

Diabetes and hyperglycaemia

4

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Summary

- This chapter reports prevalence of doctor-diagnosed diabetes in adults aged 16 and over. It also examines levels of glycated haemoglobin, an indicator of the medium-term glucose level in the blood providing a measure of average blood sugar level, and the prevalence of raised levels.
- In 2011, 7.0% of men and 4.9% of women aged 16 and over had doctor-diagnosed diabetes; the prevalence among men being significantly greater than among women.
- Since it was first assessed in HSE 1994, the proportion of people with diagnosed diabetes has increased substantially: among men it has increased from 2.9% to 7.0%, and among women from 1.9% to 4.9%.
- Diagnosed diabetes increased with age, from fewer than 2.6% of men aged under 45 to 25.7% aged 85 and over, and from fewer than 2.3% of women aged under 45 to 14.8% of those aged 75-84, and 11.5% aged 85 and over.
- Diagnosed diabetes was highest among those with the lowest household income. 11.0% of men and 5.9% of women in the lowest quintile of equivalised household income had diabetes, compared with 4.7% of men and 3.7% of women in the highest quintile.
- Doctor-diagnosed diabetes was also highest among those in the most deprived areas: 9.1% of men and 7.3% of women living in areas in the most deprived quintile of the Index of Multiple Deprivation had diabetes, compared with 4.9% of men and 2.3% of women in areas in the least deprived quintile.
- Raised levels of glycated haemoglobin (indicating diabetes) followed the same pattern as diagnosed diabetes: it was more prevalent among men than women; among older than younger adults; higher among those in lower income households; and highest among obese people.
- Some people had raised glycated haemoglobin without a diagnosis of diabetes. In 2011, 2.3% of men and 2.2% of women aged 16 and over had undiagnosed diabetes. Among men, this was highest in the 55-64 age group (4.8%) while among women, undiagnosed diabetes was highest among those aged 75 and over (8.2%).
- Total diabetes (diagnosed plus undiagnosed) has risen since 2003, with most of the increase occurring in diagnosed diabetes, although undiagnosed diabetes has also risen.
- In 2011, the total prevalence of diabetes (diagnosed or undiagnosed) in men was 9.1%, and in women 6.8%, up from 5.5% and 4.3% respectively in 2003.
- Diabetes was associated with overall obesity, as measured by body mass index (BMI), and with central obesity, as measured by waist circumference. Among obese adults (with a BMI of 30kg/m² or more), 14.7% of men and 9.9% of women had diagnosed diabetes, compared with 5.0% of men and 4.3% of women who were overweight but not obese (BMI 25 to below 30kg/m²), and 2.7% of men and 1.5% of women who were not overweight (BMI less than 25kg/m²).

- The association between obesity and diabetes was very strong: obese adults aged 25-64 were more likely to have diabetes than non-overweight adults two decades older. For example, 21% of obese men aged 55-64 had diabetes, compared with 15% of men aged 75 and over who were not overweight. Similarly 14% of obese women aged 55-64 had diabetes, compared with 9% of women aged 75 and over who were not overweight.

4.1 Introduction

4.1.1 Background

This chapter presents findings on the prevalence of self-reported doctor-diagnosed diabetes as well as objective measures of hyperglycaemia (raised levels of glucose in the blood) for adults aged 16 and over. In addition, hyperglycaemia in adults without a diagnosis is examined, representing undiagnosed diabetes; together with diagnosed disease, this gives a measure of total diabetes. The chapter also examines differences in prevalence of diabetes by sex, age, strategic health authorities, socio-economic status and obesity, and trends over time.

Diabetes is characterised by high blood glucose levels (hyperglycaemia). Untreated, hyperglycaemia is associated with damage to and possible failure of many organs, especially the eyes, kidneys, nerves, heart, and blood vessels. Type 1 and Type 2 diabetes differ in that Type 1 diabetes is the result of an autoimmune destruction of the cells of the pancreas which produce insulin, resulting in insulin deficiency. Type 2 diabetes is caused by insulin resistance, i.e. the inability of the body to respond to insulin and/or insufficient insulin secretion. Type 1 diabetes usually begins in childhood, and is always treated with insulin injections. Type 2 diabetes usually begins in middle age or older adulthood, and is controlled with diet and then drugs, and sometimes with insulin therapy (sometimes called insulin-treated, to distinguish it from insulin-dependent; see Section 4.2.1). Type 2 diabetes is more common, accounting for about 90% of all diabetes in England.¹

Diabetes substantially increases the risk of cardiovascular disease (CVD). Men with Type 2 diabetes have up to four times greater risk of coronary heart disease than those without the disease, and there is an even greater risk (up to five times higher) in women.² Diabetes tends to worsen the effect of other risk factors for CVD such as dyslipidaemia (abnormal levels of blood fats), hypertension, smoking and obesity. Being overweight or having a raised waist measurement are risk factors for Type 2 diabetes.^{3,4,5}

In the Health Survey for England 2009, the prevalence of doctor diagnosed diabetes (Type 1 or Type 2) was 6.5% in men and 4.5% in women. The prevalence of diagnosed diabetes increased in England between 1994 and 2009.⁶ GP Quality Outcome Framework (QOF) data also show a rise in diagnosed diabetes in recent years, from 3.9% in 2007-8, when 2.1 million adults were identified as having diabetes, to 5.5% in 2010-11 when 2.5 million adults had diagnosed diabetes.⁷

Diabetes UK estimates that an additional 850,000 people in the UK have diabetes without knowing about it, around one in 74 adults (1.35%).⁸ Other research placed the estimate at 1% of the adult population, and 1.7% of older people aged 52-79.¹⁰ Figures reported for the prevalence of undiagnosed diabetes or the proportion of diabetes that is undiagnosed have fallen substantially over the past two decades, as a higher proportion of cases have been detected.¹⁰

Estimates from the World Health Organisation, based on HSE 2006 figures, found that 7.8% of men and 5.7% of women aged 25 and over in England had diabetes (though using a slightly different definition from that used in the HSE¹¹). This placed England below the international average (9.8% of men and 9.2% of women), the average in high income countries (10.0% of men and 7.1% of women), and the European average (9.6% of men and 8.0% of women).¹² Although England had a slightly lower prevalence of diabetes than other countries, diabetes continues to be a leading cause of avoidable mortality: it is estimated that 11.6% of all deaths among those aged 20-79 in England in 2005 were as a result of diabetes, and the level was predicted to be 12.2% in 2010.¹³ Recent research has shown that hospital inpatients with diabetes are 10% more likely to die than those without diabetes.¹⁴

4.1.2 Treatment and care for diabetes

The Department of Health National Framework for Diabetes, published in 2003, set out a ten-year programme of change to deliver world class care and support for people with

diabetes.¹⁵ This recommended an agreed care plan, a personal diabetes record and named contact within the local service for all people diagnosed with diabetes or with poor blood glucose control (glycated haemoglobin more than 58mmol/mol or more than 7.5% – see Section 4.2.3). In 2009 a new website was set up for NHS Diabetes,¹⁶ which aimed to ensure the delivery of the Diabetes National Service Framework and raise the quality of diabetes care in England by supporting and working with the healthcare community and people with diabetes. A national programme, NHS Health Check, was set up in 2009 to offer vascular checks to everyone aged 40–74, asking about height, weight, family history and lifestyle; the checks include tests for cholesterol and, in some cases, glucose. It was anticipated that the programme will prevent approximately 4,000 cases of diabetes each year.¹⁷

