



Health Survey for England 2017

Cardiovascular diseases

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This report examines the prevalence of cardiovascular diseases (CVD, also called circulatory diseases) in adults in England in 2017. Prevalence levels are compared by sex, age, region, and household income as well as other health conditions, including diabetes and hypertension. Use of medicines for prevention is also examined.

Key findings

- In 2017, 14% of adults aged 16 and over, 15% of men and 13% of women, reported having any doctor-diagnosed cardiovascular disease (CVD). This was at a very similar level in 2011 (14% of men and 13% of women).
- More men than women suffered from ischaemic heart disease (6% and 3% respectively) and from stroke (3% and 2% respectively).
- CVD was more prevalent in lower income households. 22% of adults aged 35 and over in the lowest income quintile and 16% in the highest income quintile reported any CVD.
- Based on the EQ-5D questionnaire, 31% of adults aged 35 and over with IHD or stroke reported at least one severe health problem, compared with 14% of those who reported diagnosed diabetes or hypertension (but no IHD or stroke) and 8% of those with none of these conditions.
- Among people aged 35 and over with any CVD condition, 60% of men and 38% of women were taking prescribed lipid-lowering medicines, and 43% of men and 23% of women were taking prescribed antiplatelet medicines.

Contents

Key findings	1
This is a National Statistics publication	3
Introduction	4
Contents	4
Background	4
Methods and definitions	6
Methods	6
Definitions	6
CVD	6
Age-standardisation	7
About the survey estimates	7
Prevalence of CVD	9
Prevalence of CVD, by age and sex	9
Trends in IHD and stroke, 1994 to 2017	11
Prevalence of CVD, by region	13
Prevalence of CVD, by equivalised household income	14
Prevalence of CVD, by waist circumference	15
Prevalence of CVD, by hypertension	16
Prevalence of CVD, by doctor-diagnosed diabetes	17
Prevalence of CVD, by glycated haemoglobin level	18
Health status, by CVD condition	19
Use of prescribed medicines, by CVD condition	20
Symptoms suggestive of peripheral arterial disease (PAD)	23

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This report may be of interest to members of the public, policy officials, people working in public health and to commissioners of health and care services to see the prevalence of cardiovascular diseases among adults in England.

Introduction

Contents

This report examines the prevalence of cardiovascular diseases (CVD) in adults living in private households in England in 2017, based on self-report of ever having had a doctor diagnosis. Prevalence levels are compared by sex, age, region, and household income as well as other health conditions, including diabetes and hypertension.

Detailed tables accompanying this report can be accessed via <http://digital.nhs.uk/pubs/hse2017>. CVD risk factors are discussed in the HSE 2017 reports on Adult health, Adult behaviours and risk factors, Multiple risk factors, and Adult and child overweight and obesity.

Background

Cardiovascular disease (CVD) is one of the leading contributors to the global disease burden.¹ The single most common cardiovascular disease is ischaemic heart disease (IHD), also called coronary heart disease (CHD) or coronary artery disease. IHD includes myocardial infarction (MI, heart attack) and angina (chest pain on exertion due to inadequate blood flow to the heart muscle).² The vast majority of CVD in England is caused by atherosclerosis ('furring' of the arteries). This is not only the case for IHD and for stroke, the two main diseases, but also for aortic aneurysm and peripheral arterial disease (PAD), which impairs blood flow to the limbs. PAD occurs when the blood supply to the muscles in the legs is insufficient to provide adequate oxygen. The risk of developing or dying from these diseases increases with behavioural risk factors (including smoking, insufficient physical activity, unhealthy diet); obesity, particularly abdominal obesity³; and biological risk factors such as raised blood pressure (hypertension),⁴ raised cholesterol, and diabetes. Treatment for chronic CVD includes behavioural changes; medicines to reduce blood pressure and cholesterol, control diabetes, relieve symptoms, and reduce risk of recurrence; and coronary revascularisation procedures.⁵

¹ Global Burden of Disease Study 2013 Collaborators. *Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013*. The Lancet 2015;**386**:743-800.

² IHD can also manifest as congestive heart failure (CHF, also called congestive cardiac failure (CCF)), without any symptoms of MI or angina.

³ *Waist circumference and waist-hip ratio: Report of a WHO Expert Consultation, Geneva, 8-11 December 2008*. Geneva: World Health Organization, 2011. http://apps.who.int/iris/bitstream/handle/10665/44583/9789241501491_eng.pdf?ua=1

⁴ Lackland DT, Weber MA. *Global Burden of Cardiovascular Disease and Stroke: Hypertension at the Core*. Canadian Journal of Cardiology. 2015;**31**:569–571.

⁵ IHD occurs when the main coronary arteries that supply blood to the heart muscle are blocked, so the heart muscle receives insufficient oxygen. Coronary revascularisation removes or bypasses such blockages using angioplasty (a less intrusive procedure involving passing a tube through the blood vessels from the groin and opening up the artery from the inside) or coronary artery bypass graft that bypasses the blocked section of the artery, a more major operation.

Over the second half of the 20th century there was a marked decrease in mortality from CVD in England and Wales.⁶ In 1999, CHD was made a government priority,⁷ with the introduction of the National Service Framework for CHD following in 2000.⁸ The goal to reduce death from CHD and related illnesses in the under 75s by 40% by the year 2010 was reached ahead of schedule.⁹ Between 2000 and 2010, age-standardised CVD mortality rates in England and Wales for males and females fell by 40% and 38% respectively.⁶ Mortality rates from CVD have continued to fall: in 2011, age-standardised CVD mortality fell to below cancer mortality rates as the main cause of death in the UK in both men and women, despite cancer deaths also falling.¹⁰ Age-standardised deaths from IHD fell by 26% in men and 30% in women from 2010 to 2016.¹¹

However, CVD remains the second most common broad cause of death, accounting for just over a quarter of all deaths registered in England and Wales in 2016.¹² This included the 14% of male deaths and 8% of female deaths which were due to IHD, the leading cause of cardiovascular death in both sexes. Stroke was the second leading cardiovascular cause of death for both men and women in England and Wales in 2016, accounting for 5% of male and 7% of female deaths. Among people who died before the age of 75, 25% of male and 17% of female deaths were due to CVD in 2016.

Quality and Outcome Framework (QOF) data have shown a fall in CHD prevalence from 3.6% in 2004/05 to 3.1% in 2017/18.¹³ In HSE 2011, 5.7% of men and 3.5% of women reported ever having IHD, with 2.7% of men and 2.1% of women reporting ever having had a stroke.¹⁴ It has been estimated that more than 9,000 heart attacks

⁶ National Statistics. *Mortality Statistics: Deaths registered in England and Wales 2010*. Office for National Statistics, 2011. <http://webarchive.nationalarchives.gov.uk/20160107154525/http://www.ons.gov.uk/ons/rel/vsob1/mortality-statistics--deaths-registered-in-england-and-wales--series-dr-/2010/stb-deaths-by-cause-2010.html>.

⁷ Department of Health. *Saving lives: Our Healthier Nation*. DH, London, 1999. www.gov.uk/government/publications/saving-lives-our-healthier-nation

⁸ Department of Health. *National Service Framework for Coronary Heart Disease*. DH, London, 2000. www.gov.uk/government/publications/quality-standards-for-coronary-heart-disease-care

⁹ Department of Health Coronary Heart Disease Policy Team. *The Coronary Heart Disease National Service Framework: Building on excellence, maintaining progress. Progress report for 2008*. Department of Health, London, 2009.

¹⁰ Wilson L, Bhatnagar P, Townsend N. *Comparing trends in mortality from cardiovascular disease and cancer in the United Kingdom, 1983–2013: joinpoint regression analysis*. *Population Health Metrics*. 2017;**15**:23.

¹¹ Office for National Statistics. *Deaths registered in England and Wales, 2016*. Table DR5. London: ONS, 2017.

¹² British Heart Foundation. *Cardiovascular Disease Statistics*. <https://www.bhf.org.uk/what-we-do/our-research/heart-statistics/heart-statistics-publications/cardiovascular-disease-statistics-2018>

¹³ Data for 2004/05: NHS Digital. Quality and Outcomes Framework – England, 2004-05, SHA and England level, Data tables, Disease prevalence. <https://digital.nhs.uk/data-and-information/publications/statistical/quality-and-outcomes-framework-achievement-prevalence-and-exceptions-data/quality-and-outcomes-framework-statistics-england-2004-05-sha-level>.

