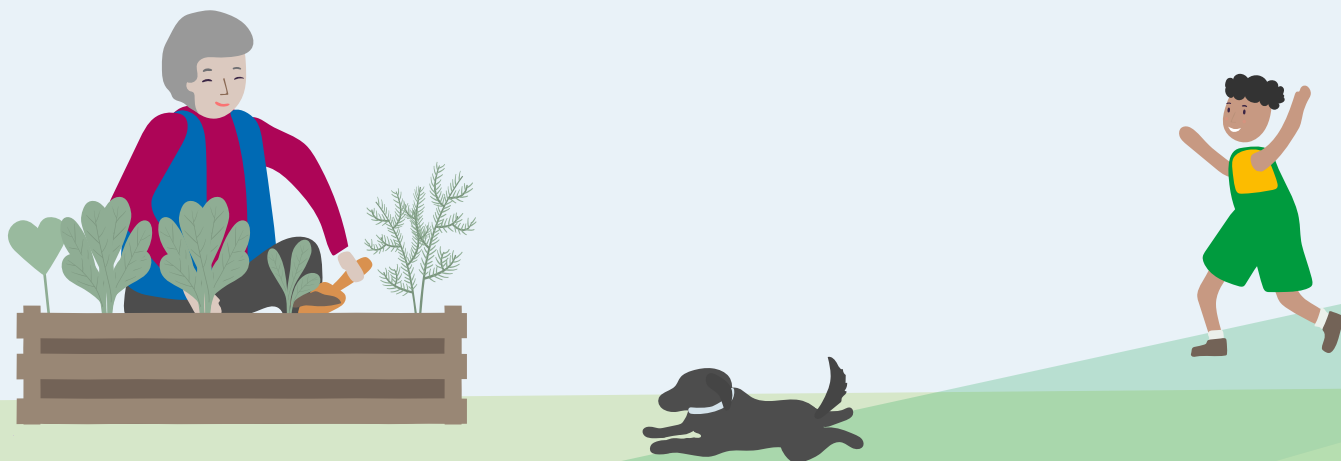
"Having fresh, seasonal, locally grown food to give our food bank clients is just fantastic! It's even encouraged some of our customers to start growing themselves. It's been a really tough year and the Grow to Give donations just show how much people care."

Justine and Sheila who run the project are in awe of the generosity of local growers. The pair said:

"We just can't believe people have taken Grow to Give into their hearts so quickly, and it's all down to our local allotment champions and fabulous growers... Each week it's so uplifting seeing the fabulous produce they donate, it's a great example of community spirit and what can be achieved working together."

A grower from Ashbrook Allotment said:

"I've really enjoyed donating some of my surplus crops to Grow to Give. I always grow too much of most crops throughout the year and it is good to know it can be put to such a great cause. If this helps in anyway to help get someone through a difficult time that is really satisfying to know. Our allotment site has really come together to support Grow to Give and I am sure all who contribute very much enjoy the regular updates on how much has been collected so far."



Community growing sites – Grow It, Cook It, Eat It

Grow It, Cook It, Eat It brings communities together to create shared growing sites in their local area. Open to all, the sites provide a supportive area where people can develop their skills, knowledge and confidence to grow their own fruit and vegetables. There are currently four sites across the county in High Wycombe, Aylesbury and Chesham, with plans to develop a further two sites in the Iver and Buckingham areas. Each site is led by an experienced 'Expert Gardener' who is on hand to offer support and guidance as needed, with the aim being the local community will take ownership of the site and keep it going long-term.

During the set-up phase of the sites this year, many community members and local organisations have generously stepped forward offering workforce, tools, sheds, greenhouses and plants to help get the sites off the ground.

The project also has a cooking element which launched late 2021. Local community volunteers are trained to empower and inspire others to cook healthy and nutritious meals from scratch. Delivering a five-week cookery course, volunteers cover topics such as healthy meals on a budget, basic cookery skills and reducing waste.

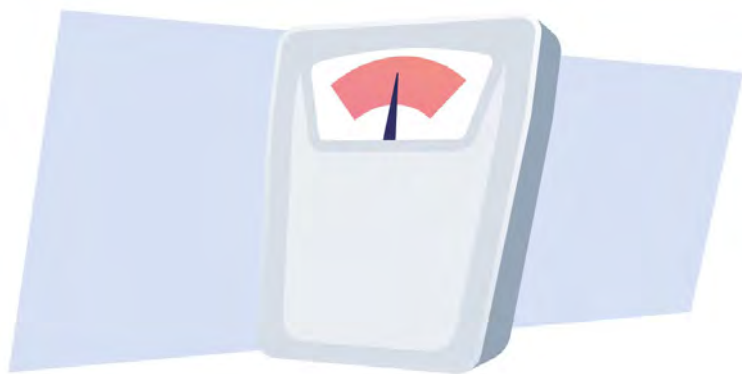
For further details of each of the growing sites, and to register your interest in getting involved on a growing site and/or as a volunteer cookery tutor, please visit the [Grow It Cook It Eat It webpages](https://healthandwellbeingbucks.org) (healthandwellbeingbucks.org).

Veggies in containers

The veggies in containers project was developed to show people how easy it is to grow their own food regardless of the space they have available whether in the garden, on balconies, in window boxes and even indoors.

As part of the project Restore Hope (Chesham and Latimer), The Vineyard Foodbank (Aylesbury) and The Women's Cultural Arena (High Wycombe) distributed a total of 251 growing kits to households who were currently using their services. Kits included containers, soil, seeds, equipment, and full instructions to allow people to try their hand at growing. Each kit also came with recipe cards enabling people to cook healthy and nutritious meals with the foods they have grown.

The project was well received by those involved with many stating they had increased confidence to try growing their own vegetables. Those with young children found the children really got engaged and provided opportunities for shared enjoyment with parents, but also provided educational value and introduced children to new foods.



Weight management

Buckinghamshire Council commissions some weight management services through our integrated lifestyle service, Live Well Stay Well.⁴⁶ Additional funding was received in 2021/22, for a one-year period, from the government to support weight management in groups with higher need of these services.

A review of current services and people accessing them in relation to need for weight management services identified three groups of people who were not attending services in the numbers expected: men, people from minority ethnic backgrounds and those with

mild learning disabilities. Services were further targeted to areas with the highest rates of diabetes, and excess weight in adults which were Aylesbury and Wycombe.

We worked with the following organisations to help improve healthy eating and healthy weight in these groups.

- **Talkback-UK** - a service for adults with a mild learning disability, based on developing the knowledge and understanding of food, nutrition, and weight issues. Taking a practical approach, they are educating people around shopping for the right food, reading food labels, cooking and trying new foods and selecting healthy foods, as well as including physical activity into everyday life.
- **Karima Foundation** (High Wycombe) - a local community organisation will provide lifestyle advice and physical activity sessions that are culturally appropriate to the black and ethnic minority population of High Wycombe.
- **Wycombe Wanderers Sports and Education Trust** - the charity of Wycombe Wanderers Football Club, using the appeal of football to deliver healthy weight services. Providing men and women only sessions across both High Wycombe and Aylesbury.
- **The Fitness Garden** - a community interest company working to improve the health of the people of High Wycombe through education and engagement in health fitness and mental wellbeing. Providing dedicated services for men and black, Asian, and ethnic minority groups, the Fitness Garden deliver services using both face to face contact and technology to keep people motivated and engaged in their journey to losing weight.
- **Man v Fat** - UK's largest male only weight loss programme. Based around a football league where all players want to enjoy football, lose weight and get healthier. The league is not just decided on goals scored, but also weight lost. Sessions start with dietary advice (and a weigh-in) followed by 28 minutes of football. Sessions run in both Aylesbury and High Wycombe.

We are currently reviewing the outcomes of each of the above programmes to help support future commissioning of services across Buckinghamshire.

2.1.6 Alcohol

Chronic alcohol consumption of more than 3.75 units per day (approx. 280ml wine or 660ml beer) is associated with an increased incidence of high blood pressure and of cardiovascular diseases, such as heart attack, heart failure and stroke.⁴⁷ One unit is 8g of pure alcohol and a standard glass (175ml) of wine contains 2.1 units and a bottle (330ml) of beer contains 1.7 units. This [calculator](#) works out the number of units in a particular drink.

Global estimates indicate that the alcohol accounts for 16% of high blood pressure worldwide.⁴⁸ Regular excess alcohol consumption also contributes calories which may lead to weight gain and abnormal heart rhythms can be exacerbated by alcohol consumption.

UK health advice is that, for both men and women, it is safest not to drink more than 14 units of alcohol a week to keep alcohol health risks to a low level. It is estimated that over one quarter (29%) of Buckinghamshire residents drink more than 14 units per week, compared to 26% nationally. This equates to 120,000 adults in Buckinghamshire drinking above recommended levels.

On average, people on low incomes drink less alcohol than people on higher incomes. However, people from deprived areas are more likely to die or suffer from a disease related to their alcohol use.⁴⁹

Adults in ethnic minority groups are less likely to report drinking alcohol at a hazardous, harmful or dependent level compared to white groups.⁵⁰

What we are doing

The Buckinghamshire Drug and Alcohol Strategy is being reviewed and updated by the local multi-agency partnership in 2022. The updated Buckinghamshire strategy will also take account of the [new national drugs plan](#).

As part of the NHS Health Check simple questions are asked about people's health. This includes how much alcohol people drink, enabling advice about alcohol to be offered. Further details are available on the [NHS website](#).

Buckinghamshire Council commissions a range of services to support people with problematic alcohol use.



2.2 Clinical risk factors

2.2.1 High blood pressure

High blood pressure (also called hypertension) affects more than one in four adults and increases the risk of stroke, heart disease, kidney failure and some types of dementia.

Surveys suggest that 30% of men and 26% of women have high blood pressure and the prevalence increases with age, rising to more than 50% in people aged over 60 years. It is more common in men than women up to the age of 65 years. High blood pressure is more common in people of South Asian, black African, black Caribbean or Irish ethnicity and people who have a relative with high blood pressure. People living in the most deprived areas are 30% more likely to have high blood pressure compared to people living in the least deprived areas.

High blood pressure is responsible for 12% of all visits to GPs with an estimated annual cost to the NHS of over £2 billion.

In England, only 57% of the estimated number of adults who have high blood pressure have had it detected, and only 56% of people under 80 who have been diagnosed with high blood pressure have achieved the NICE recommended target of BP of 140/90 mmHg.

Modifiable factors that increase the risk of high blood pressure include being overweight, being insufficiently active, eating an unhealthy diet containing too much salt and not enough fruit and vegetables, drinking too much alcohol and smoking.

The higher the blood pressure the higher the risk of harm. Each 2mmHg rise in systolic blood pressure is associated with a 7% increase in deaths from heart disease and 10% increase in deaths from stroke. High blood pressure can be reduced by drug treatment. Reducing salt in food, eating healthily, drinking less alcohol, being more physically active and losing weight if overweight can also help to reduce blood

pressure. Research suggests that for every 10mmHg reduction in blood pressure the risk of heart disease and heart failure reduces by 17% and 28% respectively and the risk of stroke reduces by 27% and deaths from all causes reduce by 13%.

Detecting high blood pressure

People with high blood pressure may not know they have it because they may not have any symptoms. The only way to detect high blood pressure is through a simple measurement using a blood pressure machine. The longer high blood pressure goes undiagnosed or uncontrolled, the greater the risk of harm to health.

Residents who are aged 40 to 74 years are eligible for the NHS Health Check once every five years. This checks for high blood pressure and other risk factors for heart disease and stroke and staff can give advice to promote a healthier life and refer to behaviour change or other services.

High blood pressure and COVID-19

High blood pressure is linked to higher risk of serious illness if someone develops COVID-19.⁵¹ Some studies suggest that people with high blood pressure are more at risk of getting seriously ill with and dying of COVID-19. Research into the link between high blood pressure and COVID-19 is ongoing. However, people with untreated high blood pressure seem to be more at risk of complications from COVID-19 than those whose high blood pressure is managed with medication.

During the COVID pandemic, an estimated 49,208 fewer people in the Buckinghamshire, Oxfordshire and Berkshire West (BOB) area had their high blood pressure managed to the target level. This means for the BOB area that there is now the risk for an extra 736 heart attacks and strokes over the next three years.

2.2.2 Diabetes

Diabetes is one of the most common chronic diseases in the UK with 4.1 million people living with a diagnosis of diabetes and a further 850,000 people estimated to be living with diabetes but not yet diagnosed. Diabetes diagnoses have doubled in the last 15 years, and 13.6 million people are estimated to be at risk of developing diabetes in future.

Diabetes comprises a group of disorders characterised by persistently raised levels of sugar in the blood. There are two main types of diabetes – the most common is type 2 accounting for nine in ten cases. Type 1 and type 2 diabetes are both associated with an increased risk of cardiovascular disease and other health problems.

People with type 2 diabetes have double the risk of cardiovascular disease, such as heart attack, heart failure and stroke, and have an increased risk of other problems, including loss of sight, and kidney disease. The life expectancy of people with type 2 diabetes is reduced by up to ten years.

There are several risk factors that may make someone more likely to be diagnosed with type 2 diabetes – a combination of characteristics people are born with and features of our environment and behaviours. The main modifiable risk factor for type 2 diabetes is being overweight or obese, which accounts for 80-85% of the overall risk. Being overweight is associated with a three-fold increased risk and being obese is associated with a seven-fold increased risk of diabetes compared to people of a healthy weight. Another contributor is higher levels of sedentary behaviour, which itself is associated with a two-fold increased risk of diabetes. A further predictor of future type 2 diabetes diagnosis is elevated blood sugar levels during pregnancy – gestational diabetes. Gestational diabetes is associated with a seven-fold increased risk of type 2 diabetes in later life.

Diabetes is also a significant contributor to health inequalities. People of Asian, African, and Afro-Caribbean ethnicity have up to a three

to six times increased risk of type 2 diabetes compared to people of white ethnicity, and their risk of developing type 2 diabetes increases earlier from age 25 compared to from age 40 for people from white groups. Nationally, people living in the most deprived areas are 2.5 times more likely to develop diabetes compared to people in the least deprived areas. People with diabetes living in the most deprived areas are also three times more likely to develop serious complications from diabetes.

It is estimated that more than half of cases of type 2 diabetes can be prevented or delayed. People can reduce their risk of developing diabetes by (1) eating a healthy diet, such as one that is high in fibre and with a low glycaemic index (the glycaemic index is a rating of how quickly carbohydrate foods affect blood sugar levels. Low index foods are broken down more slowly, thereby causing more gradual rises in blood sugar levels); (2) being more physically active (not sitting for long length periods of time and being physically active in line with national guidelines); and (3) losing weight if overweight. The NHS Diabetes Prevention Programme (DPP) was launched in 2016 and aims to provide personalised support to people at risk of developing type 2 diabetes, such as adults with a fasting plasma glucose between 5.5-6.9 mmol/L or with a history of gestational diabetes. Individuals can find out if they are at risk and register for the DPP on the [Healthier You website](#).

2.2.3 Cholesterol

Cholesterol is the main fat found in the blood. Elevated levels of total cholesterol (above 5mmol/L) causes narrowing of the arteries with fatty deposits leading to cardiovascular disease. There are two important types of cholesterol – high density lipoprotein (HDL) or non-high density lipoprotein (non-HDL). It is now known that non-HDL cholesterol, rather than low density lipoprotein (LDL) cholesterol specifically, is the key risk factor for cardiovascular disease (NICE, 2021). For these purposes the terms are interchangeable. Non-HDL cholesterol is often referred to as 'bad' cholesterol, and a raised level (above 4mmol/L) is also an important cause of atherosclerosis. HDL cholesterol is often referred to as 'good' cholesterol as it

has a protective role against cardiovascular disease. However, the beneficial effects of 'good' cholesterol may only occur up to a certain level (approximately 1.4mmol/L), and extremely high levels (above 2.3mmol/L) may also be harmful.

High levels of 'bad' cholesterol are estimated to cause one quarter of cardiovascular disease in Buckinghamshire.

In the majority of cases, high cholesterol levels are due to a combination of environmental factors and health behaviours, including a diet high in saturated fat, low levels of exercise, smoking and drinking excess alcohol, although the specific relationships with 'good' and 'bad' cholesterol may vary. For example, evidence has shown that, within reasonable limits, the more someone is active the more they can raise their 'good' cholesterol; but more intense activity may be needed in order to start reducing 'bad' cholesterol levels. Other risk factors for high cholesterol levels include being male, being from a South Asian background and being older.

It is estimated that one in 250 people have a genetic condition called familial hypercholesterolaemia (FH) which results in high cholesterol levels. If untreated half of men and one third of women with FH develop coronary heart disease by the time they reach 55 years old, but if FH is identified and treatment started early enough people with FH can have the same life expectancy as the general population.



2.3 Social economic and environmental risk factors

2.3.1 Healthy work

The work people do can affect their risk of cardiovascular disease. Stress at work can take several forms described as job strain and low effort-reward work. Job strain describes work with high demands combined with low control. Low effort-reward describes work where there are limited career opportunities, low salary and low social approval. Both higher job strain and low effort-reward work are associated with an increased risk of death from cardiovascular disease⁵² and are more common in people with lower income or in lower job grades.

A study of 10,000 British civil servants found that behavioural risk factors could only explain a third of the difference in the incidence of coronary heart disease between different civil servants.⁵³ Biological risk factors, such as metabolic syndrome (a medical term for the combination of diabetes, high blood pressure and obesity), accounted for around another third of the difference.⁵⁴ The study found that work grade affected the risk of central obesity (excess fat around the waist – a known risk factor for cardiovascular disease) and metabolic syndrome and that civil servants in the highest grade work were least likely to have central obesity or metabolic syndrome.⁵⁵ Jobs that had higher job strain or stress were associated with an increased risk of obesity.⁵⁶

Working longer hours increases the risk of cardiovascular disease – international evidence has shown that people that work 55 hours or more per week are 17% more likely to die from heart disease and 35% more likely to die from stroke, compared to people working 35-40 hours a week.⁵⁷

2.3.2 Extreme temperatures

Both low and high temperatures are associated with increases in death from cardiovascular disease.⁵⁸ Globally 'non-optimal temperature' accounted for 1.96 million deaths globally according to the Global Burden of Disease study.⁵⁹

Higher temperatures increase the risk for death from heart disease, heart failure and heart attacks.