In 2011, the National Institute for Health and Clinical Excellence (NICE) published quality standards for the care of people with diagnosed diabetes in addition to those set out in the National Service Framework. This includes education and care planning for people with diabetes to empower them to be involved in their own care; monitoring of (and action to correct) poor glucose control, blood pressure and blood lipids; and screening for and treatment of complications arising from diabetes. One of the recommendations was for each patient with diabetes to agree a target level for HbA_{1c} between 6.5% and 7.5% (48 to 58mmol/mol), and have their treatment reviewed regularly to help avoid low blood sugar (hypoglycaemia).¹⁸

4.1.3 Trend data

This chapter presents 2011 data and some comparisons with previous years. Trend tables of key variables, including prevalence of doctor-diagnosed diabetes, are available in *Health Survey for England 2011 Latest Trends* on the Health and Social Care Information Centre's website.¹⁹

4.2 Methods and definitions

4.2.1 Measurement of doctor-diagnosed diabetes

The definition of self-reported doctor-diagnosed diabetes was based on a positive response to both of the questions asked at the interview:

'Do you now have, or have you ever had diabetes?' and

'Were you told by a doctor that you had diabetes?'

The only exception was women who had diabetes only during pregnancy. No attempt was made to validate this self-reported data. There is therefore the possibility that some misclassification may have occurred, because some participants may not have remembered (or not remembered correctly) the diagnosis made by their doctor.

The HSE interview makes no distinction between Type 1 and Type 2 diabetes because of changing patterns of the disease. In previous years it was assumed that participants who reported having a diagnosis of diabetes before the age of 35 and who were on insulin therapy at the time of the survey had Type 1 diabetes, and all other participants with doctor-diagnosed diabetes were classified as having Type 2 diabetes. However, small but increasing numbers of people are now being diagnosed with Type 2 diabetes below the age of 35,^{20,21} and some adults with Type 2 diabetes are now prescribed insulin therapy,^{22,23} so these distinctions are no longer reliable.

4.2.2 Glycated haemoglobin and units of measurement

Glycated haemoglobin (HbA_{1c}), measured in the blood sample, is a validated tool for monitoring longer-term hyperglycaemia (raised levels of blood glucose).²⁴ HbA_{1c} shows the proportion of haemoglobin in the circulation to which glucose is bound. It reflects the average level of blood glucose during approximately three months preceding the measurement and has been suggested as a diagnostic or screening tool for diabetes. It can be measured reliably in non-fasting blood samples, as collected in the HSE, whereas measurement of glucose requires fasting blood samples. In addition, HbA_{1c} is more stable

than glucose for a longer period so urgent analysis is not required.²⁵

As part of the move to internationally standardised units of measurement of HbA_{1c}, the UK has moved over the past two years from reporting the percentage of haemoglobin that is glycated to reporting the number of millimoles of glycated haemoglobin per mole of haemoglobin (mmol/mol).^{25,26} From April 2010 to March 2011, laboratories were recommended to report results using both units; from April 2011 onwards, HbA_{1c} has been reported as mmol/mol. As this is the international standard, and the unit of measurement now used by healthcare workers, this is therefore the main unit used in this chapter.

4.2.3 Thresholds for diagnosis and control of diabetes

In 2009, an international expert committee recommended using levels of 6.5% (48mmol/mol) or more to diagnose diabetes.²⁷ This was confirmed by the World Health Organisation in 2011.²⁴ This report, like the 2009 report, takes a level of 48mmol/mol (6.5%) or above to represent raised glycated haemoglobin (hyperglycaemia) in the general population, and this definition is used in Tables 4.10-4.19. In people without diagnosed diabetes, this level indicates undiagnosed diabetes.

In HSE reports before 2009, a threshold of 53mmol/mol (7%) was used to indicate a raised glycated haemoglobin level (in line with previous guidance²⁸), and therefore results in this report, using the 48mmol/mol (6.5%) threshold, differ from those previously reported for prevalence of raised glycated haemoglobin or hyperglycaemia.

Elevated glycated haemoglobin in diabetic patients is associated with increased mortality following acute myocardial infarction (heart attack). NICE guidance recommends target HbA_{1c} levels between 48 and 58mmol/mol (6.5% - 7.5%) for those with diagnosed diabetes, with an appropriate target level within this range agreed for each individual. Levels higher than this are indicative of poor control.

4.2.4 Low prevalence rates

Most tables in this report present percentages as rounded whole numbers. This chapter is reporting on prevalence rates that are generally low, so percentages are shown to one decimal place, so that small differences may be observed. However, it should be borne in mind that the precision of the results depends on the number of participants.

4.2.5 Response rates

The response rate to providing a blood sample is mentioned in Chapter 2 but the tabulated responses by age are also shown in this chapter for convenience. A valid result for glycated haemoglobin was obtained from 69% of men and 67% of women with a nurse visit, a total of 3,904 samples (1,722 from men and 2,182 from women). **Tables 4.8, 4.9**

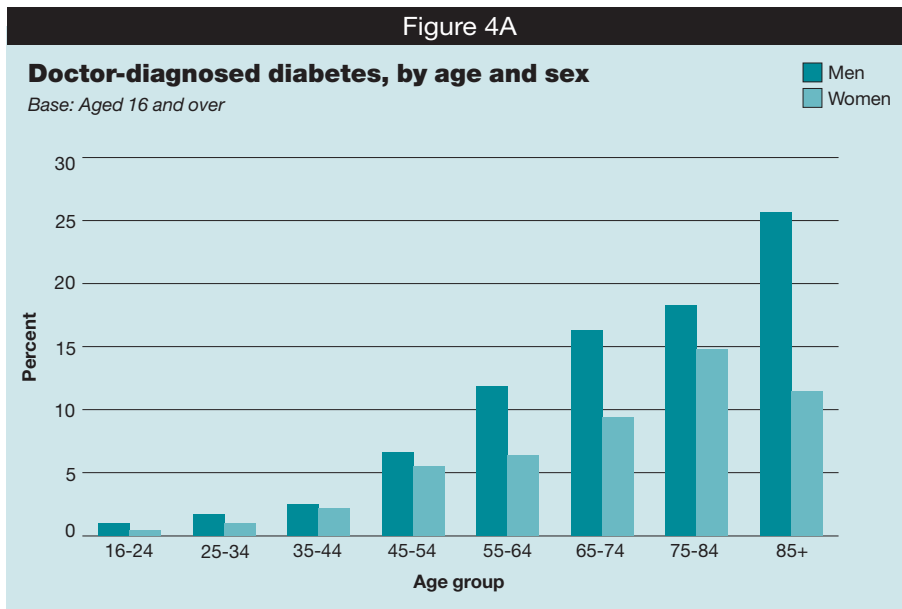
4.3 Prevalence of doctor-diagnosed diabetes