Data for 2016/17: NHS Digital. QOF 2016-18: Prevalence, achievements and exceptions at regional and national level (Table 4). <https://digital.nhs.uk/data-and-information/publications/statistical/quality-and-outcomes-framework-achievement-prevalence-and-exceptions-data/2017-18>

¹⁴ Oyeboode O. 'Cardiovascular disease'. Chapter 2 in Craig R, Mindell J (Eds). *Health Survey for England 2011. Volume 1. Health, social care and lifestyles*. Leeds: The Information Centre for Health and Social Care, 2012.

and at least 14,000 strokes could be prevented over the following three years by improved diagnosis and management of high blood pressure, high cholesterol, and atrial fibrillation.¹⁵

Primary angioplasty for acute heart attack has replaced thrombolysis (the use of clot-busting drugs) as the immediate treatment.¹⁶ Admission to specialised stroke units and use of thrombolysis for acute stroke have been used increasingly since 2008.¹⁷ Prevalence of cardiovascular diseases may have increased in recent years due to better survival through use of these treatments.¹⁸

Methods and definitions

Methods

During the interview, adults were asked a series of questions about whether they had ever had certain specified cardiovascular diseases, and if so, whether that had been diagnosed by a doctor. Detailed questions about cardiovascular disease were included previously in the HSE in 1994, 1998, 2003, 2006 and, most recently, in 2011. As with previous HSE interviews, no attempt was made to verify these self-reported diagnoses. It is therefore possible that some misclassification may have occurred because some participants may not have remembered, or may have misremembered, the diagnosis made by their doctor.

For the first time in the HSE series, questions were also asked in 2017 about symptoms that could be due to peripheral arterial disease, namely pain in the calves on walking on the level or uphill that ceases within 10 minutes of stopping walking but no pain on standing.

Definitions

CVD

Angina: Participants were classified as ever having angina if they responded 'Yes' to the question 'Were you told by a doctor that you had angina?'

MI (Myocardial infarction): Participants were classified as ever having had an MI if they responded 'Yes' to the question 'Were you told by a doctor that you had a heart attack (including myocardial infarction or coronary thrombosis)?'

IHD (Ischaemic heart disease): Participants were classified as ever having IHD if they responded 'Yes' to the questions about doctor-diagnosed angina or doctor-diagnosed MI.

¹⁵ Public Health England. *The size of the prize in cardiovascular disease (CVD) prevention: England*. London: NHS England, file:///S:/FPHS_EPH_HSE_Shared/2%20HSE%202016-19/HSE%202017/Report/CVD/size_of_the_prize_England.pdf

¹⁶ National Institute for Health and Clinical Excellence. *Myocardial infarction with ST-segment elevation: acute management. Clinical guideline [CG167]*. London: NICE, 2013.

¹⁷ Royal College of Physicians. *Sentinel Stroke Audit Programme (SSNAP) report*. London: RCP, 2016.

¹⁸ Morris S, Hunter RM, Ramsay AIG, et al. *Impact of centralising acute stroke services in English metropolitan areas on mortality and length of stay: difference-in-differences analysis*. *BMJ*. 2014;**349**:g4757.

Stroke: Participants were classified as ever having had a stroke if they responded 'Yes' to the question 'Were you told by a doctor that you had a stroke?'

Any CVD (cardiovascular disease): Participants were classified as ever having any CVD if they responded 'Yes' to any of the questions indicating doctor-diagnosed angina, MI, stroke, abnormal heart rhythm, a heart murmur, or 'other doctor-diagnosed cardiovascular condition'.

Symptoms suggestive of *peripheral arterial disease (PAD)* were defined using two categories of severity. Less severe: pain in the calves on walking uphill that ceases within 10 minutes of stopping walking but no pain on sitting, standing, or walking on the level. More severe: pain in the calves on walking on the level that ceases within 10 minutes of stopping walking but no pain on sitting or standing.¹⁹

Age-standardisation

Age-standardised data are presented in this report for some analyses shown in the text, tables and charts where appropriate. Age-standardisation allows comparisons between groups after adjusting for the effects of any differences in their age distributions, for example when comparing people in different waist circumference categories or by disease status. For regions, both observed and age-standardised data are provided. Those wishing to ascertain the actual levels of CVD conditions in each region should use the observed data, while those making comparisons between regions should use the age-standardised data. The comments on region in this report are based on age-standardised results.

About the survey estimates

HSE is restricted to individuals living in private households able to give informed consent and to respond to questions. For this reason, the stated prevalence of some cardiovascular diseases, particularly stroke, may be an underestimate of prevalence in the total population, as stroke often results in disability and may lead to an increased likelihood of residential care or of communication difficulties preventing survey participation.

The Health Survey for England, in common with other surveys, collects information from a sample of the population. The sample is designed to represent the whole population as accurately as possible within practical constraints, such as time and cost. Consequently, statistics based on the survey are estimates, rather than precise figures, and are subject to a margin of error, which can be shown as a 95% confidence interval. For example, the survey estimate might be 24% with a 95% confidence interval of 22% to 26%. A different sample might have given a different estimate, but we expect that the true value of the statistic in the population would be within the range given by the 95% confidence interval in 95 cases out of 100.

¹⁹ 68 survey participants were excluded from the analysis. This included those who reported they never walked or never walked on the level at an ordinary pace. Those who reported never walking uphill or fast were included as having more severe PAD if they also reported calf pain on walking at an ordinary pace on the level that stopped when they stopped walking; otherwise they were also excluded. The exclusions were because we cannot tell if those reporting not walking did not walk because of pain suggestive of PAD; because of other medical problems, such as angina or arthritis; or through choice. We can therefore make no comments on their likelihood of experiencing PAD symptoms.

Where differences are commented on in this report, these reflect the same degree of certainty that these differences are real, and not just within the margins of sampling error. These differences can be described as statistically significant.²⁰

Confidence intervals are quoted for key statistics within this report and are also shown in more detail in the Excel tables accompanying the report. Confidence intervals are affected by the size of the sample on which the estimate is based. Generally, the larger the sample, the smaller the confidence interval, and hence the more precise the estimate. The prevalence of CVD is very low among younger adults. Low prevalence rates have a higher level of uncertainty around the estimates and so should be treated with caution.

We thank Dr David Cohen, Consultant Physician at Northwick Park Hospital, for his expert advice.

²⁰ Statistical significance does not imply substantive importance; differences that are statistically significant are not necessarily meaningful or relevant.

Prevalence of CVD

Prevalence of CVD, by age and sex

In 2017, 14% of adults had ever had any CVD condition.²¹ Prevalence of CVD conditions was higher in men than in women; 15% of men and 13% of women had a cardiovascular condition. Survey estimates are subject to a margin of error, and it is likely that the proportion of men with any CVD was between 13% and 16%, and the proportion of women with any CVD was between 12% and 14%.²²

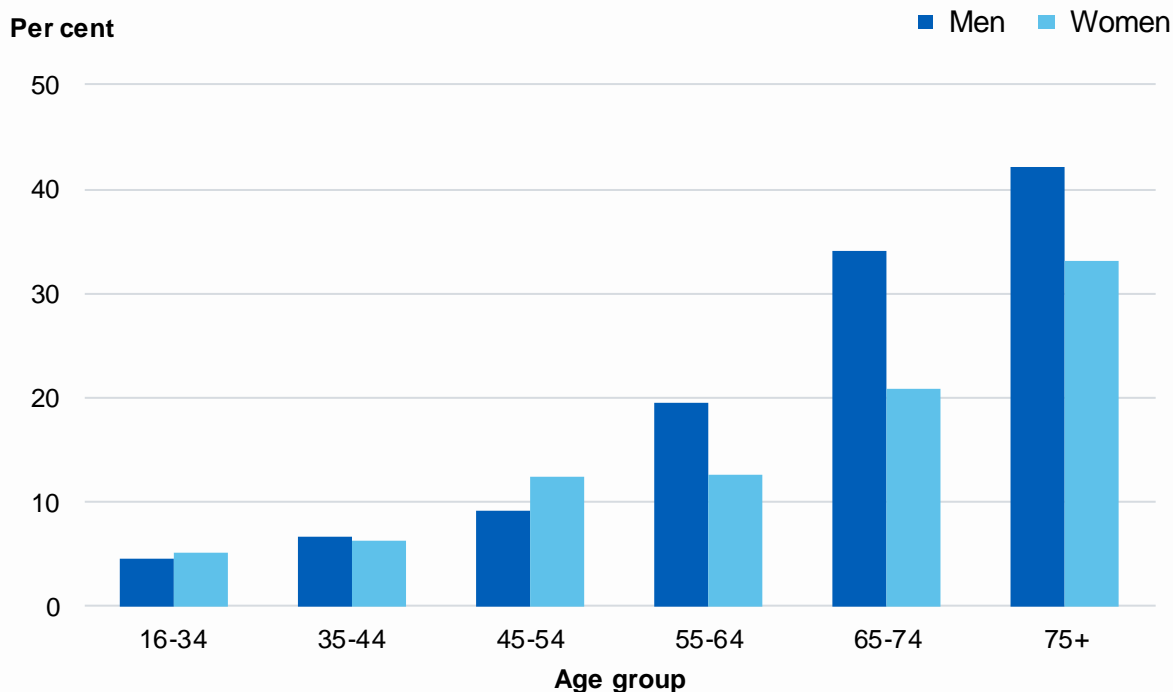
The prevalence of ever having had a CVD condition was at a similar level in 2011 (14% of men and 13% of women).²³

The pattern in the prevalence of CVD by age and sex was slightly different across the diseases. The increase with age in the prevalence of any CVD was steeper in men than in women. It ranged from 5% for both sexes among those aged 16 to 34 to 42% of men and 33% of women aged 75 and over. A broadly similar pattern was found for the prevalence of myocardial infarction (heart attack).