Very cold temperatures increase the risk of heart attack and stroke. People who have pre-existing long-term conditions are most at risk of falling ill in the days after temperatures drop. Elderly people are especially vulnerable in winter months. Before the COVID pandemic circulatory diseases accounted for around a fifth of all excess winter deaths.⁶⁰

2.3.3 Housing

The quality of housing and our ability to keep our houses warm is important.

Cold homes are associated with an increased risk of cardiovascular disease and other health issues.⁶¹

When there is a cold snap in the weather, hospitals see an increase in patients with a heart attack almost immediately and an increase in stroke around five days after the start of the cold weather.⁶² Cold temperatures below 12° cause blood vessels to narrow, causing an increase in blood pressure and blood viscosity,⁶³ leading to an increase in heart attacks and stroke.⁶⁴

The risks of ill health are even higher for people





2.3.4 Air quality

It is estimated that poor air quality is responsible for up to 36,000 deaths per year in the UK, and the majority of UK deaths attributable to outdoor air pollution are from heart disease and stroke.

Evidence from nine cities across England showed that the risk of out of hospital cardiac arrests and emergency admission for stroke was higher on days with higher pollution.⁶⁶ Air pollution rates are highest in more deprived neighbourhoods in England.⁶⁷

Tackling air quality through active travel can have dual benefits in reducing cardiovascular disease risk – studies show that people that live in places where walking and cycling are convenient and safe have lower levels of obesity and diabetes.⁶⁸

2.3.5 Cardiovascular disease and COVID

Studies have shown that cardiovascular disease is associated with poorer outcomes

from COVID-19 infection⁶⁹ and many of the risk factors for developing cardiovascular disease (such as being obese, having high blood pressure or having type 2 diabetes) are also risk factors for worse COVID-19 outcomes. The risk is greatest for people with poorly controlled disease.

However, evidence is emerging that the reverse is also true – that COVID-19 disease may be a risk factor for cardiovascular disease. Firstly, cardiovascular complications may occur during initial COVID-19 infection, including blood clots and damage or inflammation to heart muscle.

Secondly, cardiovascular events are more likely to occur up to a year after COVID-19 infection. The risk of any cardiovascular event is 63% higher (45 additional people affected per 1,000) and the risk of a major event (heart attack, stroke or death) is 55% higher (23 additional people affected per 1,000) than people who have not had COVID-19 infection. These increased risks of cardiovascular events affect working age adults as well as older adults and affect those without as well as those with pre-existing cardiovascular disease.

Thirdly, it is not known what the longer-term effects of COVID-19 infection are yet, but they could include an increased risk of future cardiovascular disease. An estimated 1.7 million people in the UK reported experiencing long COVID in March 2022, of which common symptoms include chest pain, palpitations and shortness of breath.

Lastly, the pandemic itself has had an adverse impact on many of the risk factors for cardiovascular disease.

The pandemic has led to a worsening of some people's mental health and economic circumstances and increased the proportion of people with unhealthy behaviours, such as eating unhealthily, gaining weight, doing less physical activity and drinking more alcohol. The pandemic also reduced access to routine health care and preventive interventions, such as NHS health checks to detect cardiovascular disease risk factors and management of high blood pressure and diabetes.

3. Who is Most at Risk?

This section highlights the national picture. There is less data available at a Buckinghamshire level but that which we do have shows a similar picture and is included in the following section.

The risk of cardiovascular disease increases with age and is generally higher in men, certain ethnic groups and people living in more deprived areas. People with severe mental illness and some people with learning disability are also at higher risk of developing cardiovascular disease. The reasons for this are complex and reflect a mix of interlinked factors such as living and working conditions, exposure to chronic stress, opportunities to adopt healthy behaviours and biological factors. If we are to tackle inequalities in health it is important to identify the modifiable risk factors that can help prevent or delay cardiovascular disease in these groups.



3.1 People living in deprived areas

Our health is strongly influenced by the places we live, work, and learn. People that live in the most deprived areas of England are four times more likely to die early from cardiovascular disease (before the age of 75), compared with people that live in the least deprived areas.⁷⁰

The link between deprivation and death from cardiovascular disease follows a gradient. As the level of deprivation increases the death rate from cardiovascular disease increases. The graph below shows that although premature mortality from cardiovascular disease in England decreased between 2001 and 2019, differences between more and less deprived groups persisted. In 2020, there was a marked increase in premature mortality from cardiovascular disease, with the steepest increases in the most deprived deciles widening the gap. When the population is split into tenths (deciles) by deprivation, the risk of early death from cardiovascular disease was higher with increasing deprivation consistently from 2001 to 2020.⁷¹

3.1.1 Health behaviours

The health behaviours people adopt are influenced by a wide range of factors, including their social and economic circumstances and the environments in which they live. Health behaviours that reduce the risk of cardiovascular disease are often more common in less deprived areas and those that increase the risk are more common in more deprived areas.

Smoking

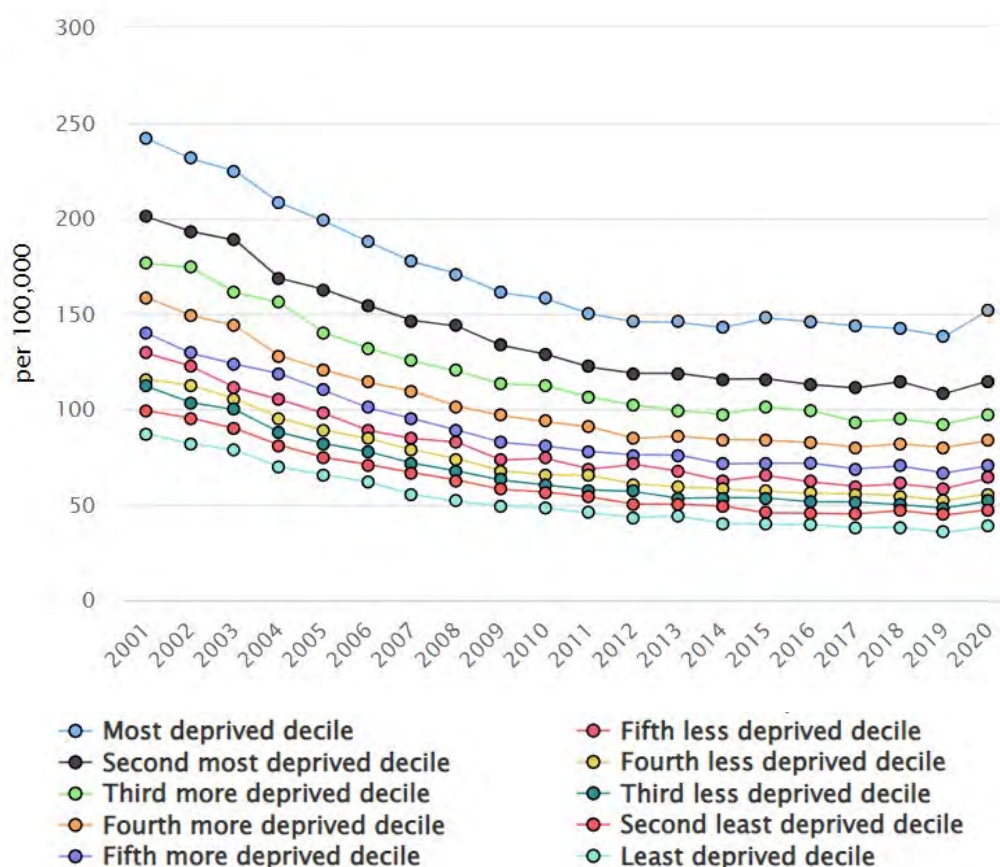
Adults who live in more deprived areas or have lower paid or manual jobs are more likely to be smokers.

Physical activity

People living in less deprived areas have higher physical activity levels. In 2020, 73% of people living in the least deprived areas were active compared with 57% in the most deprived areas.⁷²

National data show that in 2020/21 adults in routine/semi-routine occupations and people that were long-term unemployed/had never worked (managerial, administrative and

Figure 2: ENGLAND under-75 mortality for cardiovascular disease



professional occupations, e.g. chief executive, doctor, or journalist) were 19% less likely to be active (52%) compared with those in the most affluent employment groups (71%).

Overweight and obesity

The likelihood of being overweight or obese is greatest in the most deprived areas. In 2019, 39% of women in England in the most deprived fifth of the population were obese, compared with 18% in the least deprived fifth. 30% of men in the most deprived quintile were obese compared with 22% in the least deprived.⁷³ This gap has increased since 2014.

Inequalities in overweight and obesity begin in childhood and more children in deprived areas are overweight and obese than those in the least deprived areas.



Between 2006/7 and 2020/21 the gap in the prevalence of obesity between children attending school in the most and least deprived areas of England has widened.⁷⁴

The drivers of obesity are wide ranging and linked to the area we live in. For example, the availability of affordable and high-quality food is likely to influence what we eat and evidence from Scotland and England found that the density of outlets from four major fast-food chains was most concentrated more deprived areas.⁷⁵ There are many other features of the place we live that influence the risk of being overweight or obese, such as access to safe places to play, uncluttered clean pavement and access to green spaces.⁷⁶

Alcohol

People living in more deprived areas have a greater risk of harmful drinking behaviours or being dependent on alcohol.⁷⁷

3.1.2 Inequalities in clinical/biological risk factors

National analysis shows that people living in the most deprived communities are 30% more likely to have high blood pressure.⁷⁸

Living in a more deprived area of England is also associated with increasing risk of developing diabetes (both diagnosed and undiagnosed).⁷⁹ The Health Survey for England in 2016 showed that people in the most deprived fifth of the population were more than twice as likely to have a diagnosis of diabetes, compared with the least deprived (7% vs 3% with diabetes). People living in the most deprived fifth of areas were twice as likely to have diabetes that had not been diagnosed compared with the least deprived (2.2% vs 1.0%).

Atrial fibrillation is a heart rhythm disorder that is believed to cause 20% of strokes.⁸⁰ People living in more deprived areas of the UK are more likely to develop atrial fibrillation and more likely to die from it.⁸¹

3.1.3 Social and economic factors

Poorer quality jobs, poorer quality housing and poorer quality environments are linked to an increased risk of cardiovascular disease as highlighted in a previous section. These are often more common in more deprived areas and in people on low income.

3.1.4 Access to effective treatment

Research has indicated that there may be inequalities in access to specialist care for people living in more deprived areas, including longer waiting times and poorer access to cardiac interventions and acute stroke care.⁸² However, for some interventions in primary care, for example provision of NHS Health Checks (which detect some key cardiovascular disease risk factors) has been found to be higher in deprived areas.⁸³

3.2 Differences between ethnic groups

A note on terminology: This section summarises what the evidence tells us about cardiovascular disease and ethnicity.

*This report has used the UK Government guide to writing about ethnicity. However, the ways that ethnicity has been defined and analysed by researchers varies for some studies. Where this is the case, we have used the same language, so that we are accurate in our description of the evidence but have noted the variation with a *.*

Many studies use aggregated ethnic groups - in particular South Asian and black groups, for whom the risks are higher - as a whole. Recognising that these South Asian⁸⁴ and black ethnic categories include diverse groups of people, where studies have analysed ethnic groups that refer to nationalities, they are provided below.

Different ethnic groups have different risks of cardiovascular disease. Asian and black groups in the UK have a higher risk of cardiovascular disease but the type of cardiovascular disease underlying this risk differs between different ethnic groups. There is less evidence available for European groups living in the UK, although Central and Eastern European countries have the highest death rates from cardiovascular disease in Europe (defined as WHO's European Region) once the age of the population has been considered⁸⁵ (for this reason, much research uses 'white British' people as a comparator group). Gypsy, Romany and Traveller groups are known to have worse health outcomes compared to other ethnic minorities,⁸⁶ but there is little specific evidence available to understand the contribution that cardiovascular disease plays. The reason for these differences is complex and not always well understood, however, by working with people from ethnic minority backgrounds to identify and address known risk factors, we can reduce their risk of cardiovascular disease.

3.2.1 South Asian ethnic groups

People from South Asian groups are more likely to develop cardiovascular disease and are more likely to die from cardiovascular disease compared to white groups. *South Asian ethnicity applies to people whose ethnic roots originate from India, Pakistan, Bangladesh, Sri Lanka, Nepal and Bhutan.⁸⁷

South Asian people have the highest risk of death from heart disease of any ethnic group, a 50% higher risk than the population of England and Wales.

South Asian people also tend to develop heart disease at a younger age. South Asian groups are also more likely to have a stroke and to die from stroke, compared to white British groups.⁸⁷

South Asian men develop cardiovascular disease, on average around eight years younger than white men (60.4 years vs. 68.2) and South Asian women develop cardiovascular disease an average of around 11 years earlier than white women (62.9 vs. 74.2).⁸⁸

Death from ischaemic heart disease was highest for men and women in the Bangladeshi, Pakistani and Indian ethnic groups, compared to other ethnic groups.

Inequalities in clinical/biological risk factors

The primary clinical conditions that drive the difference in risk of death from cardiovascular disease for immigrant South Asian groups are ischaemic heart disease and type 2 diabetes.

Diabetes

People from South Asian groups are up to six times more likely to develop diabetes than people in white groups.⁸⁹

British South Asian (this paper uses the term 'Indian Asian', defined as from the Indian subcontinent) groups are more likely to develop

diabetes at a younger age than European* groups (age 62 years vs 67).⁹⁰ By the age of 80, close to half (40-50%) of South Asian people will have diabetes – this is twice the prevalence in Europeans*.⁹¹

Obesity (defined as a BMI of 30.0kg/m² or above) is associated with an increased risk of developing diabetes. For South Asian ethnic groups, the risk of diabetes increases at a lower BMI. The same risk of developing type 2 diabetes as is found in white populations at a BMI of 30kg/m² or over is found at a much lower BMI of 23.9 kg/m² for South Asian populations.⁹²

Ethnic differences in cardiovascular disease risk persist and are more pronounced in people with diabetes.⁹³ Death from heart disease in people from South Asian groups with diabetes is around three times higher compared to people from white groups with diabetes.⁹⁴

South Asian adults do not have higher total cholesterol overall compared to white people, but they have lower levels of HDL ('good') cholesterol and higher levels of triglycerides (associated with poorer heart health).⁹⁵

Blood pressure

The prevalence of high blood pressure varies between South Asian ethnic groups.⁹⁶ There is evidence that for some South Asian ethnic groups (in particular, Indian ethnic groups), levels of high blood pressure are slightly higher than is seen in the white population. In other South Asian groups, levels of high blood pressure are moderately lower for Pakistani people and markedly lower for people from Bangladeshi ethnic groups. However, this pattern is not found in children - South Asian children have been found to have higher blood pressure compared to white children.⁹⁷ The proportion of people from Asian groups with controlled blood pressure (defined as mean systolic BP <140 mm Hg and diastolic BP <90 mm Hg, among people who reported previously being informed of a hypertension diagnosis by a health professional as well as use of antihypertensive medication) is higher (44.4%) than for white groups (38.0%) in the UK, although this is not statistically different when adjusted for factors such as age and sex.⁹⁸

Health behaviours

National data show that adults in Asian (8.3%) ethnic groups are less likely to smoke when compared with people of white ethnic groups (14.4%). Asian men (13.9%) are more likely to smoke compared with Asian women (2.9%) but less likely to smoke than white men (15.8%).

National survey data show that fewer Asian people (*in this research, the formal ethnic category used is 'Asian, excluding Chinese') have a 'physically active' lifestyle (defined as 150 minutes or more of activity per week) than any other ethnic group. The COVID-19 pandemic has had a negative impact on activity levels across all ethnic groups but has disproportionately affected Asian adults.

Asian women are less active (46%) than Asian men (50%) and have the lowest level of activity of all gender and ethnicity categories.⁹⁹

There is some evidence that physical activity levels may have increased from first to second generation South Asian people living in the UK.¹⁰⁰ Research suggests that there is variation in participation in vigorous physical activity for children from certain ethnic minority groups – children from mixed ethnicity groups spent more time doing vigorous exercise compared to white children, whilst Pakistani and Bangladeshi children on average performed less.¹⁰¹

Adults from South Asian ethnicities tend to have lower weight compared with white groups, but their risk from cardiovascular disease and diabetes increases at a lower body mass index.¹⁰² Weight distribution is also associated with cardiovascular disease risk and particularly fat around the waist increases the risk of cardiovascular disease and this weight distribution is known to be higher in South Asian people.¹⁰³

Data from the National Child Measurement Programme indicate that in 2020/21, the proportion of children in Reception year and Year 6 at school that were obese was higher than average for children from Asian groups.

People from Asian groups are less likely to consume alcohol to a hazardous, harmful or dependent level¹⁰⁴ and South Asian people are more likely to abstain from drinking alcohol.¹⁰⁵

Access to treatment

There is evidence that although incidence, morbidity and mortality rates from cardiovascular disease are higher for people of South Asian ethnicity, once people from South Asian ethnic groups have a diagnosis of coronary disease, they have better outcomes compared to white people. Therefore, it has been suggested that to address inequalities for South Asian groups, efforts should focus on stopping cardiovascular disease developing in the first place, i.e., primary prevention.¹⁰⁶ However, people from Pakistani, Indian, and Bangladeshi groups also report a poorer experience of using health care services.¹⁰⁷ There is some evidence of variation in the management of cardiovascular disease risk specifically for people from ethnic minorities with diabetes - analysis of GP records from selected practices in UK suggested that people of South Asian ethnicity with type 2 diabetes were 9% less likely to receive a statin compared with European* people, where guidelines indicated they should be prescribed.¹⁰⁸

3.2.2 Black ethnic groups

People from black ethnic groups tend to have a lower risk of heart disease but are more likely to have, and die from, high blood pressure and stroke than other ethnic groups.