4.3.1 Prevalence of doctor-diagnosed diabetes, by age and sex

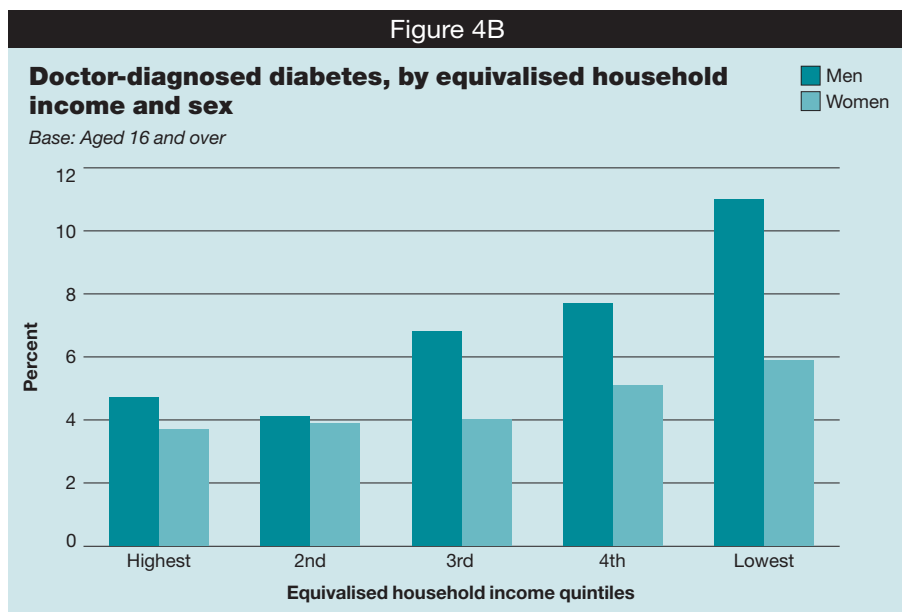
The prevalence of reported doctor-diagnosed diabetes was greater in men than women (7.0% and 4.9% respectively). Prevalence rose significantly with age, from 1.0% of men and 0.4% of women aged 16-24 to 25.7% of men and 11.5% of women aged 85 and over. Figure 4A shows that in both sexes, the prevalence of diabetes was below 3% up to and including the 35-44 age group, and increased more sharply among the older age groups. **Table 4.1, Figure 4A**

4.3.2 Prevalence of doctor-diagnosed diabetes, by strategic health authority and socio-economic factors

The prevalence of doctor-diagnosed diabetes did not vary significantly by strategic health authority. However, there were differences by equivalised household income and the Index of Multiple Deprivation (IMD).



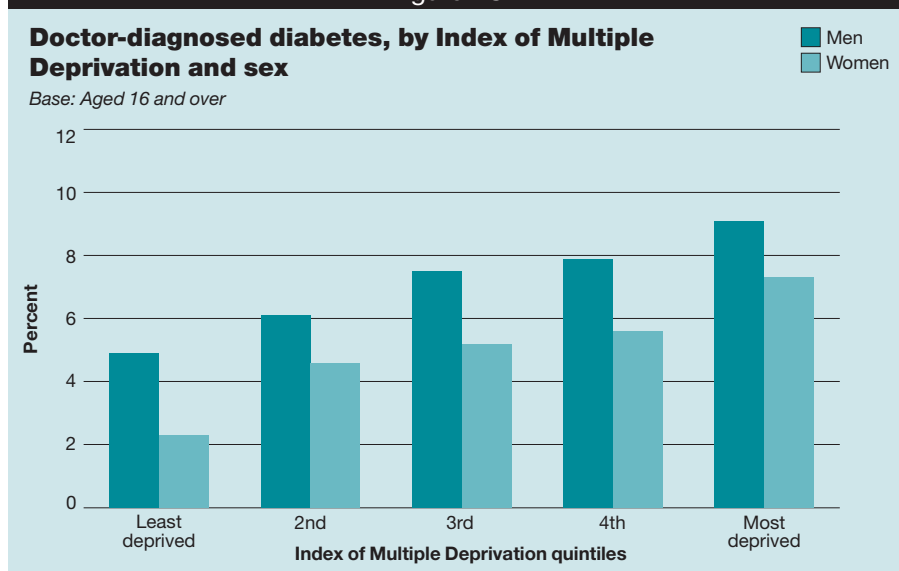
Among men, 11.0% in the lowest quintile of equivalised household income had diabetes, compared with 4.7% in the highest quintile. For women the pattern was similar, with 5.9% of those in the lowest income quintile reporting diabetes, and 3.7% in the highest quintile. As Figure 4B shows, prevalence was similar in the highest two quintiles, and rose progressively at the lower end of the income scale.



For both men and women, living in a deprived area as measured by the Index of Multiple Deprivation (IMD) was associated with greater prevalence of doctor-diagnosed diabetes. Among men prevalence fell from 9.1% of those living in the most deprived quintile to 4.9% of those in the least deprived quintile. A similar difference was found among women: from 7.3% of those in the most deprived areas, to 2.3% of those in the least deprived areas.

Tables 4.2, 4.3, 4.4, Figures 4B, 4C

Figure 4C



4.4 Glycated haemoglobin levels, diagnosis and control of diabetes

4.4.1 Glycated haemoglobin levels, by age and sex

Mean glycated haemoglobin levels were higher among men than women (39.0mmol/mol and 38.6mmol/mol respectively). Mean glycated haemoglobin increased from 34.9mmol/mol in men and 34.4mmol/mol in women aged 16-24 to 43.4mmol/mol in those aged 75 and over.

7.5% of men and 6.3% of women had hyperglycaemia (48mmol/mol or above). As with mean levels, the proportion with hyperglycaemia also increased with age; no men (in this sample) and 1.2% of women aged 16-24 had raised levels, rising to 15.9% of men and 16.9% of women aged 75 and over.

Table 4.10

4.4.2 Glycated haemoglobin levels, by strategic health authority and socio-economic factors

As with diagnosed diabetes, hyperglycaemia levels did not vary significantly by strategic health authority.

Hyperglycaemia was most prevalent in the lowest equivalised household income tertile, and least prevalent in the highest: 10.3% of men in the third of households with lowest income had hyperglycaemia, and 5.5% in the highest third. For women, the figures were 7.6% and 4.8% respectively.

There was similar variation according to IMD. Among men, the proportion with hyperglycaemia in the most deprived quintile was more than twice the level in the least deprived quintile (10.6% and 4.6% respectively). Among women, the proportion with hyperglycaemia in the most deprived quintile (10.5%) was similar to the proportion of men in the same quintile, and was more than three times the proportion of women in the least deprived (2.9%).

Tables 4.11, 4.12, 4.13

4.4.3 Doctor-diagnosed and undiagnosed diabetes

The following analysis examines doctor-diagnosed and undiagnosed diabetes (those with raised glycated haemoglobin - 48mmol/mol or more - who had not been told by a doctor that they had diabetes). Therefore the analysis is restricted to those with a valid glycated haemoglobin measurement, and percentages may be slightly different from those presented earlier.

Among this group, 6.7% of men and 4.6% of women reported doctor-diagnosed diabetes. A further 2.3% of men and 2.2% of women had undiagnosed diabetes. Overall, this brings the total level of diabetes (i.e. diagnosed plus undiagnosed) to 9.1% of men and 6.8% of women. The majority of cases of diabetes were therefore diagnosed, but 26% of men and 32% of women with diabetes were not diagnosed.

	Men	Women
	%	%
Doctor-diagnosed diabetes	6.7	4.6
Undiagnosed diabetes	2.3	2.2
<i>Total diabetes</i>	<i>9.1</i>	<i>6.8</i>
Undiagnosed diabetes as a proportion of all diabetes	26	32

As also shown in Section 4.3.1, doctor-diagnosed diabetes was higher among men than women, and rose with age.