Figure 1, Table 1

Figure 1: Prevalence of any CVD condition, by age and sex

Base: Aged 16 and over



Source: NHS Digital

²¹ In this report, CVD refers to any specific cardiovascular conditions reported by survey participants in response to direct questions about doctor-diagnosed heart attack (MI), angina, stroke, abnormal heart rhythm or heart murmur. It excludes hypertension.

²² See the Introduction to this report for an explanation of margins of error within surveys. Confidence intervals around estimates of the prevalence of CVD are shown in more detail in Table 13.

²³ See Note 14 (HSE 2011).

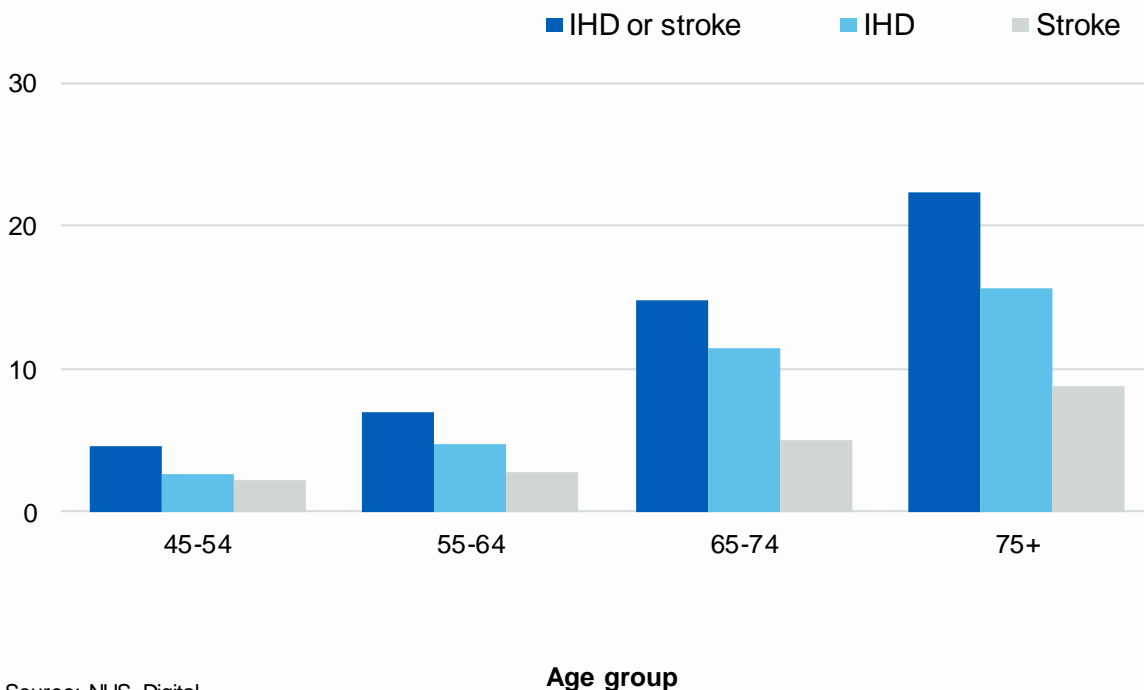
In 2017, the prevalence among all adults of ever having IHD was 4%, of having had angina 3%, and of stroke 2%. IHD, angina and stroke were very rare in adults under 45. Among older adults, the prevalence of IHD increased from 3% of adults aged 45 to 54 to 16% of adults aged 75 and over, and the prevalence of stroke from 2% of adults aged 45 to 54 to 9% of adults aged 75 and over. The increase in the prevalence of angina and of IHD and stroke with increasing age was similar for both sexes.

Figure 2, Table 1

Figure 2: Prevalence of IHD, stroke, and IHD or stroke, by age

Base: Aged 45 and over

Per cent

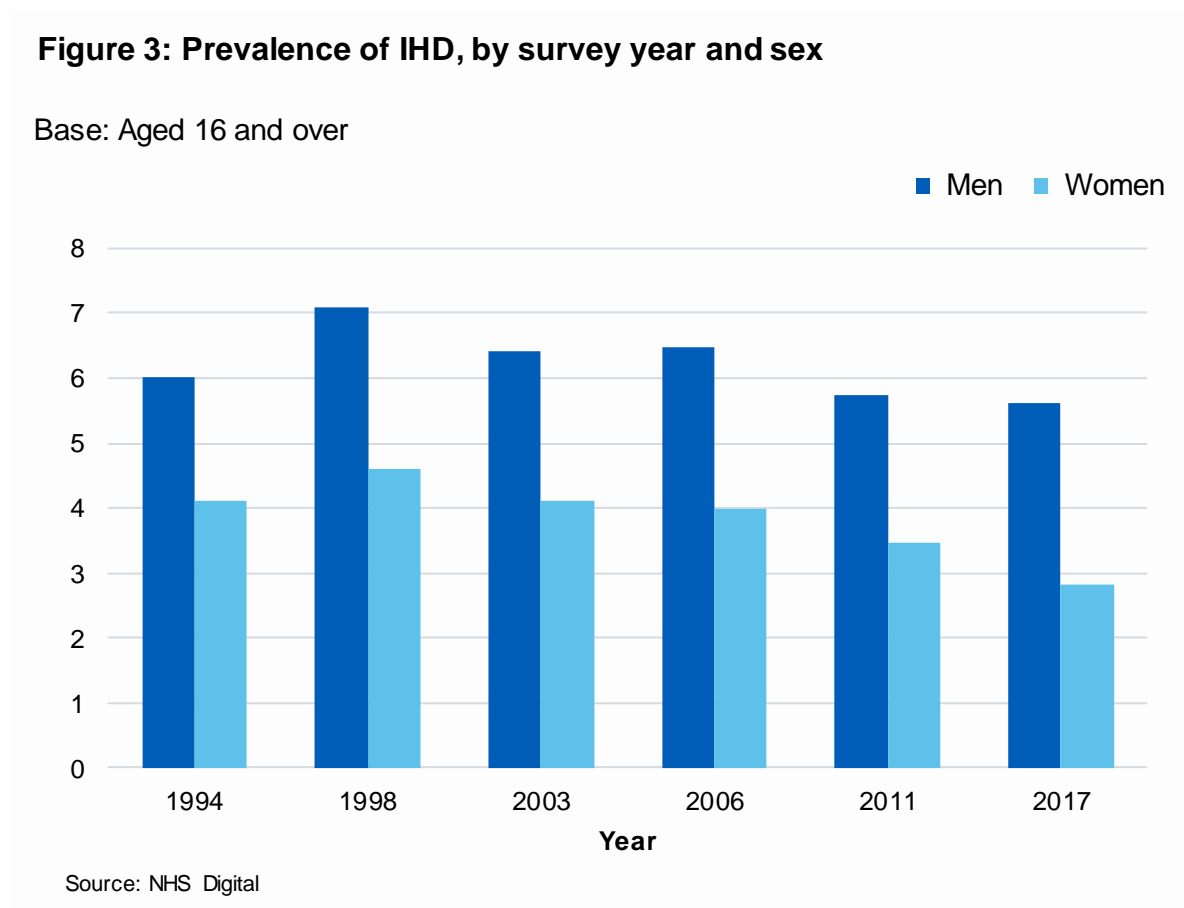


Because the prevalence of CVD is very low among younger adults, most of the following analyses in this report are based on adults aged 35 and over.

Trends in IHD and stroke, 1994 to 2017

In both men and women the highest prevalence of IHD was reported in 1998 (7% for men and 5% for women). The prevalence of IHD fell between 1998 and 2011, to 6% among men and 3% among women in 2011. In 2017, the prevalence of IHD was also 6% among men and 3% among women.