They are also more likely to have a stroke at a younger age than white groups.¹⁰⁹ Black men develop cardiovascular disease, on average, five years earlier than white men (62.8 years vs. 68.2) and black women develop cardiovascular disease an average of around 13 years earlier (61.4 years vs. 74.2).¹¹⁰

Inequalities in clinical/biological risk factors

High BP (blood pressure)

Prevalence of high blood pressure in black people in the UK may be up to three or four times higher than in white people.¹¹¹

There is evidence that blood pressure is less likely to be controlled⁴ in black groups compared to all other ethnic minorities (e.g., 35.7% of all hypertensive patients controlled to target vs. 38.0% white groups) and this difference was statistically significant after adjustment for age, sex, and other factors.¹¹²

Diabetes

People from black ethnic groups are up to three times more likely to develop diabetes and have a higher risk of dying from diabetes compared with the white population.¹¹³

Obesity levels are higher in black groups¹¹⁵ and the risk of diabetes increases at a lower body mass index.¹¹⁶ Obesity (defined as a BMI of 30.0 kg/m² or above) is associated with an increased risk of developing diabetes. For black ethnic groups the risk of diabetes increases at a lower BMI. The same risk of developing type 2 diabetes as is found in white populations at a BMI of 30kg/m² or over is found at the lower BMI of 28.1kg/m² for black populations.¹¹⁷

People of African Caribbean heritage have lower cholesterol levels than Europeans*,¹¹⁸ higher levels of HDL ('good') cholesterol and lower levels of triglycerides than white people.¹¹⁹

Health behaviours

National data show that adults in black (9.6%) ethnic groups are less likely to smoke when compared with people of white ethnic groups (14.4%). Black men (13.0%) are more likely to smoke than black women (7.0%) but less likely to smoke than white men (15.8%).

Data from the National Child Measurement Programme indicate that in 2020/21, the proportion of children in Reception year and Year 6 at school that were obese was higher than average for children from black ethnic groups.

People from black ethnic groups are less likely to consume alcohol to a hazardous, harmful or dependent level.¹²⁰

Access to treatment

Black populations tend to have lower than expected rates of healthcare use.¹²¹

Analysis of GP records from selected practices in UK suggested that people of African/African Caribbean ethnicity with type 2 diabetes were 24% less likely to receive a statin compared with European people where guidelines indicated they should be prescribed.¹²²

3.2.3 Social and economic factors

Some ethnic groups are more likely to live in more deprived areas and it is likely that this is an important part of a complex relationship between biological, environmental and behavioural factors driving the increased risk of cardiovascular disease in some groups. For example, more ethnically diverse areas are more likely to have higher levels of air pollution.¹²³

In addition, experiences of structural racism are known to affect health and may play a role through other mechanisms, for example racial discrimination has been associated with increased stress at work¹²⁴ and stress at work has been associated with an increased risk of cardiovascular disease.

3.3 Differences by gender

Men are more likely to have cardiovascular disease than women and more likely to die from cardiovascular disease.¹²⁵

One in eight men and one in 15 women die from coronary heart disease.¹²⁶

In the years before the pandemic cardiovascular disease was the leading cause of death in men.¹²⁷

3.3.1 Inequalities in biological/clinical risk factors

Women have a lower risk of cardiovascular disease than men. However hormonal changes associated with the menopause lead to a decrease in the production of a hormone that is protective against heart disease and the risk of cardiovascular disease increases in women after the menopause. This risk increases in women that have an early menopause before the age of 40.¹²⁸

Before the age of 65, women have a lower risk of high blood pressure but this risk reverses after the age of 65.¹²⁹

Men aged 25-54 are twice as likely to have diabetes as women the same age.¹³⁰

Certain pregnancy complications are associated with an increased future risk of cardiovascular disease for the mother – these include pre-eclampsia, pregnancy induced high blood pressure and gestational diabetes (the latter likely because of the increased risk of type 2 diabetes).¹³¹

3.3.2 Health behaviours

Men are more likely to smoke than women.¹³²

Men are slightly more likely than women (62.3% vs 59.8%) to be physically active.¹³³ Women are slightly more likely to be inactive (27.8% vs. 26.8%) than men.¹³⁴

Physical activity levels decreased during the pandemic for both men and women but as men's activity levels have seen a partial recovery, women's activity levels have remained consistently lower and may require more support to return to previous levels.¹³⁵

A greater proportion of men (41% vs. 30%) are overweight compared to women, but a higher proportion of women (29% vs 26%) are obese compared to men in England.¹³⁶

Being overweight or obese increases the risk of developing high blood pressure – for men this increases the risk by three times and for women by four times.¹³⁷

Men are more likely to consume more than twice the daily limit of alcohol than women.¹³⁸ Alcohol dependence is more common in men (6%) than in women (2%) in England.¹³⁹

3.3.3 Access to treatment

International evidence shows that women are less likely to correctly identify the symptoms of a heart attack, that they are slower to seek treatment, that they are 50% more likely to receive the wrong initial diagnosis and that when a heart attack is diagnosed, they received unequal care.¹⁴⁰ Prompt treatment is critical to reduce complications and damage after a heart attack.



3.4 People with severe mental illness

People with a severe mental illness (schizophrenia, bipolar disorder, and major depressive disorder) have more than a 50% higher risk of having cardiovascular disease and an 85% higher chance of dying from cardiovascular disease compared with people of similar age.¹⁴¹

People with SMI are more likely to develop cardiovascular disease at an earlier age.¹⁴² Certain risk factors for cardiovascular disease are more common in people with SMI, such as smoking and alcohol consumption.¹⁴³ In addition, obesity and diabetes are more common and some (but not all) of this association may be explained by metabolic effects of some medication.¹⁴⁴

3.5 People with learning disabilities

Some evidence suggests that people with learning disabilities may be at higher risk of cardiovascular disease and of developing cardiovascular disease earlier but the risk by type of cardiovascular disease varies. Rates of heart disease may be lower for people with learning disabilities, but the risk of heart failure, stroke and TIA are higher. Activity levels may be lower and obesity levels higher for this population.¹⁴⁵

4. The Buckinghamshire Picture

Cardiovascular disease is a significant cause of ill health and death in Buckinghamshire and is the largest contributor to the gap in life expectancy between the most and least deprived areas in Buckinghamshire.

Men born today in the least deprived area of Buckinghamshire can expect to live for 6.5 years longer than men born in the most deprived areas.¹⁴⁶ For women, the gap in life expectancy is 6.4 years.

Cardiovascular diseases (called circulatory diseases in the chart on the next page) explain a quarter (24.6%) of the gap in life expectancy between men living in the most deprived fifth (quintile) of areas of Buckinghamshire and those living in the least deprived fifth (Segment Tool Update 2017-19 - OHID South East).

For women, cardiovascular diseases explain 20.5% of the gap in life expectancy between the most deprived fifth compare with the least deprived fifth.



The chart below shows the breakdown of the life expectancy gap in Buckinghamshire by cause of death 2017-19 (see Figure 3).

During the pandemic COVID was a significant contributor to the gap in life expectancy but cardiovascular disease remained very important (see Figure 4).

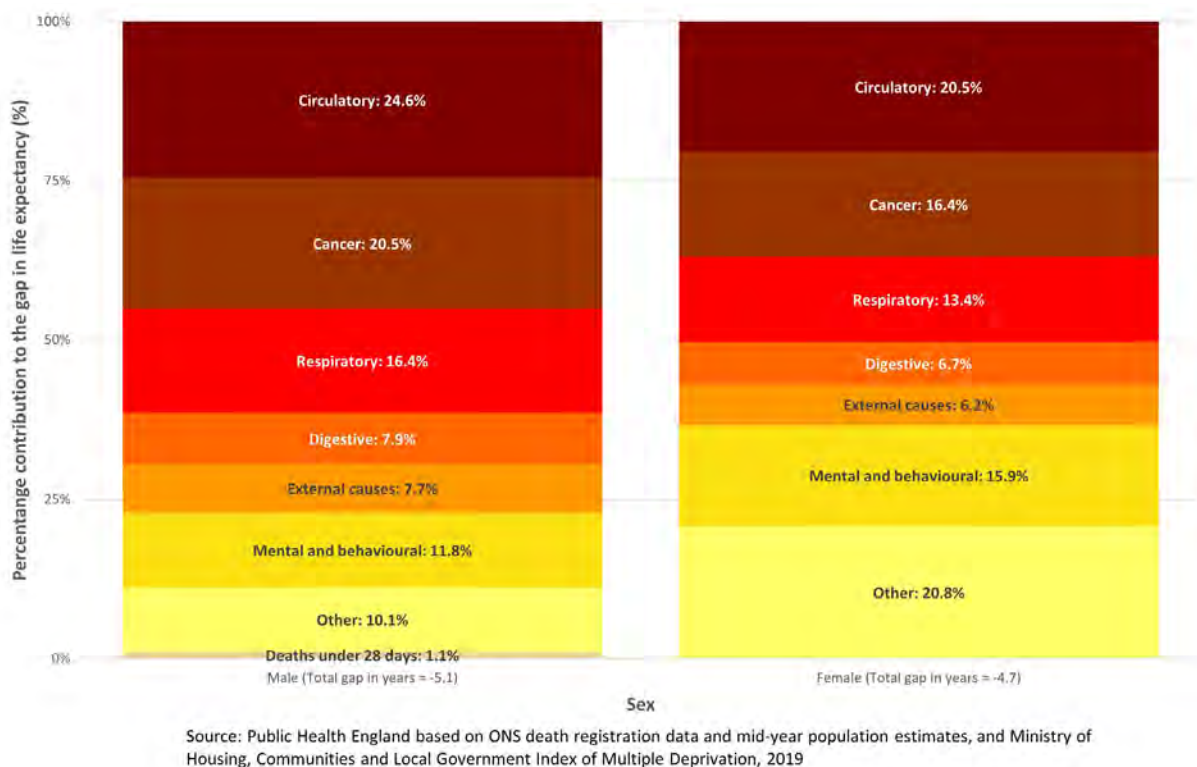


Figure 3: Chart showing the breakdown of life expectancy gap between the most deprived and least deprived quintiles of Buckinghamshire by broad cause of death for 2017 to 2019.

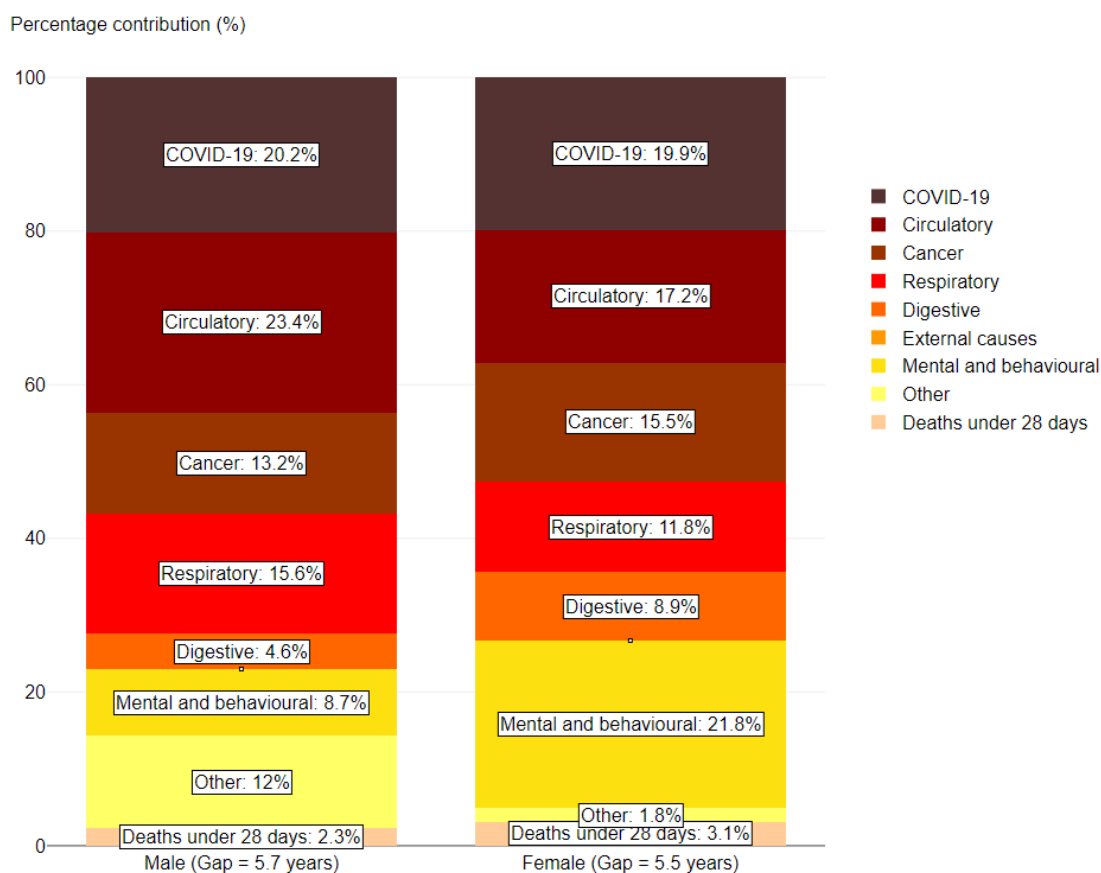


Figure 4: Chart showing the breakdown of life expectancy gap between the most deprived and least deprived quintiles of Buckinghamshire by broad cause of death for 2020 to 2021 (provisional).

4.1 Prevalence of conditions recorded in primary care

Local primary care data are available as a snapshot taken in April 2022 for adults aged 18 and over resident in Buckinghamshire who are also registered with a Buckinghamshire CCG practice (424,446 individuals). Data from some nationally published sources refer to earlier time periods and have also been included to allow comparison with the national average.

4.1.1 Smoking

Smoking status has been recorded in primary care for 86.5% of Buckinghamshire adults. 13.7% (50,358) adults are identified as a current smoker, with a further 24.4% (89,503) being

ex-smokers. Nationally, data from the Annual Population Survey estimate that 13.5% of adults (aged 18 and over) were current smokers in 2019 (due to methodological changes during the pandemic, the latest year of comparable data for the Annual Population Survey is for 2019). The most recent data available for Buckinghamshire is 2018. The prevalence of smoking is falling – it has fallen at a similar pace in Buckinghamshire (a 31% fall between 2011 and 2018) to nationally (a 27% fall over the same period).

The prevalence of current smoking is 2.7 times higher in the most deprived quintile than the least deprived and rises with deprivation from 8.1% in the least deprived quintile to 21.8% in the most deprived quintile in Buckinghamshire.

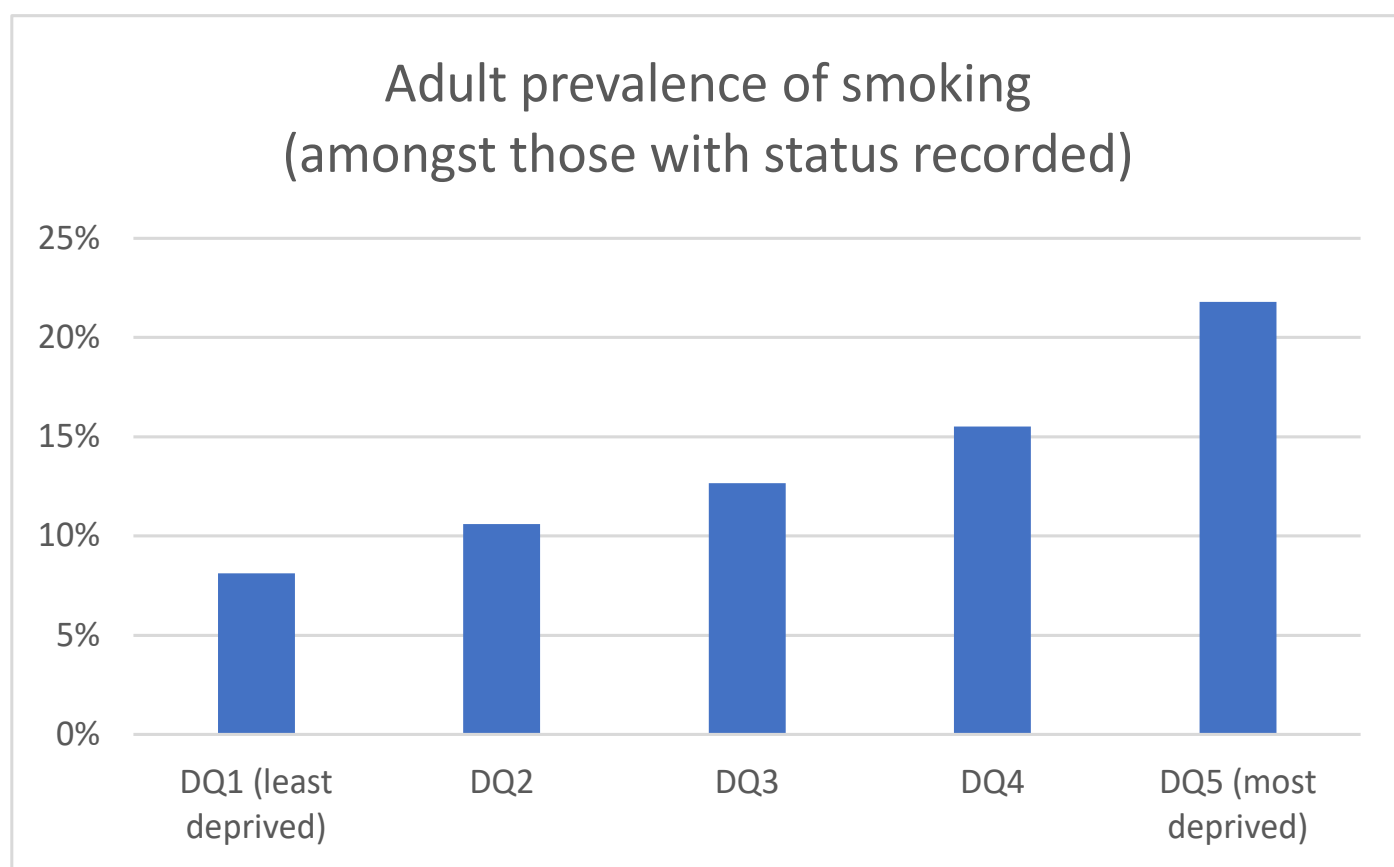


Figure 5: Adult prevalence of smoking by deprivation quintile for Buckinghamshire.