The prevalence of undiagnosed diabetes was similar among men and women (2.3% and 2.2% respectively), and like doctor-diagnosed diabetes it generally rose with age. Among men, the levels of undiagnosed diabetes rose from 1.0% of those aged 25-34 (there were no cases in those aged under 25 in this sample) to 4.8% of those aged 55-64, and among women levels rose from 0.2% of those aged 25-34, to 8.2% of those aged 75 and over. Although the pattern of age-related increase in undiagnosed diabetes appeared to be different for men (with a peak in middle age) and women (with a continued increase into older age), this was not a statistically significant difference.

Total diabetes followed a similar pattern to diagnosed diabetes; it was higher among men than women and rose with age.

Table 4.15

4.4.4 Glycated haemoglobin levels, by diabetes diagnosis

Participants aged 35 and over with doctor-diagnosed diabetes generally had higher levels of glycated haemoglobin than those without diagnosed diabetes. Only 15% of men and 9% of women with diabetes had glycated haemoglobin under 48mmol/mol (6.5%), indicating good blood glucose control. Around half of those with diabetes had glycated haemoglobin of more than 58mmol/mol (7.5%), indicating poor blood glucose control (47% of men and 56% of women). The remaining 38% of men and 35% of women with diabetes had glycated haemoglobin within the target range for those with diabetes: 48-58mmol/mol (6.5-7.5%).

Among those without doctor-diagnosed diabetes, 97% of men and women had glycated haemoglobin levels below 48mmol/mol, indicating that they did not have diabetes. However 3% of both men and women aged 35 and over without a diagnosis of diabetes did have raised glycated haemoglobin levels, suggesting that they had undiagnosed diabetes.

Table 4.17

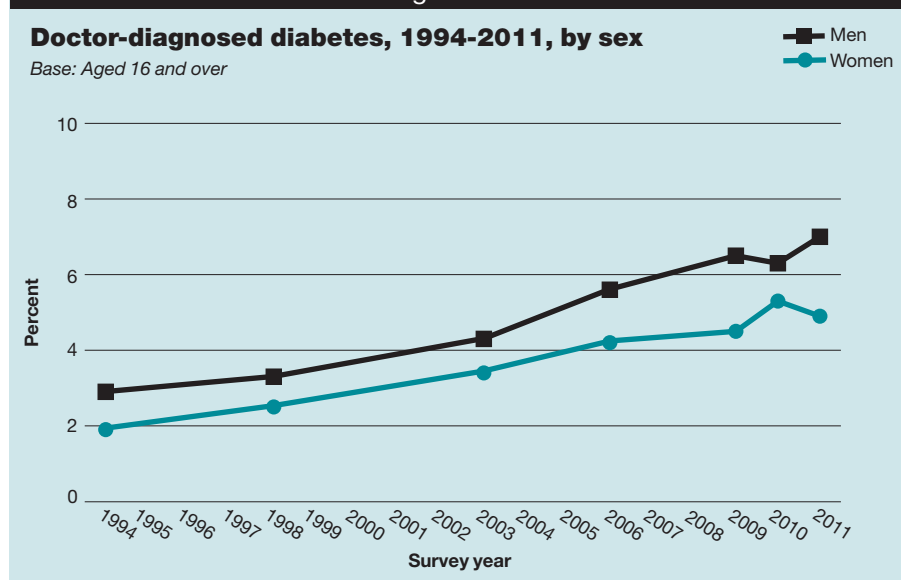
4.5 Trends in doctor-diagnosed and undiagnosed diabetes

The HSE has included a question on doctor-diagnosed diabetes in a number of years since 1994; HSE 2011 is now the seventh occasion on which this has been measured.

Figure 4D shows that the prevalence of diagnosed diabetes among both sexes has increased significantly, with some year-on-year fluctuation, from 2.9% of men in 1994 to 7.0% in 2011, and from 1.9% of women in 1994 to 4.9% in 2011. With the exception of those aged 16-24 (among whom diabetes has remained below 1% throughout), this substantial increase in prevalence was seen among every age group.

Undiagnosed diabetes can be assessed in the HSE only in years where questions were asked about doctor-diagnosed diabetes and glycated haemoglobin was measured. Trends

Figure 4D



in undiagnosed diabetes can therefore be assessed from 2003, 2006, 2009, 2010 and 2011.²⁹ Undiagnosed diabetes has varied by survey year with some fluctuations, and it would appear that there has been a gradual increase over the period, as shown in Figure 4E. Among men it increased from 1.6% in 2003 to 2.3% in 2011; and among women from 1.1% in 2003 to 2.2% in 2011. Thus taking both undiagnosed and doctor-diagnosed diabetes, it can be seen that the combined total has followed the same pattern of increase as diagnosed diabetes.

Tables 4.5, 4.16, Figures 4D, 4E

4.6 Diabetes and other health conditions

4.6.1 Diabetes and obesity

Doctor-diagnosed diabetes was associated both with overall obesity, measured by body mass index, and with central obesity, measured by waist circumference.

Body mass index (BMI) is a measure of obesity, and is calculated by dividing a person's weight in kilograms by their height in metres squared. People with a BMI below 25kg/m² are considered to be normal or underweight, BMI of 25kg/m² or more indicates being overweight, and those with a BMI of 30kg/m² or more are defined as obese. Prevalence of diabetes was greatest among those who were obese (14.7% of men and 9.9% of women). This was much greater than the prevalence among those who were overweight but not obese (5.0% and 4.3% respectively), or those who were not overweight (2.7% and 1.5% respectively).

In addition to the higher overall prevalence of diabetes among obese adults, the age-related increase in prevalence of diabetes happened at a much younger age among those who were obese than among those who were overweight, or not overweight. As Figure 4F shows, those aged 25-64 who were obese were more likely to have diabetes than their non-overweight counterparts two decades older. For example, 21% of obese men aged 55-64 had diabetes, compared with 15% of men aged 75 and over who were not overweight. Similarly 14% of obese women aged 55-64 had diabetes, compared with 9% of women aged 75 and over who were not overweight.