Figure 3, Table 2

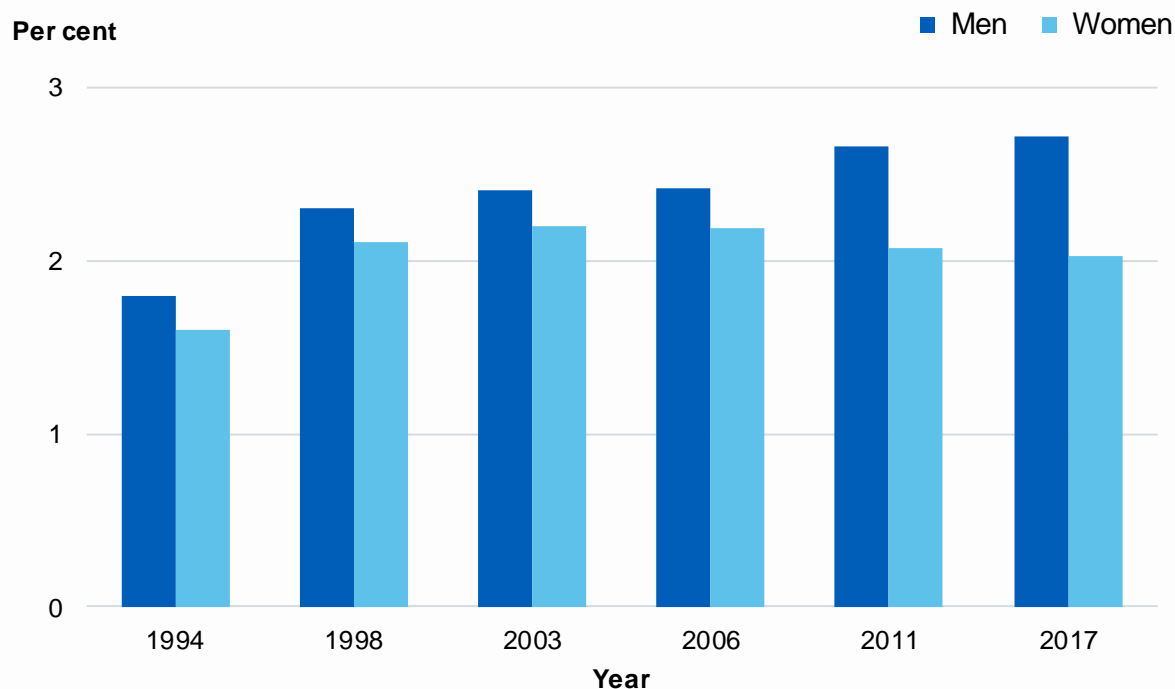


Prevalence of stroke in women increased between 1994 and 1998 (from 1.6% to 2.1%) and has remained fairly constant since then. In contrast, the prevalence of stroke in men rose by one percentage point from 2% in 1994 to 3% in 2011. The prevalence of stroke did not change between 2011 and 2017 in either men or women, being 3% among men and 2% among women in both years.

Figure 4, Table 2

Figure 4: Prevalence of stroke, by survey year and sex

Base: Aged 16 and over



Source: NHS Digital

Modelling studies have shown that falls in IHD mortality from 2000 to 2007 in England were accounted for primarily by population-wide reductions in blood pressure (probably associated with reduced salt consumption) and cholesterol, with additional falls from medicine use.²⁴ Primary prevention in apparently healthy people, through reductions in risk factors for cardiovascular disease, reduces mortality rates more than secondary prevention does, and can also reduce incidence.²⁵ HSE 2017 has shown no noticeable changes in IHD or stroke in England since HSE 2011. Given the widespread introduction of thrombolysis and hyper-acute stroke units across England,²⁶ which are known to reduce both mortality and disability, the lack of change in prevalence may be considered surprising. It is possible that people with a previous but non-disabling stroke are less likely to report ever having had a stroke; the reduction in disability among stroke survivors may mean that this applies to a higher proportion of people with a previous stroke.

²⁴ Guzman-Castillo M, Ahmed R, Hawkins N, et al. *The contribution of primary prevention medication and dietary change in coronary mortality reduction in England between 2000 and 2007: a modelling study.* *BMJ Open.* 2015;**5**:e006070.

²⁵ Unal B, Critchley J, Capewell S. *Modelling the decline in coronary heart disease deaths in England and Wales, 1981-2000: comparing contributions from primary prevention and secondary prevention.* *BMJ.* 2005;**331**:614.

²⁶ See note 17 (RCP SSNAP audit)

Prevalence of CVD, by region

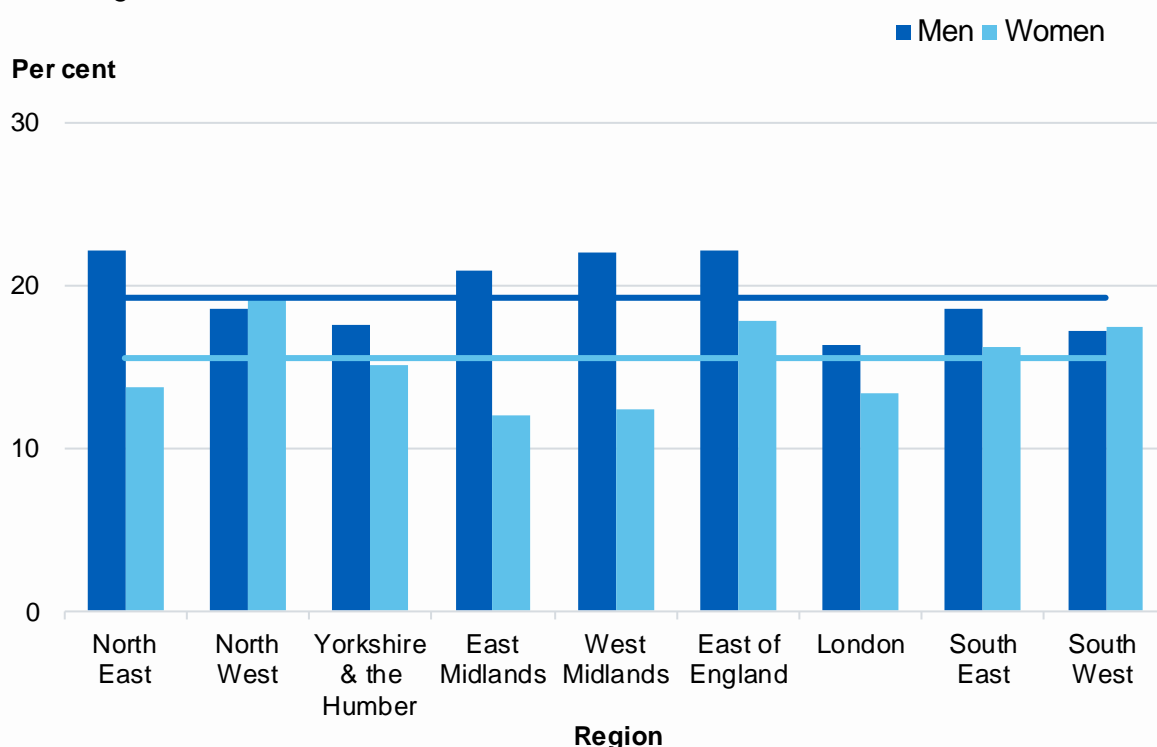
Table 3 shows the prevalence of CVD among those aged 35 and over by region, both observed and age-standardised. Observed estimates show the actual levels of overweight, obesity, and high waist circumference in each region. Comparisons between regions should be based on the age-standardised data, which take into account the different regional age profiles.

After controlling for age, the variation across regions in the prevalence of any CVD is mainly within the margins of sampling error. However, the size of the difference between men and women varied slightly across regions, being larger in the North East (22% of men and 14% of women), East Midlands (21% of men and 12% of women) and West Midlands (22% of men and 12% of women). There were no regional differences in the age-standardised prevalence of IHD and the same was true for stroke.

Figure 5, Table 3

Figure 5: Age-standardised prevalence of any CVD, by region and sex

Base: Aged 35 and over



Source: NHS Digital

Prevalence of CVD, by equivalised household income

The HSE uses the measure of equivalised household income, which takes into account the number of adults and dependent children in the household as well as overall household income.²⁷ Households are divided into quintiles (fifths) based on this measure.