4.1.2 Diabetes

Local primary care data show that 6.0% (25,287) of Buckinghamshire adults aged 18 and over have a recorded diagnosis of diabetes. Buckinghamshire has a lower prevalence of recorded diabetes than nationally in the Quality and Outcomes Framework (QOF) data for 2020/21: the prevalence in adults aged 17 and over was 6.3% in Buckinghamshire compared to 7.1% nationally. The QOF prevalence of diabetes is rising – it has risen at a similar rate in Buckinghamshire (a 16% rise between 2012/13 and 2020/21) to nationally (18% over the same period). The prevalence of diabetes is 1.6 times higher in the most deprived quintile

than the least deprived quintile, rising with each deprivation quintile from 4.8% in the least deprived quintile to 7.5% in the most deprived.

Not all cases of diabetes present in the population will be detected and recorded. The prevalence of diabetes (both diagnosed and undiagnosed) for Buckinghamshire local authority was estimated to be 8.4% (for adults aged 16 and over) in 2020. This figure is 2.4 percentage points higher than the primary care recorded prevalence, which could equate to an additional 10,000 adults with unrecorded or undiagnosed diabetes who therefore may not be receiving treatment.

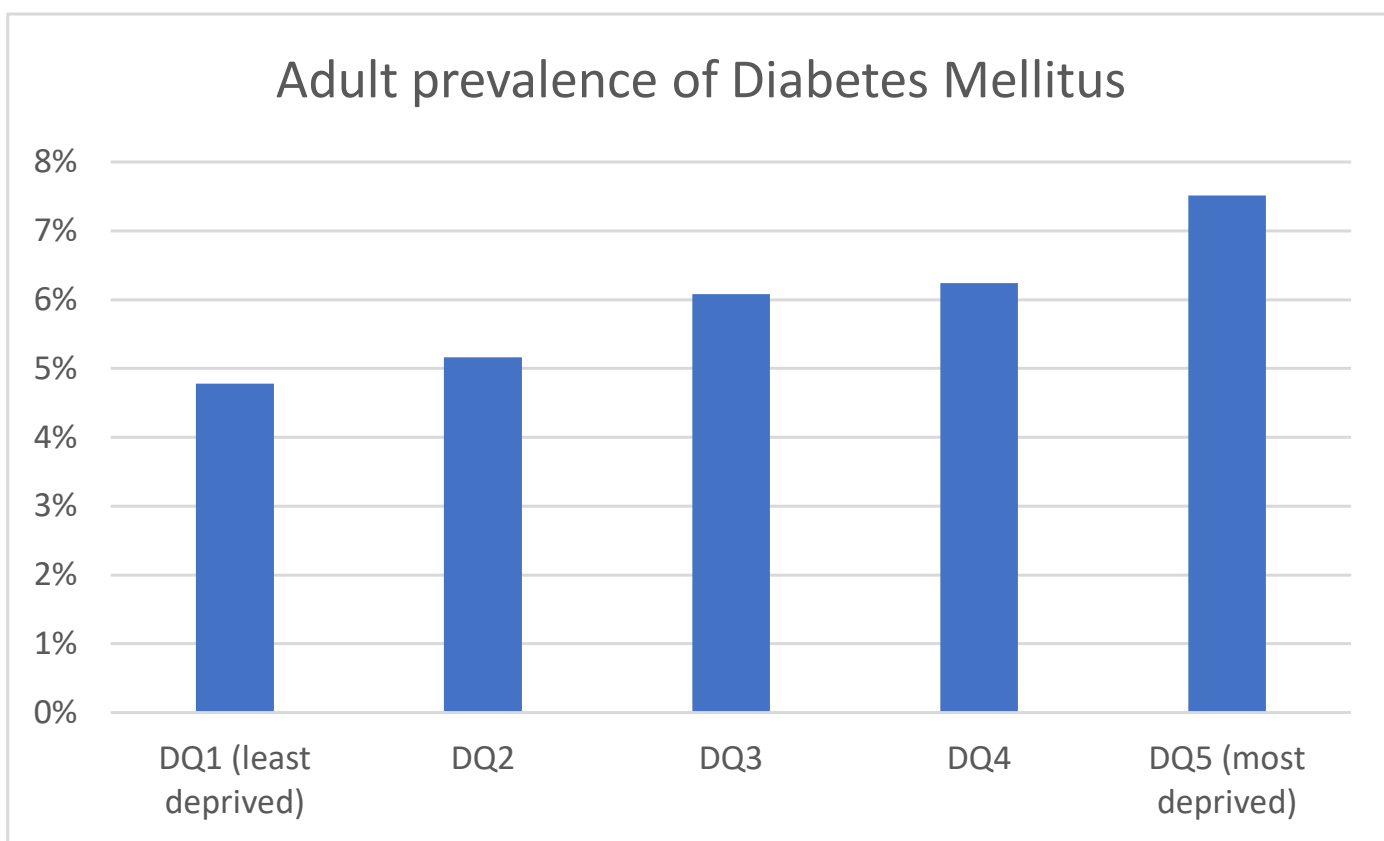


Figure 6: Adult prevalence of diabetes mellitus by deprivation quintile for Buckinghamshire.

4.1.3 Hypertension (high blood pressure)

Local primary care data show that 15.9% (67,280) of Buckinghamshire adults have a diagnosis of high blood pressure. Buckinghamshire has a higher prevalence of recorded hypertension than the national average. This may be due to better detection or recording. The QOF prevalence of high blood pressure is rising, and it is rising faster in Buckinghamshire (8% between 2012/13 and 2020/21) than nationally (2% over the same period), such that it overtook the national level in 2019/20.

Not all cases of high blood pressure present in the population will be detected and recorded. Public Health England estimated that 26.9% of Buckinghamshire adults had high blood pressure in 2017. This figure is 11 percentage points higher than the primary care recorded prevalence, which could equate to an additional 47,000 adults with unrecorded or undiagnosed high blood pressure in Buckinghamshire.

4.1.4 Coronary heart disease

Local primary care data show that 3.4% (14,220) of Buckinghamshire adults have coronary heart disease (CHD). Buckinghamshire has a similar prevalence of coronary heart disease to the national average – in the QOF 2020/21 the prevalence was 2.9% in Buckinghamshire compared to 3.0% nationally. Although the QOF prevalence of coronary heart disease has been falling, it has not fallen as quickly in Buckinghamshire (a 2% fall between 2012/13 and 2020/21) as it has done nationally (9% fall over the same period).

4.1.5 Stroke/transient ischaemic attack

Local primary care data show that 1.9% (7,877) of Buckinghamshire adults have a history of stroke or transient ischaemic attack (TIA). Buckinghamshire has a similar prevalence of stroke to the national average – in the QOF 2020/21 the all-age prevalence was 1.7% in Buckinghamshire compared to 1.8% nationally. The QOF prevalence of stroke is rising and it is

rising faster in Buckinghamshire (9% between 2012/13 and 2020/21) than nationally (6% over the same period).

The prevalence of high blood pressure, coronary heart disease and stroke/transient ischaemic attack do not show a clear relationship between deprivation and prevalence. This could be partly due to the younger age profile of the more deprived areas as these conditions are more commonly found in older age groups and these primary care datasets do not take the age of the practice population into account. Alternatively, this could potentially reflect under-recording or under-detection especially of high blood pressure as this often has no symptoms.

4.2 Gender differences in cardiovascular conditions recorded in primary care

The prevalence of coronary heart disease is over twice as high in men (4.7%) than in women (2.0%). For all risk factors analysed the prevalence is greater in men than in women – most notably smoking being 1.6 times higher in men (of those with a status recorded) and diabetes 1.4 times higher. However, high blood pressure is only recorded as being 6% higher in men than in women. Given the knowledge that high blood pressure is a key driver of cardiovascular disease, this could represent under recording, and therefore undertreatment, in men.



4.3 Hospital admissions and trends

The rate of emergency admissions for cardiovascular disease in Buckinghamshire has been 25% lower than England between 2010/11 and 2020/21. Over this period there has been a 7% rise in emergency admissions in Buckinghamshire, compared to a 2% fall nationally (the latter being predominantly driven by a fall during the pandemic).

The rise in emergency admissions appears to be driven by heart conditions (a 34% rise in heart failure and a 15% rise in heart attacks and angina), with the rate of admissions for stroke/transient ischaemic attack falling

by 20% between 2010/11 and 2020/21 in Buckinghamshire. These are all more pronounced than the national trends which have seen a 12% rise in heart failure, a 15% fall in heart attacks and angina and a 13% fall in stroke/TIA.

Despite the much lower death rates and emergency admission rates for cardiovascular disease, the rate of planned admissions for cardiovascular diseases in Buckinghamshire has been higher than the national average in recent years. Pre-pandemic the rate of planned admissions was falling faster nationally than locally (28% nationally versus 15% locally between 2011/12 and 2019/20), but during the pandemic the planned admission rates have fallen similarly (35% nationally and 36% locally).

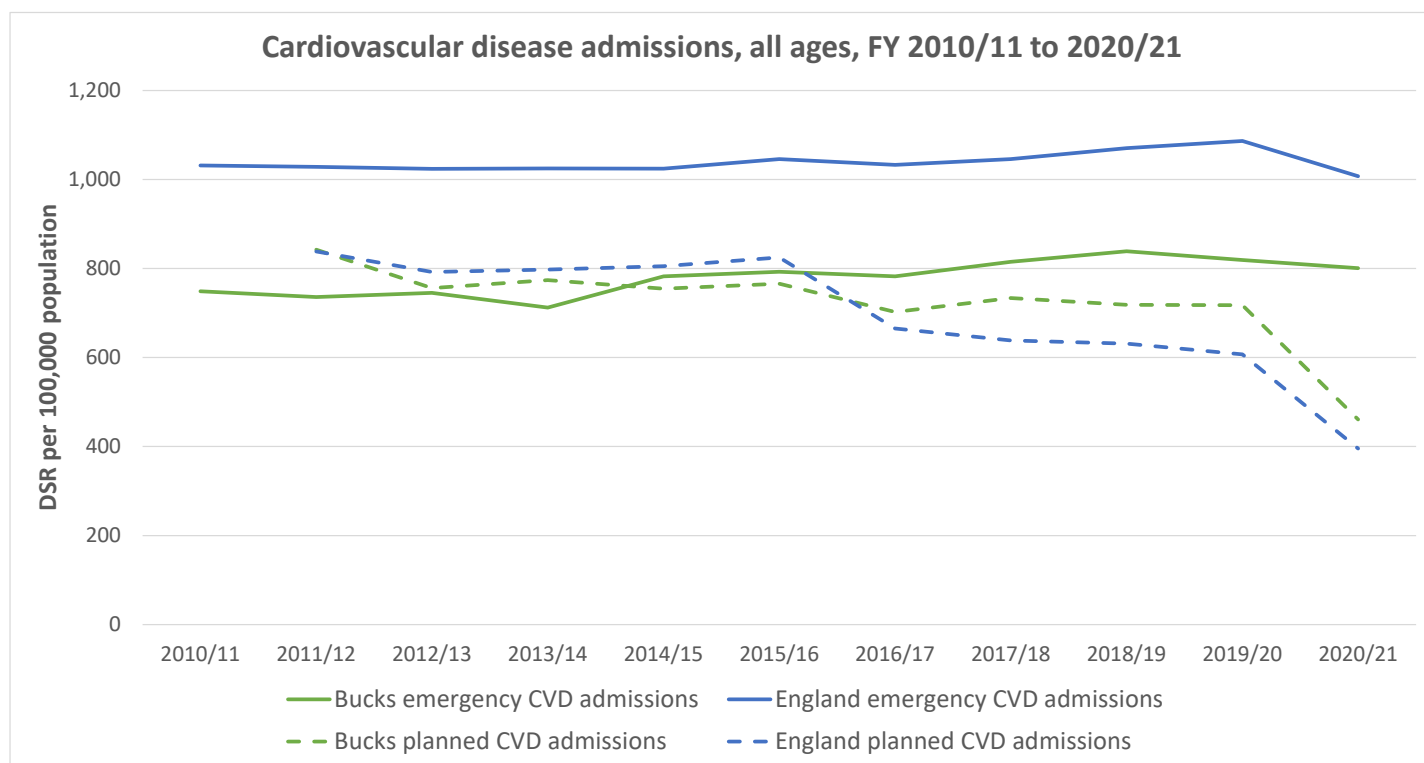


Figure 7: Cardiovascular disease admission rates (emergency and planned) for Buckinghamshire and England, from 2010/11 to 2020/21.

The rate of emergency admissions for cardiovascular diseases is consistently higher in more deprived areas than in less deprived areas within Buckinghamshire – between 2011/12 and 2020/21 it was on average 1.6 times higher in the most deprived than the least deprived quintile. Acute myocardial infarction/angina and heart failure are both 1.9 times higher and stroke is 1.7 times higher in the most deprived than the least deprived quintile between 2011/12 and 2020/21.

For most of the cardiovascular conditions analysed, the gap between the least and most deprived areas in Buckinghamshire has remained similar over the past 10 years. However, the gap in admission rates between deprivation quintiles has widened for stroke and

transient ischaemic attack. The admission rate for stroke/transient ischaemic attack is now 1.9 times higher in the most deprived than the least deprived quintile, compared to an average of 1.7 times higher over the last ten years.

The rate of planned cardiovascular disease admissions was on average 1.2 times higher in the most deprived than the least deprived quintile between 2011/12 and 2020/21. This is despite emergency cardiovascular disease admission rates being 1.6 times higher, all-age cardiovascular disease death rates being 1.5 times higher and premature cardiovascular disease death rates being 2.6 times higher in the most deprived compared to the least deprived quintile in Buckinghamshire. The reasons for this need to be explored.

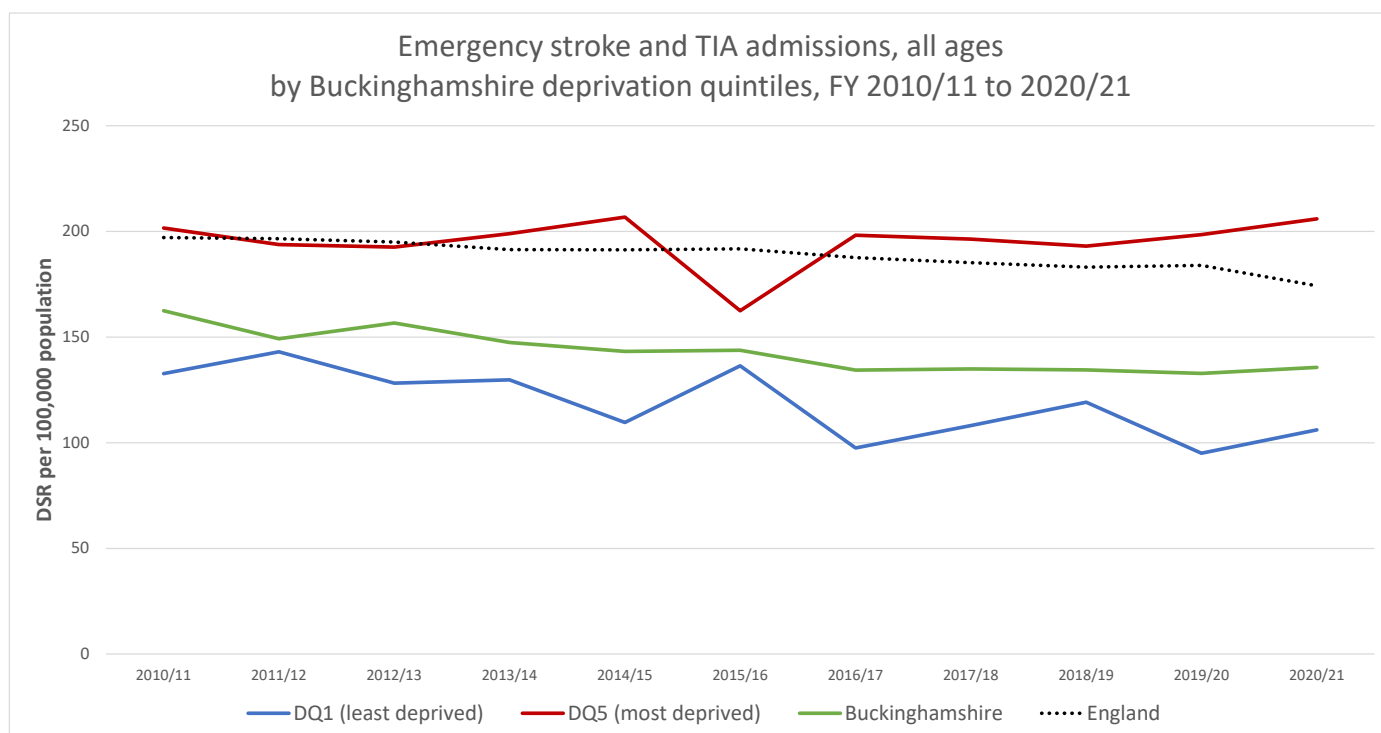


Figure 8: Emergency stroke and transient ischaemic attack admission rates for the most and least deprived quintiles in Buckinghamshire from 2010/11 to 2020/21.

4.3.1 Gender

The rate of emergency admissions for cardiovascular diseases is consistently significantly higher in men than in women – averaging at 1.6 times higher in men in Buckinghamshire which is similar to the national picture. For both men and women rates of cardiovascular disease emergency admissions are lower in Buckinghamshire than nationally.