Table 4.6, Figure 4F

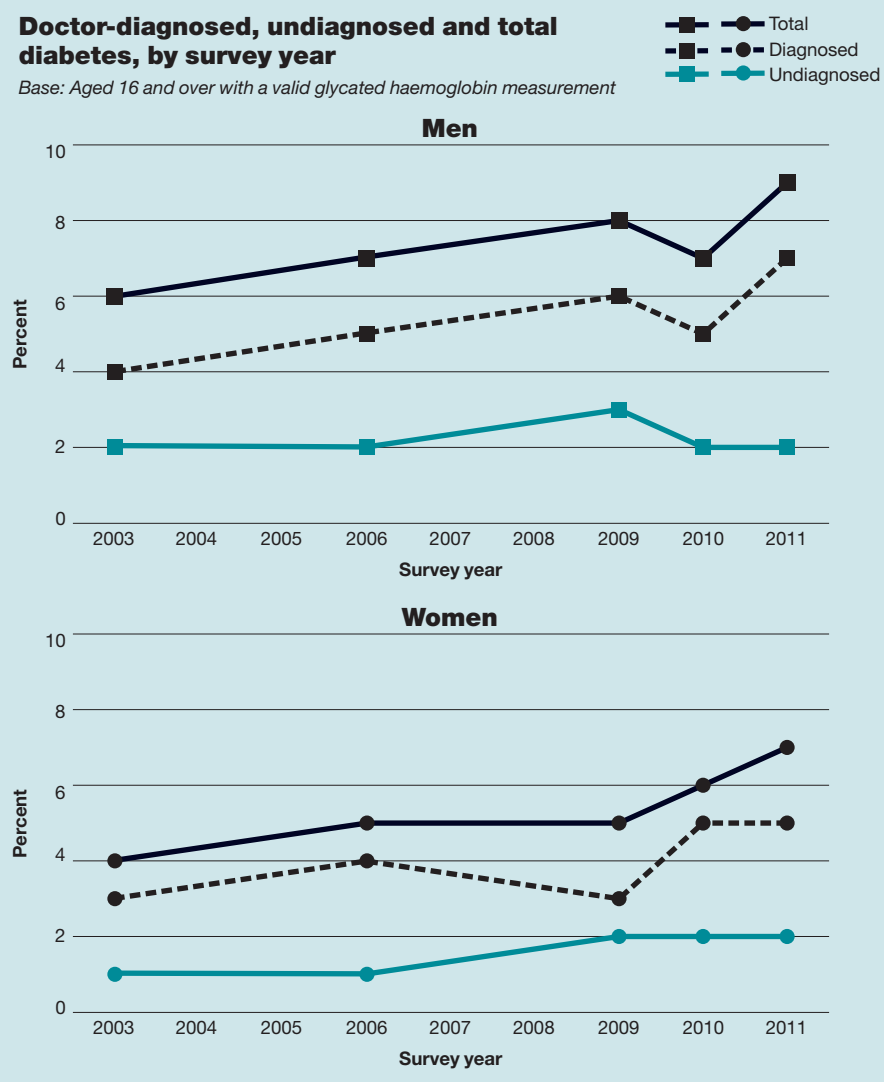
Similarly to diagnosed diabetes, hyperglycaemia (determined by raised glycated haemoglobin) was more prevalent among those who were obese compared with adults who were overweight but not obese, or not overweight. For example, 20% of men who were obese had hyperglycaemia, compared with 4% of those who were overweight and 2% who were not overweight; equivalent figures for women were 14%, 6% and 2%. Hyperglycaemia increased with age among each group, with 25% of obese men aged 65 and over and 22% of obese women of that age having the condition.

Table 4.18

Figure 4E

Doctor-diagnosed, undiagnosed and total diabetes, by survey year

Base: Aged 16 and over with a valid glycated haemoglobin measurement



While BMI measures overall obesity, a raised waist circumference indicates the presence of ‘central obesity’, i.e. excess fat around the stomach area, which is associated with a greater risk of CVD than fat elsewhere on the body⁵ (see Chapter 10). A raised waist circumference is defined as greater than 102cm for men and greater than 88cm for women.³⁰ The HSE 2011 found that a greater proportion of men and women had a raised waist circumference (34% of men and 47% of women) than were obese (24% of men and 26% of women).³¹

As with BMI, a raised waist circumference was associated with diagnosed diabetes. Among men with a raised waist circumference, 14% had diabetes, compared with 3% of those whose waist circumference was not raised. Similarly among women, 8% of those with a raised waist circumference had diabetes, compared with 1% who did not.

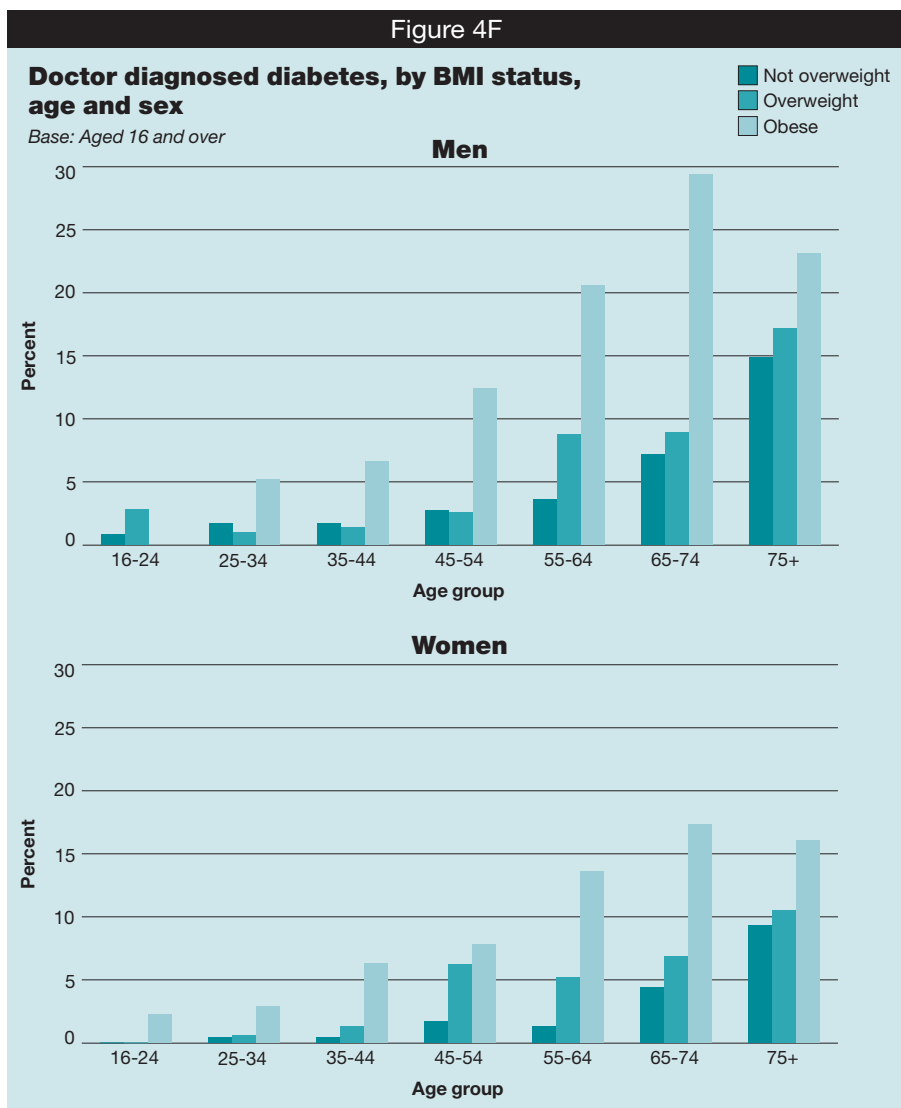
Similarly, a higher proportion of those with a raised waist circumference had hyperglycaemia: 17% of men and 11% of women with a raised waist circumference, compared with 3% of men and 2% of women with a waist circumference that was not raised.

Tables 4.7, 4.19

4.6.2 Diabetes and high blood pressure

People with doctor-diagnosed diabetes were more likely to have high blood pressure than those without: 43% of men and 28% of women with diabetes had blood pressure of 140/90mmHg or above, compared with 25% and 23% respectively without diabetes. A further 22% of men and 23% of women with diabetes had blood pressure below 140/90mmHg, but not below the recommended level for people with diabetes of 130/80mmHg. In total, 65% of men and 51% of women with diabetes had blood pressure

Figure 4F



levels at or above the 130/80mmHg target for those with diabetes.³² This was greater than the proportion without diabetes who had blood pressure over this level (54% of men and 44% of women).