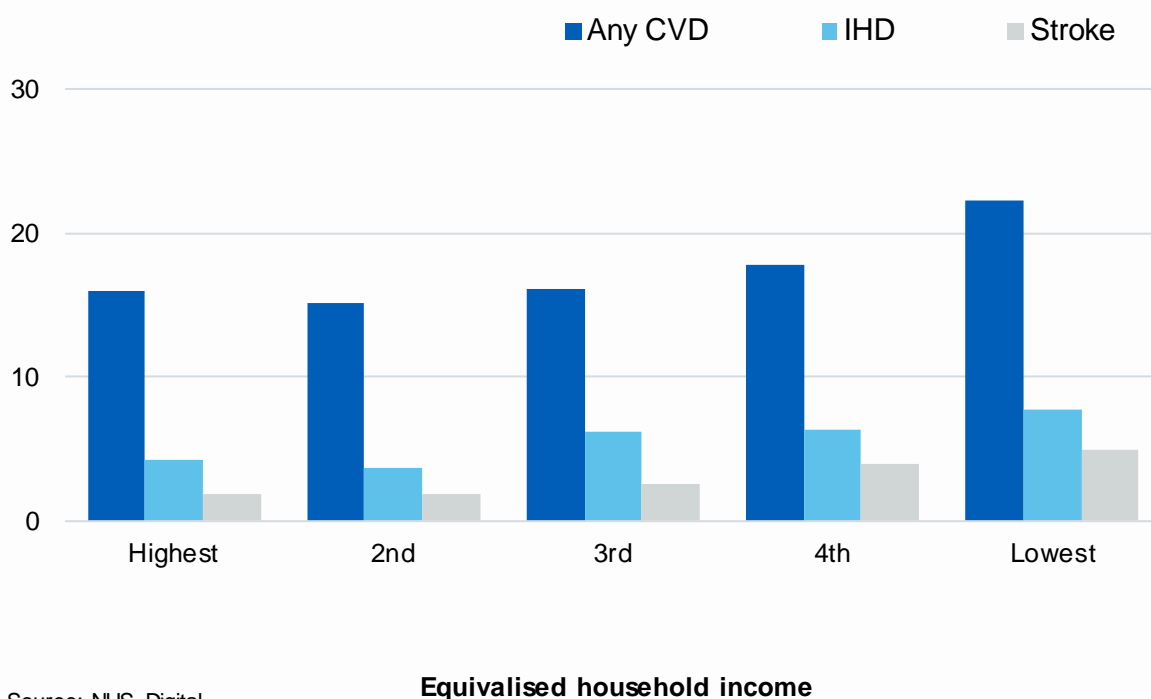
Table 4 shows the prevalence of CVD in 2017 by equivalised household income and sex among those aged 35 and over. The age-standardised prevalence of cardiovascular diseases for both sexes was generally higher in lower income households. 22% of adults from households with the lowest incomes reported any CVD, compared with 16% of adults from households with the highest incomes. This pattern was broadly similar for IHD and for stroke. For example, men in the lowest income households had almost twice the prevalence of any CVD (27% vs 15% in the highest income households), and around three times the prevalence of IHD and of stroke.

Figure 6, Table 4

Figure 6: Age-standardised prevalence of CVD conditions, by quintile of equivalised household income

Base: Aged 35 and over

Per cent



Source: NHS Digital

²⁷ See Health Survey for England 2017: Methods, Appendix B for a detailed description of how equivalised household income is calculated. <https://digital.nhs.uk/pubs/hse2017>.

Prevalence of CVD, by waist circumference

The waist circumference of participants who agreed was measured during the nurse visit, using the WHO recommended method.²⁸ Further details on the protocol are available in the HSE 2017 report on Adult and child overweight and obesity and the full protocol is in the survey documentation.²⁹

Body Mass Index (BMI) does not distinguish between mass due to body fat and mass due to muscular physique, nor the distribution of fat. It has therefore been suggested that waist circumference may be a useful supplement to BMI to identify central (abdominal) obesity, which increases the health risk from being overweight.^{30,31}

To measure abdominal obesity, waist circumference is measured, and categorised into desirable, high and very high, by sex-specific thresholds. These are shown in Table A.

Table A: Classification of waist circumference

Description	Men	Women
Desirable	Less than 94cm	Less than 80cm
High	94-102cm	80-88cm
Very high	More than 102cm	More than 88cm

Among those aged 35 and over, the age-standardised prevalence of any CVD in both men and women was highest among those with a very high waist circumference (above 102cm for men, above 88cm for women). 19% of adults with a very high waist circumference reported any CVD, compared with 15% of adults with a desirable waist circumference. This pattern was broadly similar for the prevalence of IHD but stroke prevalence did not vary by waist circumference category.

Figure 7, Table 5

²⁸ 'Methods for measuring waist and hip circumference.' Chapter 2 in *Waist circumference and waist-hip ratio: Report of a WHO Expert Consultation, Geneva, 8-11 December 2008*. Geneva: World Health Organization, 2011. (see Note 3 for URL)

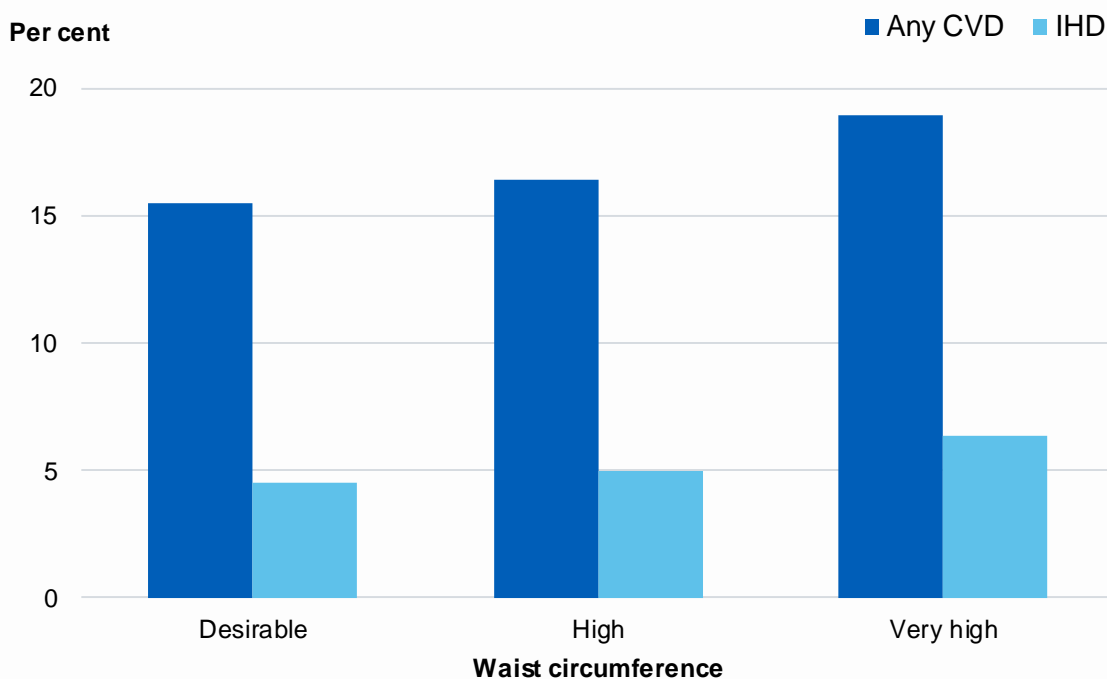
²⁹ These and other reports for HSE 2017 report are available at <https://digital.nhs.uk/pubs/hse2017>.

³⁰ Lean M, Han T, Morrison C. Waist circumference as a measure for indicating need for weight management. *BMJ* 1995;311:158-61.

³¹ Schneider HJ, Friedrich N, Klotsche J et al. The Predictive Value of Different Measures of Obesity for Incident Cardiovascular Events and Mortality. *Journal of Clinical Endocrinology and Metabolism*. 2010;95:1777-1785.

Figure 7: Age-standardised prevalence of CVD conditions, by waist circumference

Base: Aged 35 and over



Source: NHS Digital

Prevalence of CVD, by hypertension

Blood pressure was measured during the nurse visit. Hypertension was defined as systolic blood pressure (SBP) 140mmHg or above, diastolic blood pressure (DBP) 90mmHg or above, and/or taking medication for high blood pressure (BP). The mean of the second and third BP readings was used. Three specific categories of hypertension were defined:

- *Hypertensive controlled*: SBP less than 140mmHg and DBP less than 90mmHg and taking medication prescribed for high blood pressure;
- *Hypertensive uncontrolled*: SBP 140mmHg or above, and/or DBP 90mmHg or above, and taking medication prescribed for high blood pressure; and
- *Hypertensive untreated*: SBP 140mmHg or above, and/or DBP 90mmHg or above, and not taking medication prescribed for high blood pressure.

The prevalence of CVD among adults varied according to blood pressure status. After controlling for age, the prevalence of CVD was highest among those currently taking medicines prescribed for high blood pressure, and lower among other groups. For example, 28% of those with controlled hypertension reported any CVD condition, compared with 17% of normotensives (those with normal blood pressure levels) and 13% of those with high blood pressure who were not taking any medicines prescribed for high blood pressure. Similar patterns were seen for IHD and stroke.