However, despite having lower emergency admission rates than the national average, Buckinghamshire men have had a 13% higher rate of planned admissions for cardiovascular disease in Buckinghamshire than the national average in 2020/21. Buckinghamshire women have generally lower or similar rates of planned admissions than the national average. During this time the rate of planned admissions in men has been 2.6 times higher than in women in Buckinghamshire in 2020/21.

4.3.2 By community board

The rates of emergency cardiovascular admissions over the three years pre-pandemic (2017/18 to 2019/20) were highest for High Wycombe, Aylesbury and Beeches Community Boards at 1016, 988 and 943 per 100,000 per year – all statistically significantly higher than the Buckinghamshire average of 824 per 100,000 per year.

High Wycombe also has the highest rate of elective cardiovascular disease admissions over the three years pre-pandemic (2017/18 to 2019/20) at 869 per 100,000 per year compared to a Buckinghamshire average of 723 per 100,000. However, during the pandemic the rate of elective cardiovascular disease admissions fell more for High Wycombe to below the Buckinghamshire average during 2020/21 (457 versus 461 per 100,000).

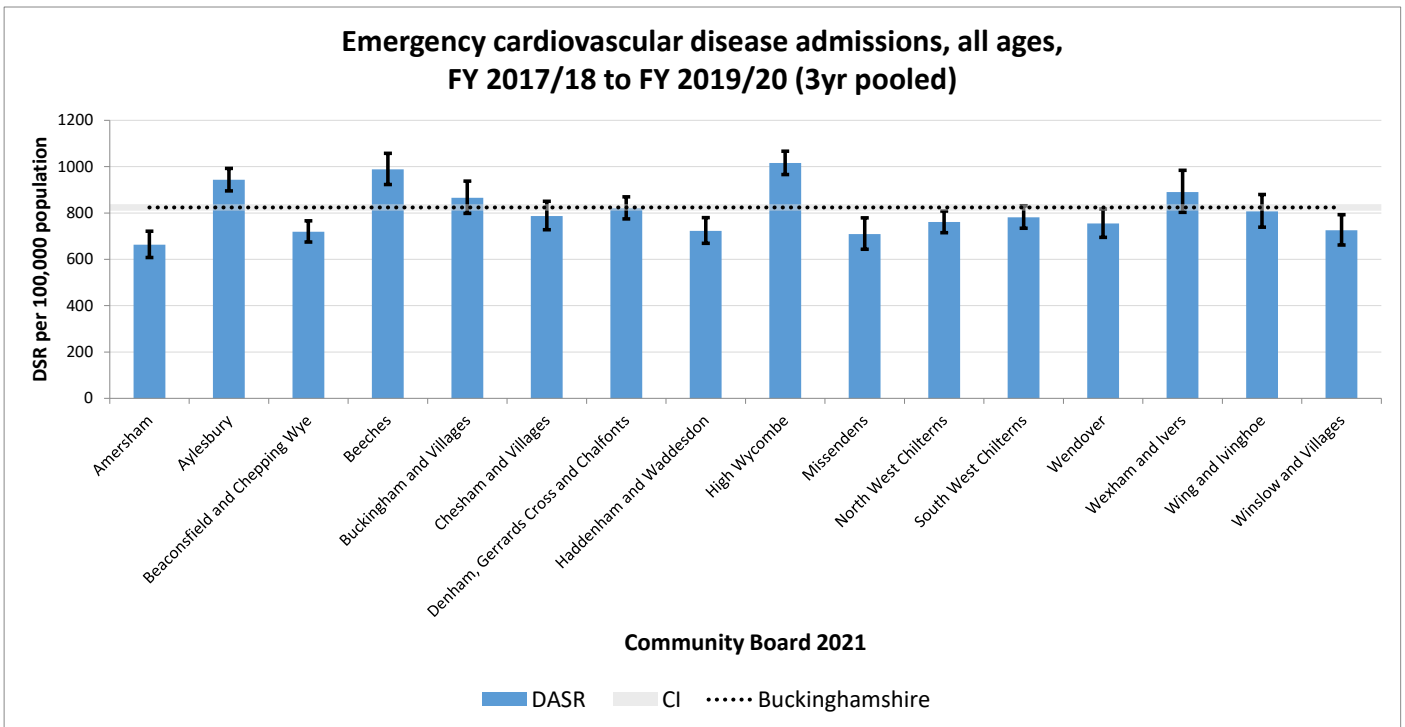


Figure 9: Emergency cardiovascular disease admission rates for Buckinghamshire's Community Boards from 2017/18 to 2019/20.

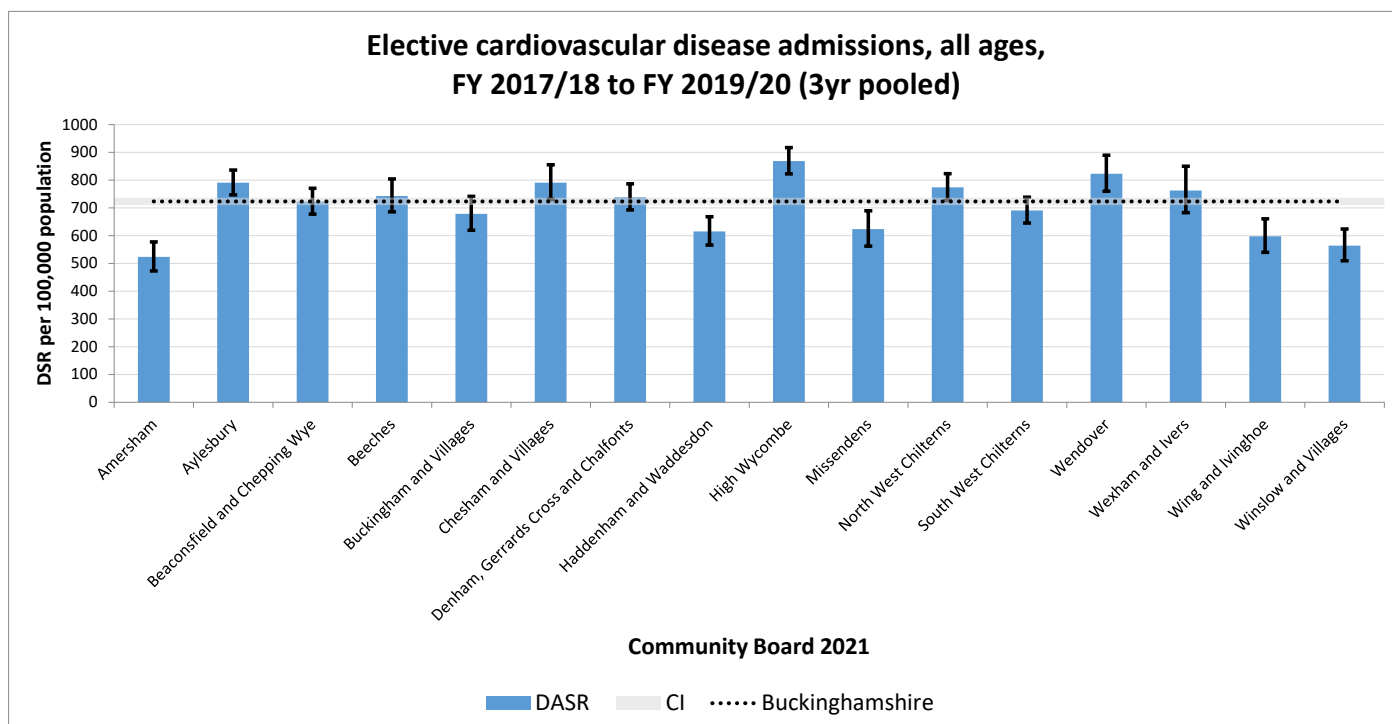


Figure 10: Elective cardiovascular disease admission rates for Buckinghamshire's Community Boards from 2017/18 to 2019/20.

4.4 Death rates and trends

There were 1,070 deaths of all ages due to cardiovascular disease in 2020 and cardiovascular disease accounted for over one in five of all deaths in Buckinghamshire.

More than one in five deaths from cardiovascular disease occurred in people under 75 years of age in 2020.

The all-age death rate due to cardiovascular disease in Buckinghamshire is 17% lower and the premature cardiovascular disease death rate is 29% lower than the national average in 2020.

The all-age death rates from cardiovascular disease fell by more than half (57% reduction)

between 2001 and 2019. The reduction in cardiovascular disease death rates has accounted for the majority (69%) of the fall in all cause all age death rates in Buckinghamshire over this period. Premature mortality due to cardiovascular disease has also more than halved, with a 58% reduction between 2001 and 2019.

However, provisional data reveal the downward trend in deaths from cardiovascular disease reversed in Buckinghamshire during the pandemic, with a 10% increase in all age cardiovascular disease mortality between 2020 and 2021 – the largest year-on-year increase in both relative and absolute terms since comparable data started being published in 2001. The increase in premature deaths from cardiovascular disease has shown an even greater increase with a 22% rise in premature cardiovascular disease death rates between 2020 and 2021.

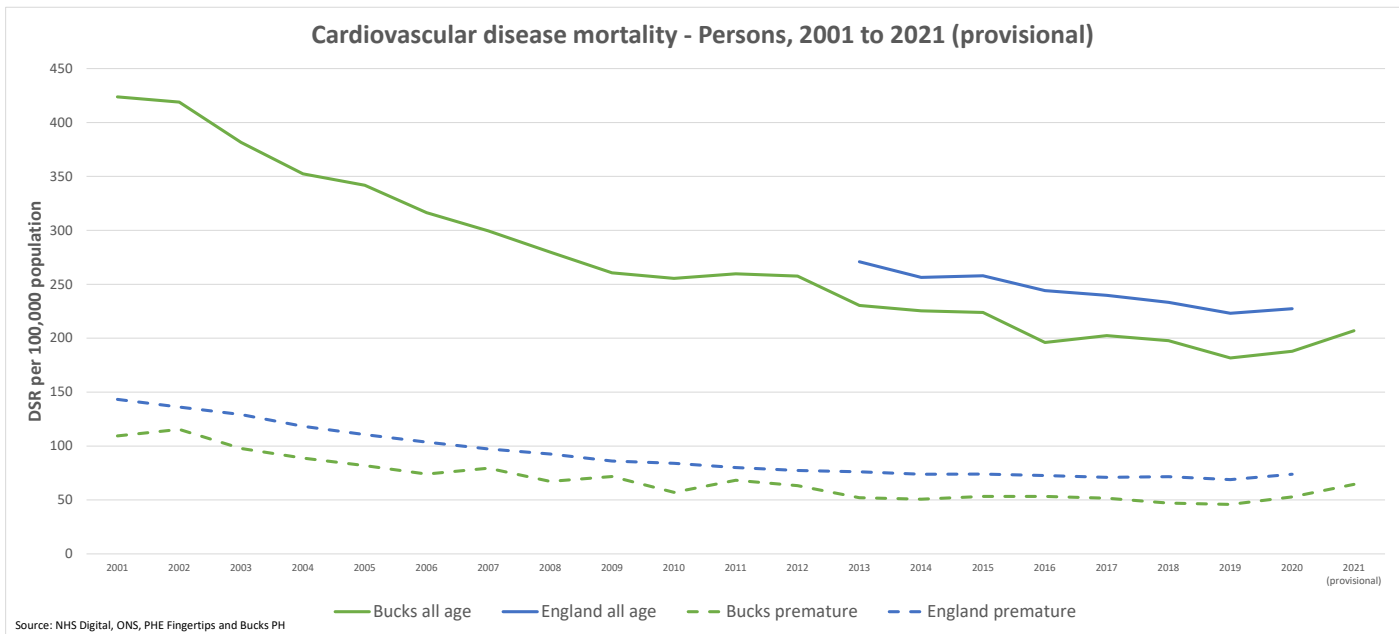


Figure 11: Premature and all age death rates from cardiovascular disease for Buckinghamshire and England, from 2001 to 2021.

On average over at least the last 20 years (2001-2021) all-age death rate due to cardiovascular disease has been 1.5 times higher in the most deprived than in the least deprived quintile, and the premature death rate 2.5 times higher in the most deprived than in the least deprived

quintile. Provisional data (2020 to 2021) reveal greater increases in cardiovascular disease mortality in the most deprived quintile (23% all age increase) than in the least deprived quintile (7% all age increase).

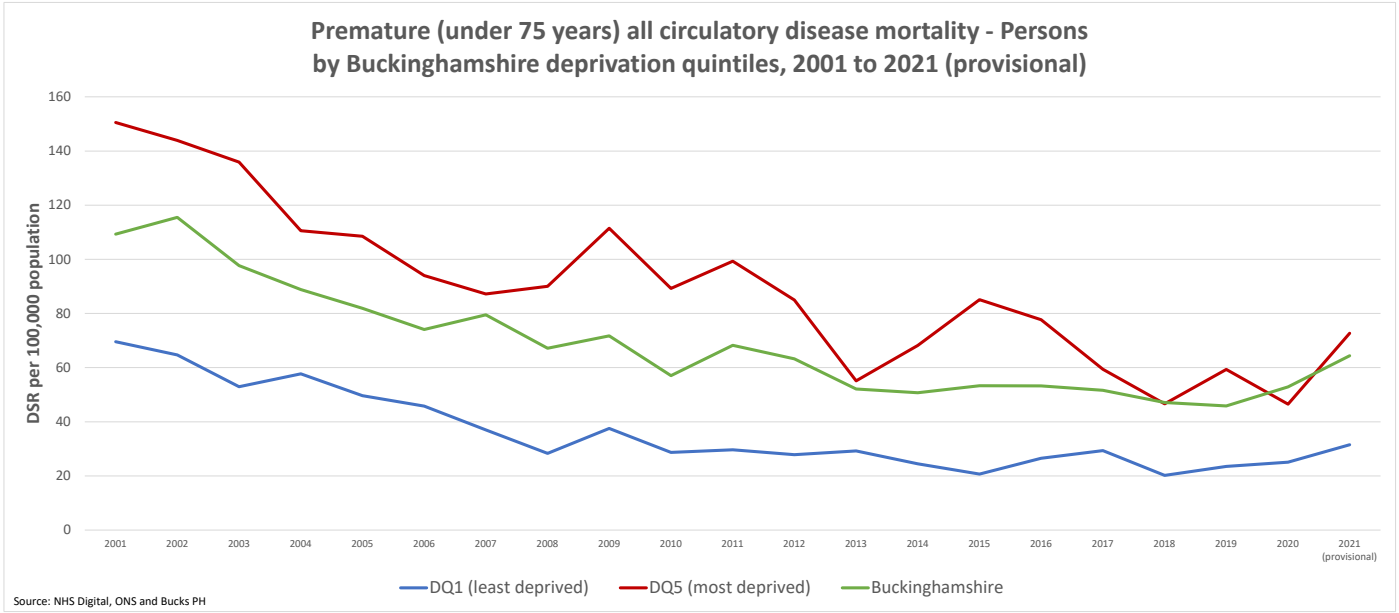


Figure 12: Premature death rates due to cardiovascular disease for Buckinghamshire for the most and least deprived quintiles, from 2001 to 2021.

4.4.1 Differences by gender

Both all-age mortality rate and premature mortality rate due to cardiovascular disease have been consistently significantly higher in men than in women over the last 20 years – on average the all-age rate in men has been 1.5 times higher than in women and the premature death rate has been 2.3 times higher in men than in women (2001 to 2019). Pre-pandemic the cardiovascular disease all-age and premature

mortality rates fell by similar proportions in both men and women (men 59% and 59%, women 56% and 55%).

However, over the last two years (2019-2021) mortality rates have risen more in men than in women. The male all-age cardiovascular disease mortality rate has risen by 24%, and the premature mortality by 53%. In women, the all-age mortality rate has risen by 3% and the premature mortality by 15%.

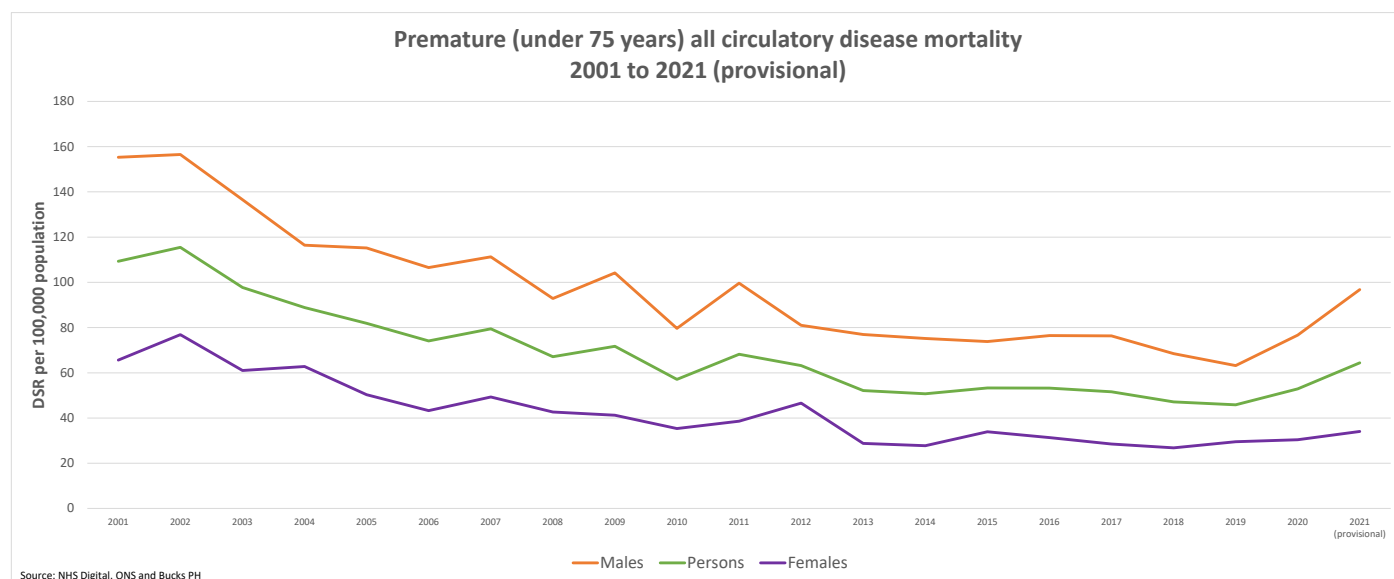


Figure 13: Premature mortality rate due to cardiovascular disease for Buckinghamshire by gender, from 2001 to 2021 (provisional).