Table 4.20

4.6.3 Diabetes and mental well-being

The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) is used to measure positive mental well-being on a 14 item scale, giving a score ranging from 14 (poorest) to 70 (best).³³ Adults aged 35 and over with diabetes had a lower mean score (49.2 for men, 47.9 for women) than adults of that age without diabetes (51.9 and 51.6 respectively). The difference was more pronounced among those with the lowest well-being scores: the score for the bottom 10% of those with diabetes was 35 or below for men, and 32 or below for women, compared with 41 or below for men and women without diabetes.

Table 4.21

4.7 Discussion

4.7.1 Prevalence of diabetes

Doctor-diagnosed diabetes has been increasing in prevalence since the HSE began recording information about it in 1994. Over the subsequent 17 years, prevalence has increased from 2.9% of men and 1.9% of women to 7.0% of men and 4.9% of women in 2011. These figures are comparable to those obtained by GPs, and compiled for the quality outcome framework (QOF): 2.6 million adults aged 17 and over (i.e. 5.8%);^{34,35} and similar to the prevalence in Scotland (6.1% of men and 4.9% of women aged 16 and over).³⁶ The rate

of increase has not shown signs of slowing down: for men the increase in the nine years from 1994 to 2003 was 1.4 percentage points, and in the eight years from 2003 to 2011, this was 2.7 percentage points. For women, the corresponding figures were 1.5 percentage points in each of the two periods.

As this chapter has also shown, the increase since 2003 represents not simply an increase in diagnosis, but an increase in 'total diabetes' (both diagnosed and undiagnosed). Since 2003, the prevalence of total diabetes has increased among men from 5.5% to 9.1%, and among women from 4.3% to 6.8%. For men and women together, the HSE 2011 estimate for total prevalence of diabetes is 8.0%, which is close to the 7.5% prevalence predicted by the APHO (Association of Public Health Observatories) Diabetes Prevalence Model for England.³⁷ Both the increase in diagnosis and the smaller increase in prevalence of diabetes are probably related to rising levels of obesity among the general population in England; obesity has increased substantially since the early 1990s (see Chapter 10).

4.7.2 Undiagnosed diabetes

A key public health aim is to diagnose as many people as possible who have diabetes, as early as possible, so that lifestyle modification and/or treatment can be introduced, ill health minimised, and the associated risk factors for other conditions (such as CVD) reduced. The increase in prevalence of diagnosed diabetes is therefore a positive finding. However it is of concern that, of those with diabetes in 2011, 26% of men and 32% of women were undiagnosed.³⁸

The HSE 2011 data suggest that 2.3% of the adult population had undiagnosed diabetes. This is similar to, though slightly greater than the estimate of 1.35% produced by Diabetes UK, based on comparing the number of adults with diabetes from 2010-11 GP QOF figures with the predicted number of total diagnosed and undiagnosed adults with diabetes from the APHO Diabetes Prevalence Model for England.^{7,21,37} The HSE estimates of the proportion of those with undiagnosed diabetes have fluctuated year on year, but it would appear that there has been a gradual increase since 2003. A similar increase (from 1.1% in 2003 to 2.4% in 2011) was also seen in Scotland.³⁶ Although based on small numbers, this evidence suggests that a reduction in undiagnosed diabetes has not been achieved, despite drives to increase diagnosis rates.

The NHS health checks, which are to be offered to all adults aged 40-74 in England, include glucose testing for those at high risk of diabetes, i.e. hypertensive or obese patients. However, early evidence has shown that health check attendance is lower than expected, which may explain why the projected benefits have not been attained.³⁹ In addition, the NHS health checks exclude those aged 75 and over, among whom diabetes is most prevalent.

4.7.3 Diabetes and obesity

This survey confirms the well known link between obesity and diabetes. A larger proportion of those who are obese develop diabetes, and those who do develop diabetes do so at a younger age – thus experiencing more years of harm to their physical health and mental well-being from diabetes. The difference in diabetes prevalence was such that obese people aged 25-64 had a higher prevalence of diabetes than their non-overweight counterparts 20 years older.

4.7.4 Inequalities in diabetes prevalence

The burden of diabetes falls heavily on older people. In 2011, as in previous years, almost half of those with diabetes were aged 65 and over, although only 20% of the adult population is in that age group. Among men, the proportion with diabetes reached 20% among those aged 75 and over, and 14% among women of that age. In addition, there were socio-economic inequalities in the burden of diabetes. After accounting for age, diabetes prevalence remained highest in the lowest income households, and those in the most deprived areas.

4.7.5 Diabetes and other health conditions

NICE recommends that patients with diabetes receive nine checks at least annually: HbA_{1c}, blood pressure, blood creatinine, BMI, cholesterol, eye screening, foot examination, smoking review and urinary albumin. The National Diabetes Audit shows that 54% of diabetes patients in England are receiving all nine health care checks. Of these checks, the most frequently carried out are blood pressure (95%) and blood glucose (92%).⁴⁰ However, HSE 2011 data show that those with diagnosed diabetes were more likely to have high blood pressure than those without, and that over half of those with diagnosed diabetes had glycated haemoglobin of more than 58mmol/mol, indicating poor control. This suggests that although monitoring is taking place, the treatments currently given are not sufficient to combat high blood pressure and poor glucose control among diabetics. The poorer physical health of those with diabetes is also mirrored in their much lower mental well-being scores.

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- 4.1 Prevalence of doctor-diagnosed diabetes, by age and sex
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Notes on the tables

1. The group on which the figures in the table are based is stated at the upper left corner of the table.
2. The data in most tables have been weighted. See Chapter 7, Volume 2 of this report for more detail. Both unweighted and weighted sample sizes are shown at the foot of each table.
3. Apart from tables showing age breakdowns, data have been age-standardised to allow comparisons between groups after adjusting for the effects of any differences in their age distributions. See Chapter 8.3.3, Volume 2 of this report for more detail.
4. The following conventions have been used in tables:
 - no observations (zero value)
 - 0 non-zero values of less than 0.5% and thus rounded to zero
 - [] used to warn of small sample bases, if the unweighted base is less than 50. If a group’s unweighted base is less than 30, data are normally not shown for that group.
5. Because of rounding, row or column percentages may not add exactly to 100%.
6. ‘Missing values’ occur for several reasons, including refusal or inability to answer a particular question; refusal to co-operate in an entire section of the survey (such as the nurse visit or a self-completion questionnaire); and cases where the question is not applicable to the participant. In general, missing values have been omitted from all tables and analyses.

Table 4.1

Prevalence of doctor-diagnosed diabetes, by age and sex

Aged 16 and over

2011

Doctor-diagnosed diabetes ^a	Age group								Total
	16-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	
	%	%	%	%	%	%	%	%	%
Men	1.0	1.7	2.5	6.6	11.9	16.3	18.3	25.7	7.0
Women^b	0.4	1.0	2.2	5.5	6.4	9.4	14.8	11.5	4.9
<i>Bases (unweighted)</i>									
Men	371	547	678	666	628	505	327	93	3815
Women	482	727	835	824	769	609	402	134	4782
<i>Bases (weighted)</i>									
Men	637	713	761	730	614	435	249	74	4214
Women	619	692	768	741	639	475	335	112	4381

^a Questions to participants do not distinguish between Type 1 and Type 2 diabetes, and therefore the distinction is not made in the HSE report.

^b Excluding women who only had diabetes during pregnancy.