This was not surprising, as existing CVD is a major indication for treating cardiovascular risk factors. One would therefore expect GPs to be more likely to measure blood pressure and to treat hypertension – and treatment to be more salient for the patient and thus adherence higher - when detected in patients with CVD. The

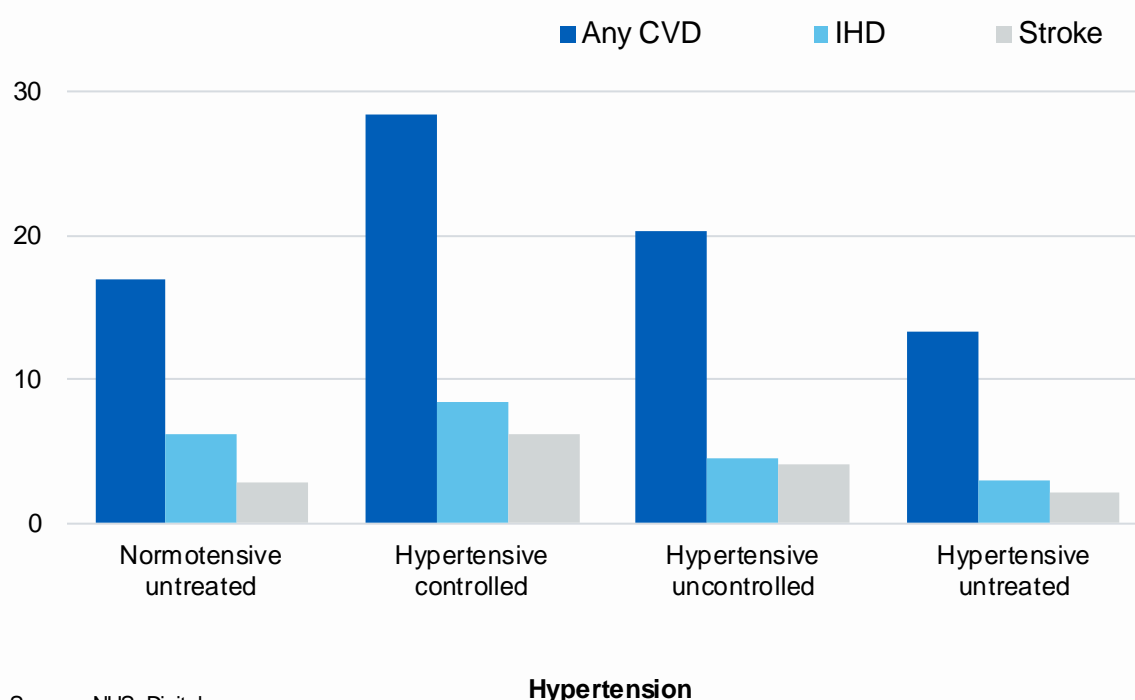
threshold for initiating medication is 140/90mmHg in such individuals rather than the higher threshold of 160/110mmHg in people without existing disease or hypertension-related organ damage. Prevalence of stroke was highest in those with controlled hypertension, presumably an example of reverse causation because of the importance of adequate control of blood pressure in people at risk of a stroke, including patients with a previous stroke.³²

Figure 8, Table 6

Figure 8: Age-standardised prevalence of ever having any CVD, IHD or stroke, by hypertension

Base: Aged 35 and over with blood pressure measurement

Per cent



Source: NHS Digital

Prevalence of CVD, by doctor-diagnosed diabetes

Participants were classified as having doctor-diagnosed diabetes if they responded ‘Yes’ to the question ‘Were you told by a doctor that you have diabetes?’, excluding those women for whom this was only during pregnancy (i.e. excluding gestational diabetes).

The prevalence of CVD in 2017 among those aged 35 and over varied according to whether they had doctor-diagnosed diabetes. After controlling for age, the prevalence of ever having any CVD, IHD or stroke was higher among people with doctor-diagnosed diabetes than those without a diabetes diagnosis. For instance, 24% of adults with doctor-diagnosed diabetes reported any CVD condition, compared with 16% of those without a diabetes diagnosis.

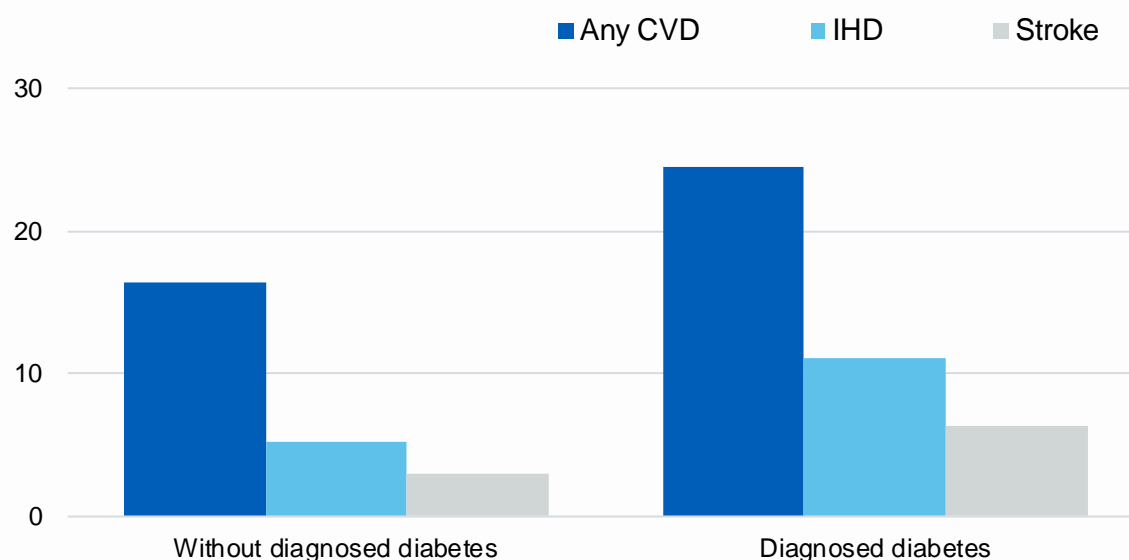
Figure 9, Table 7

³² National Institute for Health and Care Excellence. *Hypertension in adults: diagnosis and management*. Clinical guideline CG217. London: NICE, 2016. <https://www.nice.org.uk/guidance/cg127>.

Figure 9: Age-standardised prevalence of ever having any CVD, IHD or stroke, by doctor-diagnosed diabetes

Base: Aged 35 and over

Per cent



Source: NHS Digital

Diagnosed diabetes

Prevalence of CVD, by glycated haemoglobin level

Those who agreed had a blood sample taken by the nurse, taken to measure glycated haemoglobin (HbA_{1c}). This is a measure of the average glucose level in the blood over the preceding two to three months. Details of the protocol for taking blood samples and the laboratory analytical methods can be found in the HSE 2017 Methods report.

A level of 48mmol/mol or above indicates diabetes; 42-47mmol/mol indicates impaired glucose regulation, sometimes called 'pre-diabetes'.³³ Three specific categories of glycated haemoglobin were defined:

- HbA_{1c} below 42mmol/mol;
- HbA_{1c} 42-47mmol/mol; and
- HbA_{1c} 48mmol/mol or above.

This definition includes participants who have undiagnosed diabetes.

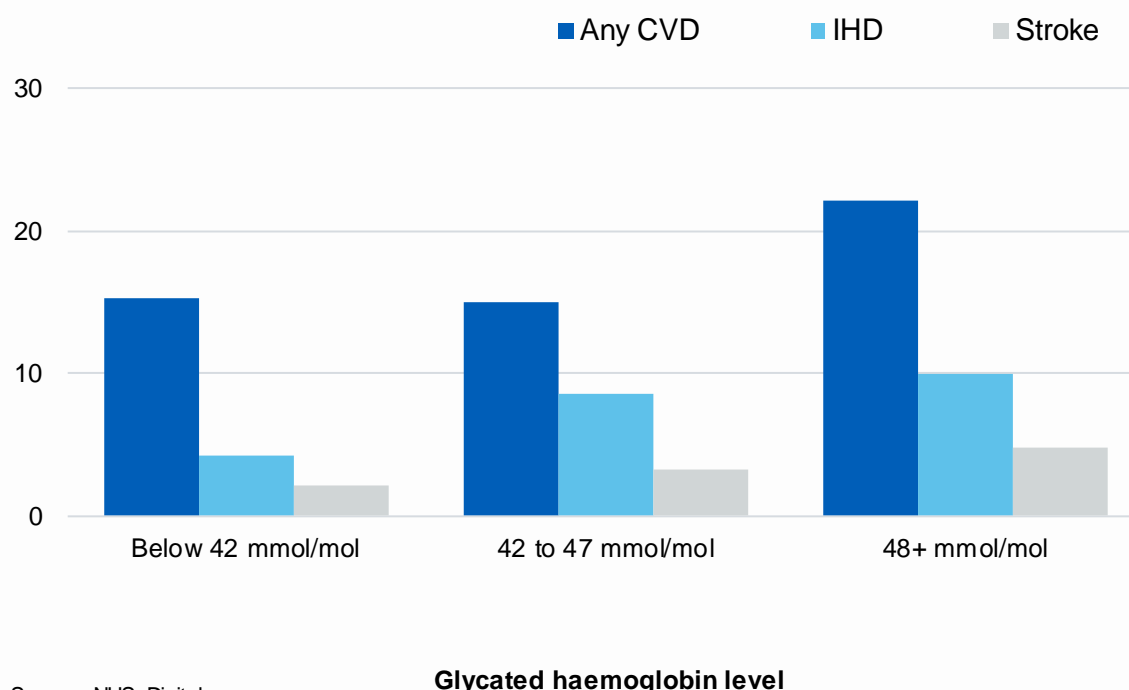
22% of those with an HbA_{1c} level of 48mmol/mol or above reported any CVD condition, compared with 15% of those with HbA_{1c} below 42mmol/mol or 42 to 47mmol/mol. Both IHD and stroke were also more prevalent in those with higher HbA_{1c} levels.