4.5 Differences by ethnic group

4.5.1 Conditions recorded in primary care

Ethnicity is recorded for 82% of all Buckinghamshire adults in Buckinghamshire CCG. 80% of current smokers, 89% of patients with a diagnosis of high blood pressure and 91% of patients with either diabetes, coronary heart disease or stroke/TIA have their ethnicity recorded.

The three ethnic groups with the highest prevalence of coronary heart disease are

Pakistani (4.7%), white British (4.1%) and 'Other' ethnicity (3.3%). The three ethnic groups with the highest prevalence of stroke/TIA are white British (2.4%), Other (1.8%) and Pakistani (1.6%).

It appears that different risk factors may be at play for these ethnic groups. For example, the Pakistani population have the highest prevalence of diabetes (14%), but below average prevalence of recorded high blood pressure (12%). In comparison, the white British population has the highest recorded prevalence of high blood pressure (19%), but below average diabetes (6%). Overall, the prevalence of coronary heart disease is recorded as being highest in the Pakistani (4.7%) and white British (4.1%) ethnicities. Stroke/TIA is highest in the white British (2.4%) ethnicity.

	Population size	Smoking	Hypertension	Diabetes	CHD	Stroke
White - British	240895	13%	19%	6%	4%	2%
White - Other	44120	18%	13%	4%	3%	1%
Asian - Pakistani	16963	13%	12%	14%	5%	2%
Asian - Indian	12927	5%	12%	9%	3%	1%
Asian - Other	9320	9%	13%	9%	3%	1%
Other	7823	15%	16%	7%	3%	2%
Black	5931	14%	18%	10%	2%	1%
Mixed	8729	18%	10%	7%	2%	1%

Table 1: Primary care recorded cardiovascular disease risk factors and conditions in Buckinghamshire, by ethnic group.

The prevalence of coronary heart disease is lowest in black groups (1.7%) and people from the mixed ethnic group (1.9%). However, these data do not take age into account so given that these are conditions increase with age some of the difference may be explained by differences in the age of these ethnic groups.

4.5.2 Admissions and trends

To enable sufficient numbers for analysis, three years of admissions data have been pooled (2018/19 to 2020/21).

Ethnicity was known for 84% of emergency cardiovascular disease admissions during this period. For emergency cardiovascular disease admissions when an ethnicity was recorded, 84% in Buckinghamshire were white British, which is in line with 81% of the population being listed as white British in Buckinghamshire at the last Census in 2011.

Ethnicity was known for a lower proportion of elective cardiovascular disease admissions at 76%, compared to 84% for emergency cardiovascular disease admissions. The proportion of cardiovascular disease admissions being for white British patients (of those with an ethnicity recorded) was 85%. We are awaiting more recent data from the 2021 census to update our analysis comparing admission rates for different ethnic groups. There appears to be over-recording of individuals having 'Other' ethnicity in Buckinghamshire hospital data. 2% of emergency cardiovascular disease admissions and 1.6% of elective cardiovascular disease admissions were recorded as being for

patients of 'Other' ethnicity in comparison to representing 0.5% of the population at the last Census.

Conversely, there appears to be under-recording of individuals having 'Mixed' ethnicity in Buckinghamshire hospital data. 0.5% of emergency cardiovascular disease admissions and 0.6% of elective cardiovascular disease admissions were recorded as being for patients of 'Mixed' ethnicity in comparison to representing 2.4% of the population at the last Census. This could suggest that some individuals who are recorded on the Census as being of Mixed ethnicity are being recorded as 'Other' ethnicity by acute NHS Trusts for Buckinghamshire residents.



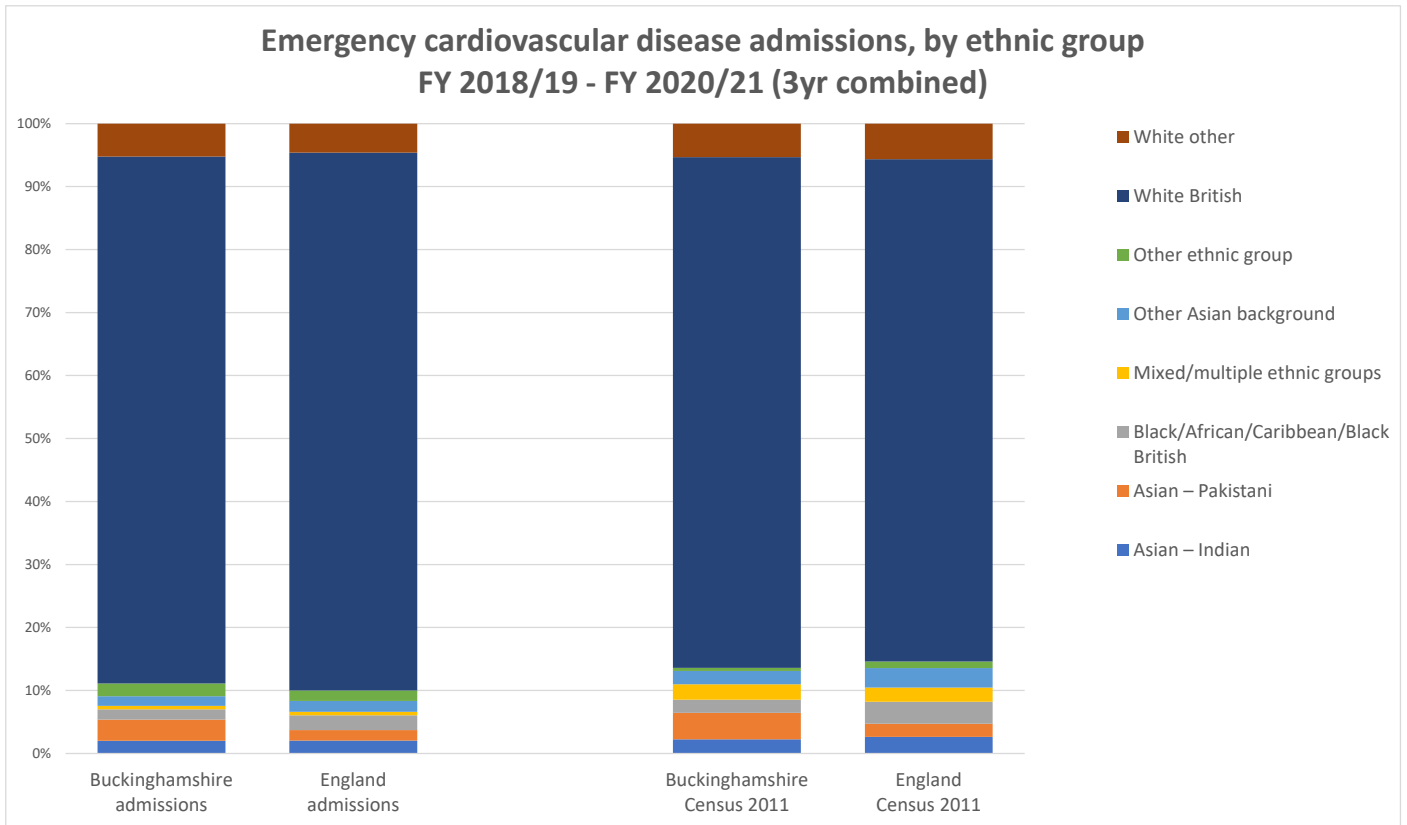


Figure 14: Proportion of Emergency cardiovascular disease admissions by ethnic group from 2018/19 to 2020/21 for Buckinghamshire and England.

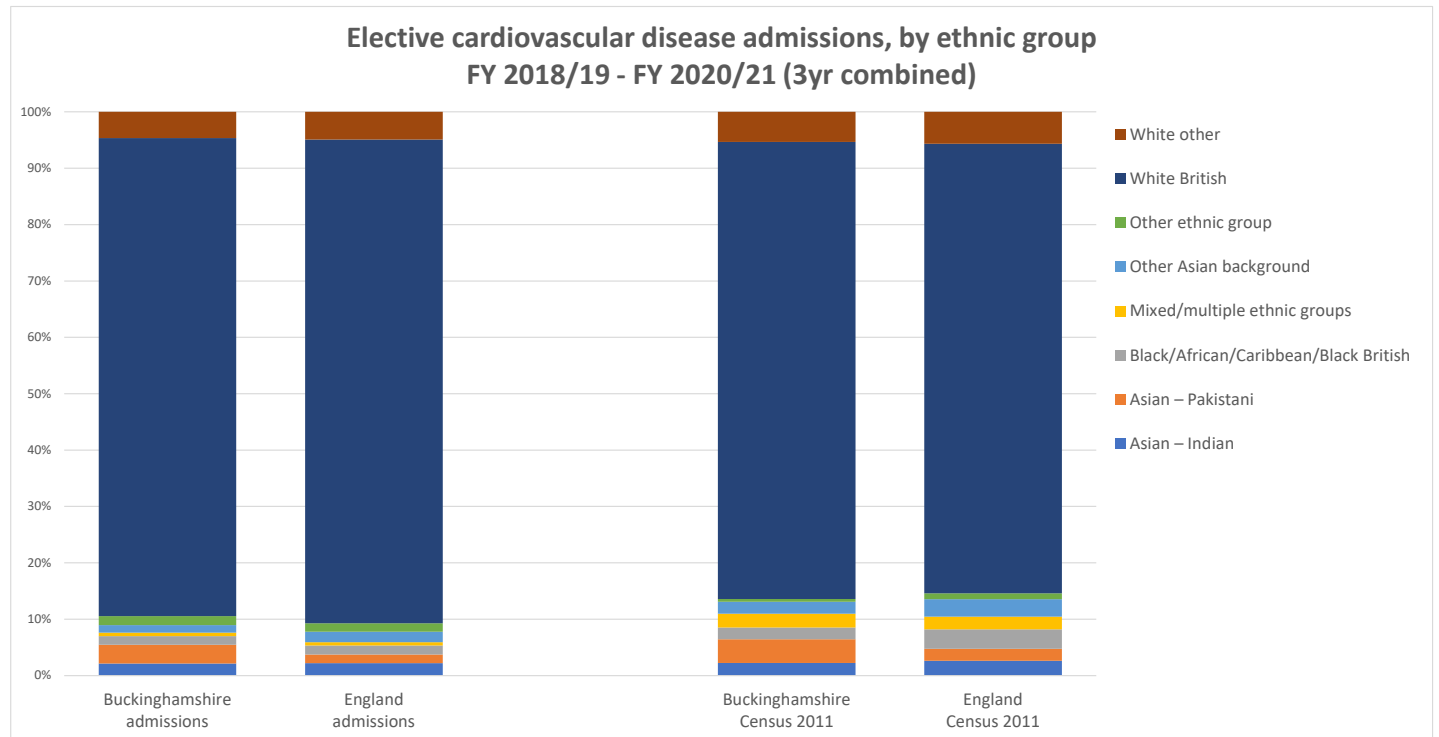


Figure 15: Proportion of Elective cardiovascular disease admissions by ethnic group from 2018/19 to 2020/21 for Buckinghamshire and England.

5. Summary and Recommendations

Cardiovascular disease is a major cause of ill health, disability and death in Buckinghamshire. It causes heart disease, strokes and the second commonest type of dementia. It is the major driver of the inequalities in death rates between people living in our most deprived and least deprived areas. Cardiovascular disease is also more common in our black and Asian populations and people with serious mental illness. Tackling cardiovascular disease and its risk factors is a top priority for reducing inequalities in health in Buckinghamshire and increasing life expectancy and healthy life expectancy.

The good news is that a sizeable proportion of cardiovascular disease can be prevented or delayed by tackling the risk factors identified in this report and ensuring uptake of effective treatments.



5.1 What should we do?

We need a renewed focus on preventing cardiovascular disease in Buckinghamshire. This needs to address the key social, economic and environmental risk factors for cardiovascular disease, alongside the behavioural and clinical risk factors to keep our residents healthy and narrow inequalities. Tackling the key risk factors will also improve health in a variety of other ways, including reducing the risk of cancer, diabetes, dementia, musculoskeletal problems and poor mental health, and produce many other societal and economic benefits, making Buckinghamshire an even better place to live.

To tackle cardiovascular disease and reduce inequalities in illness and premature death in Buckinghamshire we need a multilevel approach that addresses risks at the individual, community and Buckinghamshire-wide level that will impact over the short, medium and long term.

We need to work together with partners and communities across Buckinghamshire to:

1. Act on the broader determinants of health, such as income, debt, good quality employment, high quality education and healthy environments to level up outcomes across Buckinghamshire. Tackling these issues is an essential component of reducing inequalities in health.

2. Support a systematic large-scale improvement in behavioural risk factors by:

- Ensuring the physical, social, commercial and economic environments in which people live, work and learn support healthy behaviours.
- Increasing the understanding and the skills required to design effective behaviour change interventions across Buckinghamshire Council, the NHS and partners, including rolling out the behaviour change Making Every Contact Count programme. This enables people to have 'healthy conversations' to support behaviour change in their day-to-day interactions.
- Working with communities to understand

what would support them to reduce their risk of cardiovascular disease and co-design and evaluate appropriate approaches.

- Supporting NHS trusts to implement the NHS Long Term Plan smoking cessation support requirements as smoking is the single biggest modifiable driver of health inequalities.
- Working together with partners and communities to develop a whole system approach to healthy eating and physical activity to combat the rise in unhealthy weight and obesity.
- Working together to tackle smoking via the Tobacco Control Action Plan.
- Working together to address harmful alcohol misuse through development of our new drug and alcohol strategy.

3. Increase detection and management of modifiable risk factors in people at higher risk of cardiovascular disease, including those living in more deprived areas, ethnic groups at higher risk of cardiovascular disease and those with mental illness by:

- Increasing capacity in primary care in more deprived areas to undertake NHS health checks and detect and manage clinical risk factors, such as high blood pressure and diabetes, and refer to appropriate interventions, such as smoking cessation.
- Working with people from ethnic minority groups to design effective, culturally competent approaches to increase detection of risk factors and management of risk factors.
- Working with NHS and local authority partners to develop and implement the whole system plan to tackle inequalities in cardiovascular disease.

4. Improve data collection and monitoring to track progress.

- Improve data collection in primary and secondary care to enable monitoring of outcomes by ethnicity and areas of deprivation and improve the quality, accuracy and completeness of ethnic monitoring data.
- Undertake equity audits to determine access to and uptake of prevention and treatment initiatives of cardiovascular disease by different groups.

6. Glossary

Body Mass Index (BMI)

BMI is a measure of whether you're a healthy weight for your height. You can calculate your BMI by dividing your weight (in kilograms) by your height in metres squared, or alternatively visit the [NHS BMI calculator](#).

- 18.5 to 24.9 means you're a healthy weight
- 25 to 29.9 means you're overweight
- 30 to 39.9 means you're obese
- 40 or above means you're severely obese

The scores mentioned above generally apply to people with a white background. If you have an ethnic minority background, the threshold for being considered overweight or obese may be lower. BMI is not used on its own to diagnose obesity because people who are very muscular can have a high BMI without much fat. But for most people, BMI is a useful indication of whether they're a healthy weight.

Cardiovascular disease

Cardiovascular disease (CVD) is an overarching term that describes a family of diseases (including stroke, heart attack and peripheral vascular disease) sharing a common set of risk factors.

Cholesterol

Cholesterol is a fatty substance found in your blood. Your body needs cholesterol to build healthy cells, but high levels of cholesterol can increase your risk of heart disease.

Coronary heart disease

Coronary heart disease (CHD) (also known as coronary artery disease or heart disease) is a disease in which a waxy substance called plaque builds up inside the coronary arteries. These arteries supply oxygen-rich blood to your heart muscle.

Directly age standardised rate

The rate that we would expect to find in the populations (groups) under study if they all had the same age composition.

Deprivation

Deprivation in England is measured using the Index of Multiple Deprivation (IMD). It is an official measure of relative deprivation and defines deprivation to include a wide range of an individual's living conditions. There are seven distinct domains of deprivation:

- Income
- Employment
- Health Deprivation and Disability
- Education, Skills and Training
- Crime
- Barriers to Housing and Services
- Living Environment

Deprivation quintile

Within Buckinghamshire, the population for our county is split into five even groups (quintiles) containing 20% of the population each, based on the deprivation score of the areas they live in.

When the term 'least deprived' is used, it means the 20% of the Buckinghamshire population who live in the least deprived areas within the county using the Index of Multiple Deprivation. The 'most deprived' means the 20% of the Buckinghamshire resident who live in the most deprived areas within the county using the Index of Multiple deprivation.

Diabetes

A condition that arises when the pancreas does not produce enough insulin or when the body cannot effectively use insulin. The three most common types of diabetes are: type 1, type 2, and gestational (during pregnancy).

Elective admissions

Hospital inpatients admissions that were planned in advance and are not an emergency. Sometimes referred to as 'planned admissions.'

Emergency admission

An admission where the clinician admits the individual to the hospital due to a sudden and unexpected change in the individual's physical or mental condition which is severe enough to require immediate admission as an inpatient in a hospital.

HDL cholesterol

High-density lipoprotein is sometimes called 'good' cholesterol. High levels of HDL cholesterol can lower your risk for heart disease and stroke.

Heart failure

Heart failure (also known as congestive heart failure) is a condition in which the heart can't pump enough blood to meet the body's needs.

Hypertension

Hypertension (also known as high blood pressure) is a common condition which increases the risk of stroke and heart disease.

LDL cholesterol

Low-density lipoprotein is sometimes called 'bad' cholesterol. High levels of LDL cholesterol raise your risk for heart disease and stroke.