Table 4.2

Prevalence of doctor-diagnosed diabetes (observed and age-standardised), by strategic health authority^a and sex

Aged 16 and over

2011

Doctor-diagnosed diabetes	Strategic health authority									
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South East Coast	South Central	South West
	%	%	%	%	%	%	%	%	%	%
Men										
Observed	11.2	7.1	5.2	6.1	7.1	7.8	7.2	7.8	5.5	6.4
Standardised	10.5	7.7	5.2	6.2	7.1	6.7	8.7	6.7	5.4	5.8
Women^b										
Observed	5.9	5.4	6.9	5.6	4.1	4.0	4.9	4.7	3.9	3.9
Standardised	5.4	5.4	6.2	6.0	3.9	4.1	5.8	4.2	3.9	3.5
<i>Bases (unweighted)</i>										
Men	309	507	390	338	409	423	436	286	327	390
Women	409	614	500	430	484	522	551	382	398	492
<i>Bases (weighted)</i>										
Men	209	569	437	354	456	461	613	341	342	432
Women	225	571	458	387	445	490	625	379	340	461

^a This table provides data for regional analysis by the configuration of strategic health authorities (SHAs) in place from July 2006.

^b Excluding women who had diabetes only during pregnancy.

Table 4.3

Prevalence of doctor-diagnosed diabetes (age-standardised), by equivalised household income and sex

Aged 16 and over

2011

Doctor-diagnosed diabetes	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men	4.7	4.1	6.8	7.7	11.0
Women^a	3.7	3.9	4.0	5.1	5.9
<i>Bases (unweighted)</i>					
Men	701	643	618	605	473
Women	728	761	740	809	724
<i>Bases (weighted)</i>					
Men	757	705	654	638	536
Women	669	707	654	717	653

^a Excluding women who had diabetes only during pregnancy.

Table 4.4

Prevalence of doctor-diagnosed diabetes (age-standardised), by Index of Multiple Deprivation^a and sex

Aged 16 and over

2011

Doctor-diagnosed diabetes	IMD quintile				
	Least deprived	2nd	3rd	4th	Most deprived
	%	%	%	%	%
Men	4.9	6.1	7.5	7.9	9.1
Women^b	2.3	4.6	5.2	5.6	7.3
<i>Bases (unweighted)</i>					
Men	785	807	800	717	706
Women	986	1014	1026	876	880
<i>Bases (weighted)</i>					
Men	832	881	868	813	818
Women	877	949	954	798	803

^a The Index of Multiple Deprivation 2010 (IMD) combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score at the small area level in England.

^b Excluding women who had diabetes only during pregnancy.

Table 4.5

Trends in prevalence of doctor-diagnosed diabetes, 1994-2011, by age and sex

Aged 16 and over

1994, 1998, 2003, 2006, 2009-2011

Doctor-diagnosed diabetes	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
1994 ^a	0.8	0.8	1.0	2.5	6.4	5.8	7.5	2.9
1998 ^a	0.1	0.7	1.6	2.9	5.8	7.0	8.7	3.3
2003	0.4	0.3	2.8	3.6	8.1	11.9	10.0	4.3
2006	0.8	1.2	2.4	6.0	8.5	15.7	13.5	5.6
2009	0.5	1.0	1.9	8.1	10.5	15.7	19.5	6.5
2010	0.5	1.3	2.5	6.9	11.1	15.2	15.9	6.3
2011	1.0	1.7	2.5	6.6	11.9	16.3	20.0	7.0
Women^b								
1994 ^a	0.6	0.3	0.9	1.5	2.5	4.8	5.2	1.9
1998 ^a	0.8	0.7	0.9	1.6	3.1	6.6	6.6	2.5
2003	0.9	0.9	1.5	2.6	4.7	8.4	8.9	3.4
2006	0.9	1.2	1.2	3.6	6.0	10.4	10.6	4.2
2009	0.4	0.8	3.2	3.5	6.3	9.2	12.7	4.5
2010	0.4	1.7	2.5	4.1	8.0	12.2	13.2	5.3
2011	0.4	1.0	2.2	5.5	6.4	9.4	14.0	4.9
<i>Bases (unweighted)</i>								
Men 1994	968	1434	1329	1127	1001	877	441	7177
Men 1998	875	1338	1305	1289	987	837	562	7193
Men 2003	746	1025	1263	1101	1103	807	557	6602
Men 2006	650	862	1183	1050	1126	437	317	5625
Men 2009	233	277	386	347	359	316	190	2108
Men 2010	376	493	643	625	640	518	402	3697
Men 2011	371	547	678	666	628	505	420	3815
Women 1994	1080	1723	1520	1300	1059	1120	825	8627
Women 1998	1006	1630	1573	1484	1148	967	907	8715
Women 2003	890	1285	1618	1279	1307	952	903	8234
Women 2006	794	1148	1494	1279	1268	470	470	6923
Women 2009	275	361	489	392	391	339	290	2537
Women 2010	476	695	820	874	723	566	561	4715
Women 2011	482	727	835	824	769	609	536	4782
<i>Bases (weighted)^a</i>								
Men 2003	1047	1274	1416	1185	1043	731	507	7202
Men 2006	1041	1129	1356	1123	1015	694	496	6854
Men 2009	367	388	444	391	345	233	174	2342
Men 2010	642	701	755	721	607	429	318	4174
Men 2011	637	713	761	730	614	435	322	4214
Women 2003	1034	1285	1440	1200	1074	816	785	7634
Women 2006	1014	1160	1379	1141	1049	768	796	7307
Women 2009	350	382	450	398	358	257	249	2443
Women 2010	610	686	760	730	631	470	439	4327
Women 2011	619	692	768	741	639	475	446	4381

^a From 2003 data have been weighted for non-response.

^b Excluding women who only had diabetes during pregnancy.

Table 4.6

Prevalence of doctor-diagnosed diabetes, by age within BMI status and sex

Aged 16 and over with a valid BMI

2011

Doctor-diagnosed diabetes	Men			Women ^a		
	Not overweight ^b	Overweight ^b	Obese ^b	Not overweight ^b	Overweight ^b	Obese ^b
	%	%	%	%	%	%
16-24	0.8	2.8	-	-	-	2.3
25-34	1.7	1.0	5.2	0.4	0.6	2.9
35-44	1.7	1.4	6.6	0.4	1.3	6.3
45-54	2.7	2.6	12.4	1.7	6.2	7.8
55-64	3.6	8.8	20.6	1.3	5.2	13.6
65-74	7.2	8.9	29.4	4.4	6.9	17.3
75+	14.9	17.2	23.1	9.3	10.5	16.1
All	2.7	5.0	14.7	1.5	4.3	9.9
<i>Bases (unweighted)</i>						
16-24	205	71	31	263	88	50
25-34	196	190	81	321	145	121
35-44	182	273	118	271	248	169
45-54	137	251	174	235	239	212
55-64	123	231	176	200	235	204
65-74	85	211	124	152	188	159
75+	71	146	88	110	142	118
All	999	1373	792	1552	1285	1033
<i>Bases (weighted)</i>						
16-24	351	117	48	338	105	60
25-34	263	232	102	300	141	112
35-44	201	302	130	246	227	155
45-54	142	272	198	207	214	191
55-64	129	228	164	167	194	173
65-74	74	180	110	119	147	124
75+	57	109	67	93	119	98
All	1217	1439	819	1469	1147	913

^a Excluding women who had diabetes only during pregnancy.^b Not overweight = BMI below 25kg/m²; Overweight = BMI 25 to less than 30kg/m²; Obese = BMI 30kg/m² or more.