³³ Moody A, Cowley G, Ng Fat L, et al. *Social inequalities in prevalence of diagnosed and undiagnosed diabetes and impaired glucose regulation in participants in the Health Surveys for England series*. BMJ Open. 2016;6:e010155.

Figure 10: Age-standardised prevalence of ever having any CVD, IHD or stroke, by glycated haemoglobin level

Base: Aged 35 and over with valid glycated haemoglobin measurement

Per cent



Source: NHS Digital

Health status, by CVD condition

The EQ-5D questionnaire is a standardised instrument used for the measurement of a person's health status. It consists of five dimensions: mobility, self-care, usual activities, pain or discomfort, and anxiety or depression. In HSE 2017, five responses were possible: no problems (1), slight problems (2), moderate problems (3), severe problems (4), and unable to perform activities such as walking about (mobility), wash or dress themselves (self-care), and unable to do usual activities (5). Participants were categorised into one of three categories: no problems (a score of 1 on each of the five dimensions); slight or moderate but not severe (a maximum score of 2 or 3 on any item); and at least one severe problem (a score of 4 or 5 on any item).

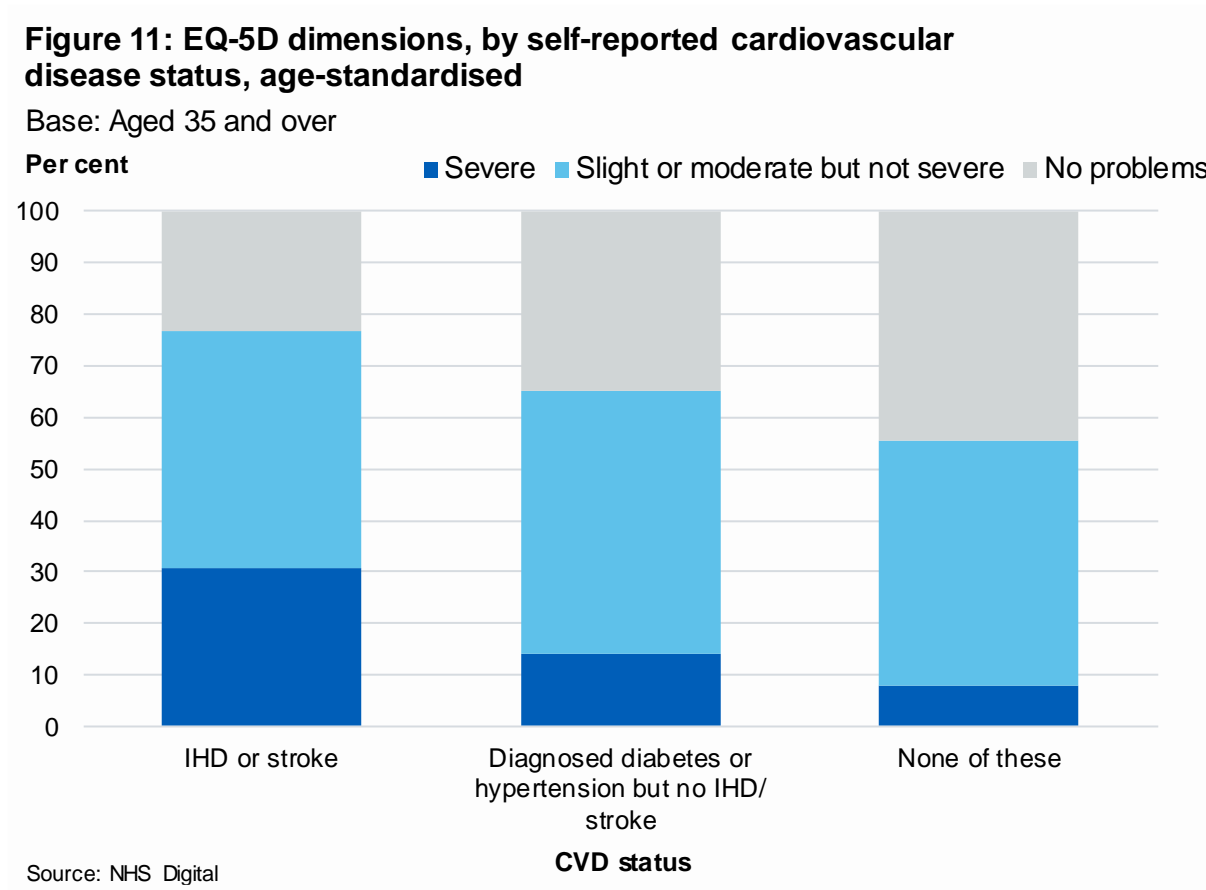
The proportions of men and women aged 35 and over who reported no problems, slight or moderate problems, or severe problems across the five EQ-5D dimensions are shown in Table 9 by self-reported CVD status. The proportions in each EQ-5D category were examined in three groups of participants:

- those reporting IHD or stroke;
- those reporting doctor-diagnosed diabetes or hypertension but no IHD or stroke; and
- those with none of these conditions.

Overall, 12% of adults aged 35 and over reported a severe problem in at least one of the five EQ-5D dimensions. After controlling for age, the proportion reporting a severe

problem in at least one dimension was highest for those with IHD or stroke. 31% of adults with IHD or stroke reported at least one severe health problem, compared with 14% of those who reported diagnosed diabetes or hypertension (but no IHD or stroke) and 8% of those with none of these conditions.

Figure 11, Table 9



Use of prescribed medicines, by CVD condition

This section looks at the use of lipid-lowering and antiplatelet medicines. There is a strong evidence base that these medicines should be used in secondary prevention of CVD and considered for primary prevention of CVD in certain groups of the population. The use of prescribed lipid-lowering and antiplatelet medicines were examined in three groups of participants aged 35 and over:

- those reporting any doctor-diagnosed CVD condition;
- those reporting doctor-diagnosed diabetes or hypertension but no CVD; and
- those with none of these conditions.

In 2007, it was estimated that aspirin (the first antiplatelet medicine) was highly cost-effective and statins (the main lipid-lowering medicines) were reasonably cost-

effective for secondary prevention in IHD.³⁴ Prescription data show that prescriptions of lipid-lowering drugs increased dramatically from the 2000s onwards, as statins and the evidence of their effectiveness in reducing CVD mortality became available.³⁵ The rise in use of antiplatelet medicines started earlier but has been less dramatic.³⁵

During the nurse visit, participants were asked about all the prescribed medicines they had taken within the previous seven days. Nurses coded these according to the classification within the British National Formulary (BNF). For CVD-related medicines, participants were also asked why they were taking that medicine. For example, for aspirin, the participant was asked whether it was for pain relief, arthritis, or for their heart or to prevent a stroke; those taking medicines which can be used for angina or for hypertension were asked which it was for.

Table 10 shows the proportions of men and women aged 35 and over who reported taking prescribed lipid-lowering medicines in the last seven days by self-reported cardiovascular disease status and age group. Overall, 21% of adults aged 35 and over reported taking prescribed lipid-lowering medicines in the last seven days. The proportions taking prescribed lipid-lowering medicines in the last seven days were highest among those with CVD, especially among men. 60% of men with CVD reported taking prescribed lipid-lowering medicines in the last seven days, compared with 38% of women. For those with diagnosed diabetes or hypertension (but no CVD) the figures were 36% of men and 30% of women.

Those with CVD are likely to be older, but having CVD, diabetes or hypertension warranting medical treatment to lower blood pressure are each indications for lipid-lowering medicine.