Mortality rate

Also called 'death rate' is a measure of the number of deaths in a population over a specific time period. It is usually reported as a number of deaths for a given number of people, e.g. per 1,000 individuals per year.

Myocardial infarction

A myocardial infarction (also known as a heart attack) happens when the flow of oxygen-rich blood to a section of heart muscle suddenly becomes blocked and the heart muscle can't get enough oxygen. If blood flow isn't restored quickly, the section of heart muscle begins to die.

Obesity

For adults obesity is defined as having a BMI of 30 or greater. If you have an ethnic minority background, the threshold for being considered obese may be lower.

Prevalence

The proportion of individuals in a population who have a particular disease or characteristic at a given time.

Quality and outcomes framework (QOF)

A system designed to remunerate general practices in England for providing good quality care to their patients, and to help fund work to further improve the quality of health care delivered.

Quintile

One of five equal groups in a population. For example, the Buckinghamshire population is split into five equal sized groups for deprivation.

Stroke

A stroke occurs if the flow of oxygen-rich blood to a portion of the brain is restricted or stopped. Without oxygen, brain cells start to die after a few minutes. The majority are caused by a clot blocking the flow of blood, but others are caused by a blood vessel bleeding.

Transient ischaemic attack

A transient ischaemic attack (TIA) or 'mini stroke' is caused by a temporary disruption in the blood supply to part of the brain. The effects of a TIA fully resolve within 24 hours.



7. References

- ¹ Action on Smoking and Health. Health Inequalities - Action on Smoking and Health. Available at: ash.org.uk/category/information-and-resources/health-inequalities/
- ² U.S. Food and Drug Administration. 2020. Cigarette Smoking: A Risk Factor for Type 2 Diabetes. [online] Available at: da.gov/tobacco-products/health-effects-tobacco-use/cigarette-smoking-risk-factor-type-2-diabetes
- ³ Alzheimer's Disease International, 2014. World Alzheimer Report 2014 Dementia and Risk Reduction AN ANALYSIS OF PROTECTIVE AND MODIFIABLE FACTORS. Alzheimer's Disease International. Available at: alzint.org/u/WorldAlzheimerReport2014.pdf
- ⁴ Smokefree Action on Smoking. Media Release
- ⁵ Jackson, SE, Beard, E, Angus, C, Field, M, Brown, J. Moderators of changes in smoking, drinking and quitting behaviour associated with the first COVID-19 lockdown in England. *Addiction*. 2021; 1– 12.
- ⁶ Ons.GOV.uk. 2020. Adult smoking habits in the UK - Office for National Statistics. Available at: ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2019
- ⁷ Office for National Statistics., 2021. Cigarette smoking among adults. Ethnicity-facts-figures. service.GOV.uk. Available at: www.ethnicity-facts-figures.service.gov.uk/health/alcohol-smoking-and-drug-use/adult-smokers/latest
- ⁸ Fingertips.phe.org.uk. 2021. Local Tobacco Control Profiles - Data - OHID. Available at: fingertips.phe.org.uk/profile/tobacco-control/data#page/6/gid/1938132888/pat/6/par/E12000008/ati/302/are/E06000060/iid/93753/age/202/sex/4/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/car-do-0
- ⁹ NHS Digital. 2021. Statistics on NHS Stop Smoking Services in England - April 2020 to March 2021. Available at: digital.nhs.uk/data-and-information/publications/statistical/statistics-on-nhs-stop-smoking-services-in-england/april-2020-to-march-2021/introduction
- ¹⁰
- ¹¹ Webarchive.nationalarchives.GOV.uk. 2014. Do smoking rates vary between more and less advantaged areas?. Available at: webarchive.nationalarchives.gov.uk/ukgwa/20160105204521/http://www.ons.gov.uk/ons/rel/disability-and-health-measurement/do-smoking-rates-vary-between-more-and-less-advantaged-areas-/2012/sty-smoking-rates.html
- ¹² Assets.publishing.service.GOV.uk. 2017. UK Chief Medical Officers' Physical Activity Guidelines. Available at: [assets.publishing.service.GOV.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf)
- ¹³ GOV.UK. 2019. Health matters: preventing cardiovascular disease. Available at: [www.GOV.uk/government/publications/health-matters-preventing-cardiovascular-disease/health-matters-preventing-cardiovascular-disease](https://www.gov.uk/government/publications/health-matters-preventing-cardiovascular-disease/health-matters-preventing-cardiovascular-disease)
- ¹⁴ Mann, S., Beedie, C. and Jimenez, A., 2013. Differential Effects of Aerobic Exercise, Resistance Training and Combined Exercise Modalities on Cholesterol and the Lipid Profile: Review, Synthesis and Recommendations. [online] National Library of Medicine. Available at: [ncbi.nlm.nih.gov/pmc/articles/PMC3906547/](https://pubmed.ncbi.nlm.nih.gov/24734771/)
- ¹⁵ Assets.publishing.service.GOV.uk. 2017. UK Chief Medical Officers' Physical Activity Guidelines. Available at: [assets.publishing.service.GOV.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf)
- ¹⁶ Talty, R., 2015. The Danger of Sitting Down: A Summary of the Health Risks of Excessive Sedentary Behavior. *Inquiries Journal*. Available at: [inquiriesjournal.com/articles/1299/the-danger-of-sitting-down-a-summary-of-the-health-risks-of-excessive-sedentary-behavior](https://www.inquiriesjournal.com/articles/1299/the-danger-of-sitting-down-a-summary-of-the-health-risks-of-excessive-sedentary-behavior)
- ¹⁷ The Health Foundation. 2017. Our food and our health. Available at: [health.org.uk/infographic/our-food-and-our-health](https://www.health.org.uk/infographic/our-food-and-our-health)

- ¹⁸ Public Health England. 2018. The Eat Well Guide. Available at: [assets.publishing.service.GOV.uk/government/uploads/system/uploads/attachment_data/file/742750/Eatwell_Guide_booklet_2018v4.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/742750/Eatwell_Guide_booklet_2018v4.pdf)
- ¹⁹ Department of Health. The NHS Plan: A Plan for Investment, a Plan for Reform.; 2000:144 p. doi:10.1136/bmj.321.7257.315.
- ²⁰ Aune, D., Giovannucci, E., Boffetta, P., Fadnes, L., Keum, N., Norat, T., Greenwood, D., Riboli, E., Vatten, L. and Tonstad, S., 2017. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. PubMed Central Available at: ncbi.nlm.nih.gov/pmc/articles/PMC5837313/
- ²¹ Schwaller, E., Green, M., Patterson, G., O’Flaherty, P. and Kypridemos, C., 2021. Area inequalities in fruit and vegetable intake in England: a spatial microsimulation, cross-sectional study. The Lancet, 398, p.S78. Available at: [thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)02621-0/fulltext](https://thelancet.com/journals/lancet/article/PIIS0140-6736(21)02621-0/fulltext)
- ²² Fingertips. n.d. Public Health Outcomes Framework - Data - OHID. Available at: fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000042/pat/6/par/E12000008/ati/402/are/E06000060/iid/93077/age/164/sex/4/cid/1/tbm/1
- ²³ NHS Digital. n.d. Health Survey for England Fruit & vegetables. Available at: [healthsurvey.hscic.GOV.uk/data-visualisation/data-visualisation/explore-the-trends/fruit-vegetables.aspx?type=adult](https://healthsurvey.hscic.gov.uk/data-visualisation/data-visualisation/explore-the-trends/fruit-vegetables.aspx?type=adult)
- ²⁴ Action on Salt. n.d. UK Salt Reduction - Action on Salt. Available at: www.actiononsalt.org.uk/uk-20salt-20reduction-20programme/145617.html#:~:text=The%20average%20person%20in%20the%20UK%20is%20thought,increased%20risk%20of%20suffering%20later%20on%20in%20life
- ²⁵ UK Health Security Agency, 2017. Available at: khsa.blog.GOV.uk/2017/03/31/health-matters-obesity-and-the-food-environment/
- ²⁶ [Association Between Frequency of Eating Away-From-Home Meals and Risk of All-Cause and Cause-Specific Mortality - Journal of the Academy of Nutrition and Dietetics \(jandonline.org\)](https://jandonline.org)
- ²⁷ Public Health England, 2018. England’s poorest areas are fast food hotspots. Available at: www.GOV.uk/government/news/englands-poorest-areas-are-fast-food-hotspots
- ²⁸ Foodfoundation.org.uk. 2020. THE BROKEN PLATE 2020 The State of the Nation’s Food System. [online] Available at: foodfoundation.org.uk/sites/default/files/2021-10/FF-Broken-Plate-2020-DIGITAL-FULL.pdf
- ²⁹ Foodfoundation.org.uk. n.d. Food Insecurity Tracking. Available at: foodfoundation.org.uk/initiatives/food-insecurity-tracking
- ³⁰ GOV.UK. 2020. Excess weight can increase risk of serious illness and death from COVID-19. Available at: www.GOV.uk/government/news/excess-weight-can-increase-risk-of-serious-illness-and-death-from-covid-19
- ³¹ GOV.UK. 2021. Seven in 10 adults are motivated to get healthier in 2021 due to COVID-19. Available at: www.GOV.uk/government/news/seven-in-10-adults-are-motivated-to-get-healthier-in-2021-due-to-covid-19
- ³² The Body Mass Index (or BMI) is a way of seeing if your weight is appropriate for your height - BMI calculator | Check your BMI - NHS | Please fill in your details (www.nhs.uk)
- ³³ Van Gaal LF, Mertens IL, De Block CE. Mechanisms linking obesity with cardiovascular disease. Nature. 2006 Dec;444:875–80. [PubMed] [Google Scholar]
- ³⁴ Bhf.org.uk. n.d. Obesity. Available at: www.bhf.org.uk/informationsupport/risk-factors/obesity
- ³⁵ GOV.UK. 2017. Health matters: obesity and the food environment. Available at: <https://www.GOV.uk/government/publications/health-matters-obesity-and-the-food-environment/health-matters-obesity-and-the-food-environment--2>
- ³⁶ UCL. 2020. Obesity linked to higher dementia risk. Available at: www.ucl.ac.uk/news/2020/jun/obesity-linked-higher-dementia-risk
- ³⁷ NICE. 2014. Available at: www.nice.org.uk/guidance/cg189/resources/obesity-identification-assessment-and-management-pdf-35109821097925
- ³⁸ GOV.UK. 2020. Excess weight can increase risk of serious illness and death from COVID-19. Available at: www.GOV.uk/government/news/excess-weight-can-increase-risk-of-serious-illness-and-death-from-covid-19

- ³⁹ Freedman D, Dietz WH, Srinivasan S et al. The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study. *Pediatrics* 1999;103:1175-1182.
- ⁴⁰ Cote AT, Harris KC, Panagiotopoulos C et al. Childhood obesity and cardiovascular dysfunction. *Journal of the American College of Cardiology*. 2013;62:1309-1319
- ⁴¹ NHS Digital. 2020. Statistics on Obesity, Physical Activity and Diet, England, 2020 - NHS Digital. Available at: digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/england-2020
- ⁴² Fingertips. n.d. Obesity Profile - Data – OHID. Available at: fingertips.phe.org.uk/profile/national-child-measurement-programme/data#page/0/gid/1938133368/pat/6/par/E12000008/ati/302/are/E06000060/yr/1/cid/4/tbm/1
- ⁴³ NHS Digital. 2019. Health Survey for England 2018 [NS]. Available at: digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2018/summary
- ⁴⁴ NHS Digital. 2020. National Child Measurement Programme, England 2019/20 School Year. Available at: digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2019-20-school-year/deprivation
- ⁴⁵ NICE. 2013. BMI: preventing ill health and premature death in black, Asian and other minority ethnic groups. Available at: www.nice.org.uk/guidance/ph46/chapter/1-Recommendations#recommendation-1-preventing-type-2-diabetes
- ⁴⁶ Live Well Stay Well - Live Well Stay Well (livewellstaywellbucks.co.uk)
- ⁴⁷ PubMed, 2016. Alcohol-induced hypertension: Mechanism and prevention. Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC4038773/#B18
- ⁴⁸ Puddey, I. and Beilin, L., 2006. ALCOHOL IS BAD FOR BLOOD PRESSURE. *Clinical and Experimental Pharmacology and Physiology*, Available at: pubmed.ncbi.nlm.nih.gov/16922819/
- ⁴⁹ Public Health England 2016. The Public Health Burden of Alcohol and the Effectiveness and Cost-Effectiveness of Alcohol Control Policies. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733108/alcohol_public_health_burden_evidence_review_update_2018.pdf
- ⁵⁰ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england
- ⁵¹ British Heart Foundation. 2021. Coronavirus: what it means for you if you have heart or circulatory disease. Available at: www.bhf.org.uk/information-support/heart-matters-magazine/news/coronavirus-and-your-health#Heading2
- ⁵² Kivimaki, M., 2002. Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees. *BMJ*, 325(7369), pp.857-857. Available at: www.bmj.com/content/325/7369/857
- ⁵³ Marmot, M., Shipley, M., Hemingway, H., Head, J. and Brunner, E., 2008. Biological and behavioural explanations of social inequalities in coronary heart disease: the Whitehall II study. *PubMed*, Available at: pubmed.ncbi.nlm.nih.gov/18777168/
- ⁵⁴ nhs.uk. 2019. Metabolic syndrome. Available at: www.nhs.uk/conditions/metabolic-syndrome/
- ⁵⁵ Brunner, E., Marmot, M., Nanchahal, K., Shipley, M., Stansfeld, S., Juneja, M. and Alberti, K., 1997. Social inequality in coronary risk: Central obesity and the metabolic syndrome. Evidence from the Whitehall II study. *PubMed*, Available at: pubmed.ncbi.nlm.nih.gov/9389428/
- ⁵⁶ Brunner, E., Chandola, T. and Marmot, M., 2007. Prospective Effect of Job Strain on General and Central Obesity in the Whitehall II Study. *American Journal of Epidemiology*, 165(7), pp.828-837. Available at: academic.oup.com/aje/article/165/7/828/158160
- ⁵⁷ Pega, F., Náfrádi, B., Momen, N., Ujita, Y., Streicher, K., Prüss-Üstün, A., Descatha, A., Driscoll, T., Fischer, F., Godderis, L., Kiiver, H., Li, J., Magnusson Hanson, L., Rugulies, R., Sørensen, K. and Woodruff, T., 2021. Global, regional, and national burdens of ischemic heart disease and stroke attributable to exposure to long working hours for 194 countries, 2000–2016: A systematic analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury. *Environment International*, Available at: www.sciencedirect.com/science/article/pii/S0160412021002208

- ⁵⁸ Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Capstick, S., Chambers, J., Dalin, C., Daly, M., Dasandi, N., Davies, M., Drummond, P., Dubrow, R., Ebi, K., Eckelman, M., Ekins, P., Escobar, L., Fernandez Montoya, L., Georgeson, L., Graham, H., Hagggar, P., Hamilton, I., Hartinger, S., Hess, J., Kelman, I., Kiesewetter, G., Kjellstrom, T., Kniveton, D., Lemke, B., Liu, Y., Lott, M., Lowe, R., Sewe, M., Martinez-Urtaza, J., Maslin, M., McAllister, L., McGushin, A., Jankin Mikhaylov, S., Milner, J., Moradi-Lakeh, M., Morrissey, K., Murray, K., Munzert, S., Nilsson, M., Neville, T., Oreszczyn, T., Owfi, F., Pearman, O., Pencheon, D., Phung, D., Pye, S., Quinn, R., Rabbaniha, M., Robinson, E., Rocklöv, J., Semenza, J., Sherman, J., Shumake-Guillemot, J., Tabatabaei, M., Taylor, J., Trinanes, J., Wilkinson, P., Costello, A., Gong, P. and Montgomery, H., 2019. The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. The Lancet, Available at: [www.thelancet.com/journals/lancet/article/PIIS0140-6736\(19\)32596-6/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)32596-6/fulltext)
- ⁵⁹ Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. The Lancet, 396(10258), pp.1223-1249. Available at: [www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30752-2/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30752-2/fulltext)
- ⁶⁰ Office for National Statistics. 2020. Excess winter mortality in England and Wales - Office for National Statistics. Available at: www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/2019to2020provisionaland2018to2019final
- ⁶¹ The King's Fund. n.d. Housing. Available at: www.kingsfund.org.uk/projects/time-think-differently/trends-broader-determinants-health-housing
- ⁶² NHS England. 2018. NHS England North » Cold weather increases risk of heart attack and stroke. Available at: www.england.nhs.uk/north/cold-weather-increases-risk-of-heart-attack-and-stroke/
- ⁶³ COLLINS, K., 1986. LOW INDOOR TEMPERATURES AND MORBIDITY IN THE ELDERLY. Age and Ageing, 15(4), pp.212-220. Available at: academic.oup.com/ageing/article-abstract/15/4/212/34583?redirectedFrom=fulltext
- ⁶⁴ COLLINS, K., 1986. LOW INDOOR TEMPERATURES AND MORBIDITY IN THE ELDERLY. Age and Ageing, 15(4), pp.212-220. Available at: academic.oup.com/ageing/article-abstract/15/4/212/34583?redirectedFrom=fulltext
- ⁶⁵ Al-Shakarchi, N., Evans, H., Luchenski, S., Story, A. and Banerjee, A., 2020. Cardiovascular disease in homeless versus housed individuals: a systematic review of observational and interventional studies. BMJ. Available at: heart.bmj.com/content/106/19/1483.info
- ⁶⁶ Kings College London. 2020. Personalising the Health Impacts of Air Pollution: Interim Statistics Summary for a Selection of Statements. Available at: erg.ic.ac.uk/Research/docs/personalised-health-impacts.pdf
- ⁶⁷ Fecht, D., Fischer, P., Fortunato, L., Hoek, G., de Hoogh, K., Marra, M., Kruize, H., Vienneau, D., Beelen, R. and Hansell, A., 2015. Associations between air pollution and socioeconomic characteristics, ethnicity and age profile of neighbourhoods in England and the Netherlands. Environmental Pollution, 198, pp.201-210. Available at: www.sciencedirect.com/science/article/abs/pii/S0269749114005144
- ⁶⁸ New Scientist. 2022. Diabetes and obesity: Pedestrian-friendly cities have lower rates | New Scientist. Available at: www.newscientist.com/article/2309343-pedestrian-friendly-cities-have-lower-rates-of-diabetes-and-obesity/
- ⁶⁹ Williamson, E.J., Walker, A.J., Bhaskaran, K. et al. Factors associated with COVID-19-related death using OpenSAFELY. Nature 584, 430–436 (2020). doi.org/10.1038/s41586-020-2521-4
- ⁷⁰ GOV.UK. 2019. Health matters: preventing cardiovascular disease. Available at: www.gov.uk/government/publications/health-matters-preventing-cardiovascular-disease/health-matters-preventing-cardiovascular-disease
- ⁷¹ Fingertips. n.d. Public health profiles - OHID. Available at: fingertips.phe.org.uk/search/cardiovascular#page/7/gid/1/pat/159/par/K02000001/ati/15/are/E92000001/iid/40401/age/163/sex/4/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/tre-do-1