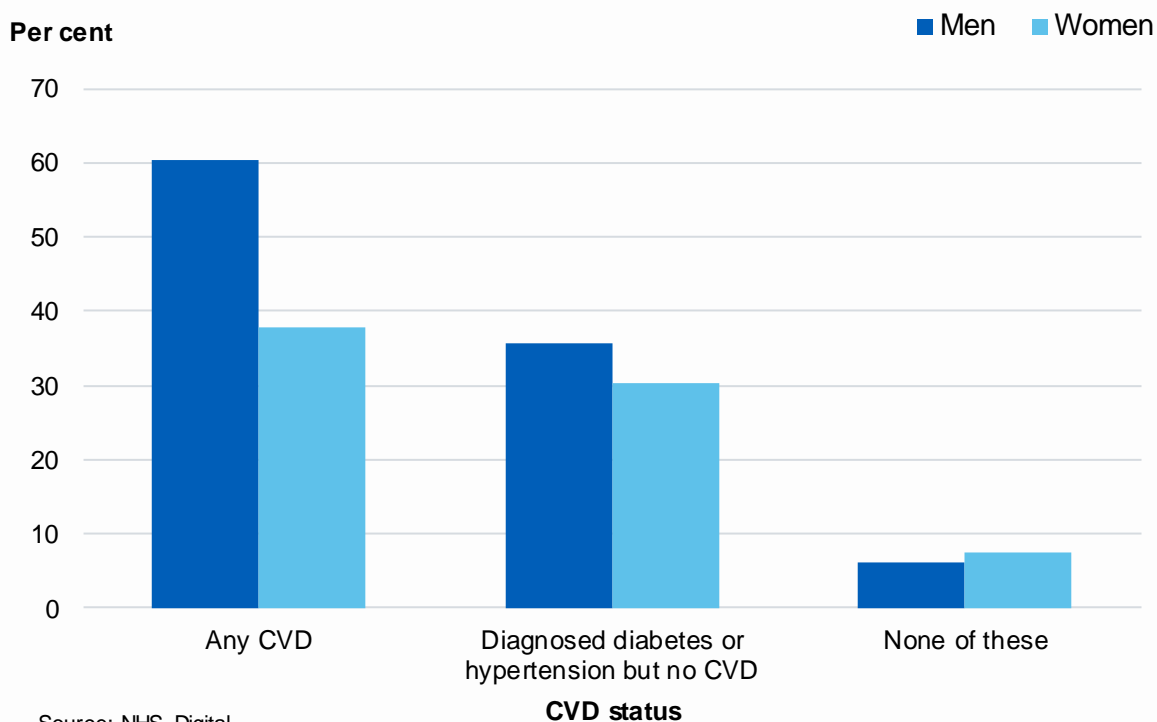
Figure 12, Table 10

³⁴ Fidan D, Unal B, Critchley J et al. *Economic analysis of treatments reducing coronary heart disease mortality in England and Wales, 2000-2010*. Quarterly Journal of Medicine. 2007;**100**:277-89.

³⁵ See note 12 (BHF stats)

Figure 12: Prescribed lipid-lowering medicine use, by CVD and sex

Base: Aged 35 and over with a nurse visit



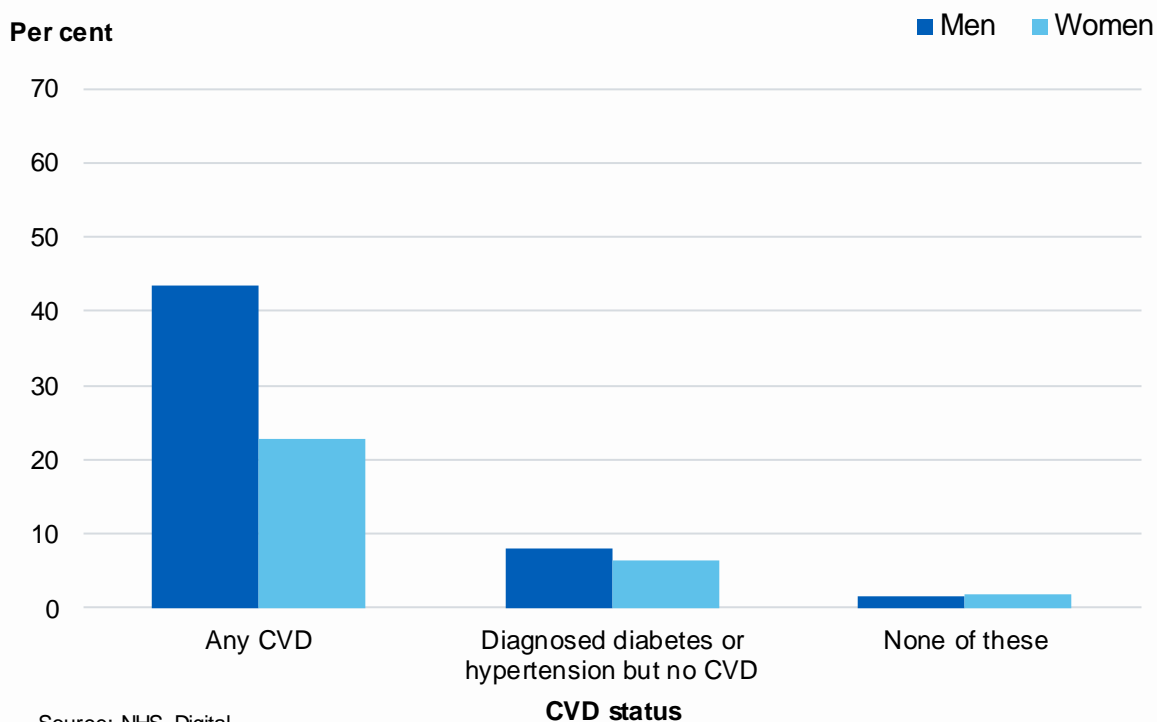
Overall, 9% of adults aged 35 and over reported taking prescribed antiplatelet medicines in the last seven days.³⁶ The pattern in antiplatelet medicine use was similar to that described for lipid-lowering medicines, although antiplatelet medicine use was much lower. As with lipid-lowering medicine, the proportions taking prescribed antiplatelet medicines in the last seven days were highest among those with CVD, but men with CVD were much more likely to have taken prescribed antiplatelet medicine (43% of men with CVD, compared with 23% of women). In contrast, among those with diagnosed diabetes or hypertension (but no CVD) the proportions of men and women taking antiplatelet medicine were similar (8% and 6% respectively).

Figure 13, Table 11

³⁶ Antiplatelet medicine includes low-dose aspirin and medicines such as clopidogrel and dipyridamole.

Figure 13: Prescribed antiplatelet medicine use, by CVD and sex

Base: Aged 35 and over with a nurse visit



Symptoms suggestive of peripheral arterial disease (PAD)

This section looks at the proportions of participants aged 16 and over who reported symptoms suggestive of peripheral arterial disease (PAD).³⁷ Symptoms suggestive of PAD were defined using two categories of severity as follows:

- *Less severe*: pain in the calves on walking uphill that ceases within 10 minutes of stopping walking but no pain on sitting, standing, or walking on the level; and
- *More severe*: pain in the calves on walking on the level that ceases within 10 minutes of stopping walking but no pain on sitting or standing.

Overall, 1% of adults reported any symptoms suggestive of peripheral arterial disease (less or more severe). This proportion increased with age. 3% of adults aged 75 and over reported any symptoms suggestive of peripheral arterial disease. 2% of adults aged 75 and over reported more severe symptoms and 1% reported less severe symptoms.

For comparison, a survey in 1987/88 of people aged 55 to 74 registered with GP practices in Edinburgh found a prevalence of 4.5% for symptoms of claudication but

³⁷ See note 21 (PAD exclusions)

almost twice as many had asymptomatic disease on testing.³⁸ Five-year follow-up of participants in that survey found incidence of new cases to be 15.5 per 1000 person-years.³⁹ NICE, the National Institute for Health and Care Excellence, produced guidance in 2012; it was updated in 2018 to include more detailed guidance for diagnosing PAD in people with diabetes.⁴⁰ Screening by measuring the blood pressure in both the ankle and arm, to detect a marked difference, is useful for diagnosis but does not meet criteria as a screening test.⁴¹

Table 12

³⁸ Fowkes FGR, Housley E, Cawood EHH, et al. *Edinburgh Artery Study: Prevalence of Asymptomatic and Symptomatic Peripheral Arterial Disease in the General Population*. *International Journal of Epidemiology*. 1991;**20**:384-392.

³⁹ Leng GC, Lee AJ, Fowkes GR, et al. *Incidence, natural history and cardiovascular events in symptomatic and asymptomatic peripheral arterial disease in the general population*. *International Journal of Epidemiology*. 1996;**25**:1172-1181.

⁴⁰ National Institute for Health and Clinical Excellence. *Peripheral arterial disease: diagnosis and management. Clinical guideline [CG147]*. London: NICE, 2018.

⁴¹ McDermott MM, Criqui MH. *Ankle-Brachial Index screening and improving peripheral artery disease detection and outcomes*. *JAMA*. 2018;**320**:143-145.

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