- ⁷² NHS Digital. n.d. Part 5: Physical activity - NHS Digital. Available at: digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/england-2020/part-5-adult-physical-activity-copy
- ⁷³ Holmes, J., 2021. Tackling obesity The role of the NHS in a whole-system approach. The Kings Fund. Available at: www.kingsfund.org.uk/sites/default/files/2021-07/Tackling%20obesity.pdf
- ⁷⁴ NHS Digital. n.d. Part 4: Deprivation - NHS Digital. Available at: digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2020-21-school-year/deprivation
- ⁷⁵ Macdonald, L., Cummins, S. and Macintyre, S., 2007. Neighbourhood fast food environment and area deprivation—substitution or concentration?. *Appetite*, 49(1), pp.251-254. Available at: www.sciencedirect.com/science/article/abs/pii/S0195666306006519?via%3Dihub
- ⁷⁶ The Health Foundation. 2020. Health Equity in England: The Marmot Review 10 Years On. Available at: www.health.org.uk/publications/reports/the-marmot-review-10-years-on
- ⁷⁷ GOV.UK. 2016. Health matters: harmful drinking and alcohol dependence. Available at: www.GOV.uk/government/publications/health-matters-harmful-drinking-and-alcohol-dependence/health-matters-harmful-drinking-and-alcohol-dependence
- ⁷⁸ GOV.UK. 2019. Health matters: preventing cardiovascular disease. Available at: www.GOV.uk/government/publications/health-matters-preventing-cardiovascular-disease/health-matters-preventing-cardiovascular-disease
- ⁷⁹ Moody, A., Cowley, G., Ng Fat, L. and Mindell, J., 2016. Social inequalities in prevalence of diagnosed and undiagnosed diabetes and impaired glucose regulation in participants in the Health Surveys for England series. *BMJ*. Available at: bmjopen.bmj.com/content/6/2/e010155
- ⁸⁰ www.england.nhs.uk/midlands/clinical-networks/west-midlands-clinical-network/our-networks/cardiovascular/cardiac/atrial-fibrillation/
- ⁸¹ Chung, S., Sofat, R., Acosta-Mena, D., Taylor, J., Lambiase, P., Casas, J. and Providencia, R., 2021. Atrial fibrillation epidemiology, disparity and healthcare contacts: a population-wide study of 5.6 million individuals. *The Lancet Regional Health - Europe*, 7, p.100157. Available at: [www.thelancet.com/journals/lanep/article/PIIS2666-7762\(21\)00134-4/fulltext](http://www.thelancet.com/journals/lanep/article/PIIS2666-7762(21)00134-4/fulltext)
- ⁸² Asthana, S., Moon, G., Gibson, A., Bailey, T., Hewson, P. and Dibben, C., 2016. Inequity in cardiovascular care in the English National Health Service (NHS): a scoping review of the literature. *Health & Social Care in the Community*, 26(3), pp.259-272. Available at: eprints.soton.ac.uk/419823/1/Asthana_et_al_2018_Health_Social_Care_in_the_Community.pdf
- ⁸³ As above
- ⁸⁴ Office for National Statistics. 2012. Ethnicity and National Identity in England and Wales - Office for National Statistics. Available at: www.ons.GOV.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/articles/ethnicityandnationalidentityinenglandandwales/2012-12-11
- ⁸⁵ Movsisyan, N., Vinciguerra, M., Medina-Inojosa, J. and Lopez-Jimenez, F., 2020. Cardiovascular Diseases in Central and Eastern Europe: A Call for More Surveillance and Evidence-Based Health Promotion. Boston College. Available at: annalsofglobalhealth.org/articles/10.5334/aogh.2713/
- ⁸⁶ Matthews, Z., 2008. The health of Gypsies and Travellers in the UK. Gypsy-traveller.org. Available at: www.gypsy-traveller.org/wp-content/uploads/health-brief.pdf
- ⁸⁷ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england
- ⁸⁸ George, J., Mathur, R., Shah, A., Pujades-Rodriguez, M., Denaxas, S., Smeeth, L., Timmis, A. and Hemingway, H., 2017. Ethnicity and the first diagnosis of a wide range of cardiovascular diseases: Associations in a linked electronic health record cohort of 1 million patients. *PLOS ONE*, 12(6), p.e0178945. Available at: journals.plos.org/plosone/article/file?type=printable&id=10.1371/journal.pone.0178945
- ⁸⁹ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england#diabetes
- ⁹⁰ Tillin, T., Hughes, A., Godsland, I., Whincup, P., Forouhi, N., Welsh, P., Sattar, N., McKeigue,

P. and Chaturvedi, N., 2013. Insulin Resistance and Truncal Obesity as Important Determinants of the Greater Incidence of Diabetes in Indian Asians and African Caribbeans Compared With Europeans. *Diabetes Care*, 36(2), pp.383-393. Available at: diabetesjournals.org/care/article/36/2/383/38145/Insulin-Resistance-and-Truncal-Obesity-as

⁹¹ As above

⁹² The Lancet Respiratory Medicine, 2021. Ethnicity-specific BMI cutoffs for obesity based on type 2 diabetes risk in England: a population-based cohort study. Available at: www.thelancet.com/action/showPdf?pii=S2213-8587%2821%2900088-7

⁹³ Chaturvedi, N. and Fuller, J., 1996. Ethnic differences in mortality from cardiovascular disease in the UK: do they persist in people with diabetes?. *Journal of Epidemiology & Community Health*, 50(2), pp.137-139. Available at: www.jstor.org/stable/25568228

⁹⁴ As above

⁹⁵ GOV.UK. 2021. Ethnic disparities in the major causes of mortality and their risk factors – a rapid review. Available at: www.GOV.uk/government/publications/the-report-of-the-commission-on-race-and-ethnic-disparities-supporting-research/ethnic-disparities-in-the-major-causes-of-mortality-and-their-risk-factors-by-dr-raghib-ali-et-al

⁹⁶ Agyemang, C. and Bhopal, R., 2002. Is the blood pressure of South Asian adults in the UK higher or lower than that in European white adults? A review of cross-sectional data. *Journal of Human Hypertension*, 16(11), pp.739-751. Available at: www.nature.com/articles/1001488#:~:text=5%E2%80%93751,Available%20at%20the,South%20Asians%20compared%20to%20whites

⁹⁷ Battu, H., Bhopal, R. and Agyemang, C., 2018. Heterogeneity in blood pressure in UK Bangladeshi, Indian and Pakistani, compared to White, populations: divergence of adults and children. *Journal of Human Hypertension*, 32(11), pp.725-744. Available at: www.nature.com/articles/s41371-018-0095-5

⁹⁸ Tapela, N., Collister, J., Clifton, L., Turnbull, I., Rahimi, K. and Hunter, D., 2021. Prevalence and determinants of hypertension control among almost 100 000 treated adults in the UK. Available at: openheart.bmj.com/content/8/1/e001461.info

⁹⁹ Sportengland-production-files.s3.eu-west-2.amazonaws.com. 2020. Active Lives Adult Survey November 2018/19 Report. Available at: sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/2020-04/Active%20Lives%20Adult%20November%202018-19%20Report..pdf?VersionId=BhkAy2K28pd9bDEz_NuisHI2ppuqJtpZ

¹⁰⁰ Bhatnagar, P., Shaw, A. and Foster, C., 2015. Generational differences in the physical activity of UK South Asians: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1). Available at: ijbnpa.biomedcentral.com/articles/10.1186/s12966-015-0255-8

¹⁰¹ Love, R., Adams, J., Atkin, A. and van Sluijs, E., 2019. Socioeconomic and ethnic differences in children's vigorous intensity physical activity: a cross-sectional analysis of the UK Millennium Cohort Study. *BMJ Open*, 9(5), p.e027627. Available at: bmjopen.bmj.com/content/9/5/e027627

¹⁰² NICE. 2013. 1 Recommendations | BMI: preventing ill health and premature death in black, Asian and other minority ethnic groups | Guidance | NICE. Available at: www.nice.org.uk/guidance/ph46/chapter/1-Recommendations

¹⁰³ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england#cvd

¹⁰⁴ GOV.uk. 2021. Harmful and probable dependent drinking in adults. Available at: www.ethnicity-facts-figures.service.GOV.uk/health/alcohol-smoking-and-drug-use/harmful-and-probable-dependent-drinking-in-adults/latest

¹⁰⁵ Joseph Rowntree Foundation. 2010. Ethnicity and alcohol: a review of the UK literature. Available at: www.jrf.org.uk/sites/default/files/jrf/migrated/files/ethnicity-alcohol-literature-review-summary.pdf

¹⁰⁶ Zaman, M., Philipson, P., Chen, R., Farag, A., Shipley, M., Marmot, M., Timmis, A. and Hemingway, H., 2012. South Asians and coronary disease: is there discordance between effects on incidence and prognosis?. [online] *BMJ*. Available at: heart.bmj.com/content/99/10/729.info

- ¹⁰⁷ The Kings Fund. 2016. Access to health care and minority ethnic groups. Available at: www.kingsfund.org.uk/sites/default/files/field/field_publication_file/access-to-health-care-minority-ethnic-groups-briefing-kings-fund-february-2006.pdf
- ¹⁰⁸ Eastwood, S., Mathur, R., Sattar, N., Smeeth, L., Bhaskaran, K. and Chaturvedi, N., 2021. Ethnic differences in guideline-indicated statin initiation for people with type 2 diabetes in UK primary care, 2006–2019: A cohort study. *PLOS Medicine*, 18(6), p.e1003672. Available at: journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1003672
- ¹⁰⁹ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england#cvd
- ¹¹⁰ George, J., Mathur, R., Shah, A., Pujades-Rodriguez, M., Denaxas, S., Smeeth, L., Timmis, A. and Hemingway, H., 2017. Ethnicity and the first diagnosis of a wide range of cardiovascular diseases: Associations in a linked electronic health record cohort of 1 million patients. *PLOS ONE*, 12(6), p.e0178945. Available at: journals.plos.org/plosone/article/file?type=printable&id=10.1371/journal.pone.0178945
- ¹¹¹ Schofield, P., Saka, O. and Ashworth, M., 2019. Ethnic differences in blood pressure monitoring and control in south east London. *British Journal of General Practice*, Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC3063048/#b6
- ¹¹² Tapela, N., Collister, J., Clifton, L., Turnbull, I., Rahimi, K. and Hunter, D., 2021. Prevalence and determinants of hypertension control among almost 100 000 treated adults in the UK. *BMJ*. Available at: openheart.bmj.com/content/8/1/e001461
- ¹¹³ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: <https://tes>
- ¹¹⁴ Tillin, T., Hughes, A., Godsland, I., Whincup, P., Forouhi, N., Welsh, P., Sattar, N., McKeigue, P. and Chaturvedi, N., 2013. Insulin Resistance and Truncal Obesity as Important Determinants of the Greater Incidence of Diabetes in Indian Asians and African Caribbeans Compared With Europeans. *Diabetes Care*, 36(2), pp.383-393. Available at: diabetesjournals.org/care/article/36/2/383/38145/Insulin-Resistance-and-Truncal-Obesity-as
- ¹¹⁵ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england#cvd
- ¹¹⁶ The Lancet Respiratory Medicine, 2021. Ethnicity-specific BMI cutoffs for obesity based on type 2 diabetes risk in England: a population-based cohort study. Available at: www.thelancet.com/action/showPdf?pii=S2213-8587%2821%2900088-7
- ¹¹⁷ As above
- ¹¹⁸ Raleigh, V. and Holmes, J., 2021. The health of people from ethnic minority groups in England. The Kings Fund. Available at: www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england#cvd
- ¹¹⁹ GOV.UK. 2021. Ethnic disparities in the major causes of mortality and their risk factors – a rapid review. Available at: www.GOV.uk/government/publications/the-report-of-the-commission-on-race-and-ethnic-disparities-supporting-research/ethnic-disparities-in-the-major-causes-of-mortality-and-their-risk-factors-by-dr-raghib-ali-et-al
- ¹²⁰ GOV.uk. 2021. Harmful and probable dependent drinking in adults. Available at: www.ethnicity-facts-figures.service.GOV.uk/health/alcohol-smoking-and-drug-use/harmful-and-probable-dependent-drinking-in-adults/latest
- ¹²¹ Asthana, S., Moon, G., Gibson, A., Bailey, T., Hewson, P. and Dibben, C., 2016. Inequity in cardiovascular care in the English National Health Service (NHS): a scoping review of the literature. *Health & Social Care in the Community*, 26 (3), pp.259-272. Available at: onlinelibrary.wiley.com/doi/10.1111/hsc.12384
- ¹²² Eastwood, S., Mathur, R., Sattar, N., Smeeth, L., Bhaskaran, K. and Chaturvedi, N., 2021. Ethnic differences in guideline-indicated statin initiation for people with type 2 diabetes in UK primary care, 2006–2019: A cohort study. *PLOS Medicine*, 18(6), p.e1003672. Available at: journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1003672

- ¹²³ Fecht, D., Fischer, P., Fortunato, L., Hoek, G., de Hoogh, K., Marra, M., Kruize, H., Vienneau, D., Beelen, R. and Hansell, A., 2015. Associations between air pollution and socioeconomic characteristics, ethnicity and age profile of neighbourhoods in England and the Netherlands. *Environmental Pollution*, 198, pp.201-210. Available at: www.sciencedirect.com/science/article/abs/pii/S0269749114005144
- ¹²⁴ Hse.gov.uk. 2005. Ethnicity, work characteristics, stress and health. Available at: www.hse.gov.uk/research/rrpdf/rr308.pdf
- ¹²⁵ HSCIC 2018. Health Survey for England 2017 Cardiovascular diseases. Available at: healthsurvey.hscic.GOV.uk/media/78646/HSE17-CVD-rep.pdf
- ¹²⁶ British Heart Foundation 2022. UK Factsheet. [online] Available at: www.bhf.org.uk/-/media/files/research/heart-statistics/bhf-cvd-statistics---uk-factsheet.pdf
- ¹²⁷ Office for National Statistics. 2020. Leading causes of death, UK - Office for National Statistics. Available at: www.ons.GOV.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/articles/leadingcausesofdeathuk/2001to2018
- ¹²⁸ British Heart Foundation. n.d. Menopause and heart disease. Available at: www.bhf.org.uk/information-support/support/women-with-a-heart-condition/menopause-and-heart-disease
- ¹²⁹ GOV.uk. 2014. Tackling high blood pressure From evidence into action. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/527916/Tackling_high_blood_pressure.pdf
- ¹³⁰ Diabetes UK 2009. Middle-aged men twice as likely to have diabetes as women. Diabetes UK. Available at: www.diabetes.org.uk/about_us/news_landing_page/middle-aged-men-twice-as-likely-to-have-diabetes-as-women
- ¹³¹ Gao, Z., Chen, Z., Sun, A. and Deng, X., 2019. Gender differences in cardiovascular disease. *Medicine in Novel Technology and Devices*, Available at: www.sciencedirect.com/science/article/pii/S2590093519300256#:~:text=Although%20the%20incidence%20of%20CVD,heart%20failure%20and%20aortic%20diseases
- ¹³² Office for National Statistics. 2020. Adult smoking habits in the UK - Office for National Statistics. Available at: www.ons.GOV.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2019
- ¹³³ Sport England. 2021. Active Lives Adult Survey May 2020/21 Report. Available at: sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/2021-10/Active%20Lives%20Adult%20Survey%20May%202020-21%20Report.pdf?VersionId=YcsnWYZSKx4n12TH0cKpY392hBkRdA8N
- ¹³⁴ GOV.uk. 2014. Tackling high blood pressure From evidence into action. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/527916/Tackling_high_blood_pressure.pdf
- ¹³⁵ Sport England. 2021. Active Lives Adult Survey May 2020/21 Report. Available at: sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/2021-10/Active%20Lives%20Adult%20Survey%20May%202020-21%20Report.pdf?VersionId=YcsnWYZSKx4n12TH0cKpY392hBkRdA8N
- ¹³⁶ NHS Digital. 2020. Statistics on Obesity, Physical Activity and Diet, England, 2020. Available at: digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/england-2020/part-3-adult-obesity-copy
- ¹³⁷ GOV.uk. 2014. Tackling high blood pressure From evidence into action. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/527916/Tackling_high_blood_pressure.pdf
- ¹³⁸ GOV.uk. 2014. Tackling high blood pressure From evidence into action. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/527916/Tackling_high_blood_pressure.pdf
- ¹³⁹ GOV.UK. 2016. Health matters: harmful drinking and alcohol dependence. Available at: www.gov.uk/government/publications/health-matters-harmful-drinking-and-alcohol-dependence/health-matters-harmful-drinking-and-alcohol-dependence

¹⁴⁰ British Heart Foundation. n.d. Bias and Biology. Available at: www.bhf.org.uk/informationsupport/heart-matters-magazine/medical/women-and-heart-disease/download-bias-