Table 4.7

Prevalence of doctor-diagnosed diabetes, by age within waist circumference and sex

Aged 16 and over with a valid waist measurement

2011

Doctor-diagnosed diabetes	Men		Women ^a	
	Waist circumference up to 102cm	Waist circumference more than 102cm	Waist circumference up to 88cm	Waist circumference more than 88cm
	%	%	%	%
16-24	0.6	-	-	3.6
25-34	1.4	2.7	0.3	1.8
35-44	1.2	6.3	0.3	3.7
45-54	3.5	10.9	2.3	7.0
55-64	6.8	17.4	0.8	9.6
65-74	5.9	21.3	3.7	13.3
75+	13.2	22.8	6.4	16.4
All	3.0	13.5	1.3	8.4
<i>Bases (unweighted)</i>				
16-24	172	21	207	66
25-34	263	62	315	127
35-44	308	117	304	245
45-54	240	184	267	275
55-64	224	214	232	320
65-74	162	195	164	255
75+	115	143	103	208
All	1484	936	1592	1496
<i>Bases (weighted)</i>				
16-24	369	40	290	93
25-34	378	84	296	121
35-44	352	139	262	224
45-54	267	202	228	248
55-64	203	189	171	241
65-74	122	154	116	185
75+	87	113	91	187
All	1779	921	1453	1300

^a Excluding women who had diabetes only during pregnancy.

Table 4.8

Response to blood sample, by age and sex								
<i>Aged 16 and over with a nurse visit</i>								2011
Response	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Valid blood sample taken	62	74	77	78	79	74	65	74
Unsuccessful attempt	4	6	6	6	5	6	10	6
Refused	32	19	14	12	12	12	12	15
Not applicable ^a	2	1	3	3	4	8	13	5
Women								
Valid blood sample taken	55	66	74	80	77	78	66	73
Unsuccessful attempt	8	7	8	7	7	7	8	7
Refused	32	19	14	12	12	11	16	15
Not applicable ^a	5	8	4	1	3	4	10	5
<i>Bases (unweighted)</i>								
<i>Men</i>	199	327	433	431	452	367	273	2482
<i>Women</i>	291	481	576	557	567	433	328	3233

^a On anticoagulants or had fits in the past five years, or among women, pregnant.

Table 4.9

Proportion with valid glyated haemoglobin result, by age and sex								
<i>Aged 16 and over with a nurse visit</i>								2011
Valid sample	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Glycated haemoglobin	57	69	73	73	75	69	59	69
Women								
Glycated haemoglobin	50	62	70	76	72	72	61	67
<i>Bases (unweighted)</i>								
<i>Men</i>	199	327	433	431	452	367	273	2482
<i>Women</i>	291	481	576	557	567	433	328	3233

Table 4.10

Glycated haemoglobin, by age and sexAged 16 and over with a valid glycated haemoglobin measurement^a

2011

Glycated haemoglobin (HbA _{1c})	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Mean (mmol/mol) ^b	34.9	36.3	37.5	40.6	42.1	42.0	43.4	39.0
Standard error of the mean	0.34	0.59	0.33	0.75	0.62	0.65	0.67	0.25
% with levels of 48mmol/mol (6.5%) or more ^c	-	3.3	3.4	9.8	13.8	13.4	15.9	7.5
Women								
Mean (mmol/mol)	34.4	34.8	37.0	39.2	41.2	42.8	43.4	38.6
Standard error of the mean	0.36	0.29	0.59	0.47	0.51	0.68	0.60	0.23
% with levels of 48mmol/mol (6.5%) or more ^c	1.2	1.0	3.9	6.1	8.1	13.2	16.9	6.3
<i>Bases (unweighted)</i>								
<i>Men</i>	114	226	316	315	337	252	162	1722
<i>Women</i>	145	296	401	423	408	310	199	2182
<i>Bases (weighted)</i>								
<i>Men</i>	285	322	351	330	284	196	144	1912
<i>Women</i>	278	316	353	345	293	213	201	1999

^a Including those with and without diagnosed diabetes.

^b In April 2010, the unit for reporting of glycated haemoglobin levels nationally changed from % to mmol/mol (see Section 4.2.2). The conversion rates are as follows:

$$\text{mmol/mol} = (\% - 2.15) \times 10.929$$

$$\% = (\text{mmol/mol} / 10.929) + 2.15.$$

^c Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

Table 4.11

Raised glycated haemoglobin (observed and age-standardised), by strategic health authority^a and sex

Aged 16 and over with a valid glycated haemoglobin measurement^b

2011

Glycated haemoglobin (HbA _{1c}) 48mmol/mol (6.5%) or more ^c	Strategic health authority									
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South East Coast	South Central	South West
	%	%	%	%	%	%	%	%	%	%
Men										
Observed	8.8	6.9	7.5	9.6	5.5	10.2	6.5	11.3	2.3	7.6
Standardised	8.4	7.1	7.3	9.2	5.5	8.8	8.2	8.6	2.5	7.1
Women										
Observed	3.7	7.4	10.9	3.8	6.7	3.7	7.2	7.0	5.3	4.9
Standardised	3.5	7.1	10.2	5.0	5.9	3.6	8.7	6.2	5.2	4.3
<i>Bases (unweighted)</i>										
<i>Men</i>	144	199	178	172	203	199	157	119	137	214
<i>Women</i>	199	262	243	222	206	226	240	173	176	235
<i>Bases (weighted)</i>										
<i>Men</i>	94	248	185	160	225	226	264	139	158	211
<i>Women</i>	105	264	220	182	185	211	314	180	147	191

^a This table provides data for regional analysis by the configuration of strategic health authorities (SHAs) in place from July 2006.

^b Including those with and without diagnosed diabetes.

^c Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

Table 4.12

Raised glycated haemoglobin (age-standardised), by equivalised household income and sex

Aged 16 and over with a valid glycated haemoglobin measurement^a

2011

Glycated haemoglobin (HbA _{1c}) 48mmol/mol (6.5%) or more ^b	Equivalised household income tertile		
	Highest	Middle	Lowest
	%	%	%
Men			
	5.5	6.9	10.3
Women			
	4.8	4.5	7.6
<i>Bases (unweighted)</i>			
<i>Men</i>	590	527	343
<i>Women</i>	643	636	520
<i>Bases (weighted)</i>			
<i>Men</i>	600	563	406
<i>Women</i>	537	543	507

^a Including those with and without diagnosed diabetes.

^b Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

Table 4.13

Raised glycated haemoglobin (age-standardised), by Index of Multiple Deprivation^a and sex

Aged 16 and over with a valid glycated haemoglobin measurement^b

2011

Glycated haemoglobin (HbA _{1c}) 48mmol/mol (6.5%) or more ^c	IMD quintile				
	Least deprived	2nd	3rd	4th	Most deprived
	%	%	%	%	%
Men					
	4.6	7.5	7.2	7.6	10.6
Women					
	2.9	6.0	5.3	8.2	10.5
<i>Bases (unweighted)</i>					
<i>Men</i>	384	381	385	301	271
<i>Women</i>	490	502	440	392	358
<i>Bases (weighted)</i>					
<i>Men</i>	376	419	424	350	344
<i>Women</i>	395	474	398	367	365

^a The Index of Multiple Deprivation 2010 (IMD) combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score at the small area level in England.

^b Including those with and without diagnosed diabetes.

^c Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

Table 4.14

Trends in raised glycated haemoglobin, 2003-2011, by age and sex

Aged 16 and over with a valid glycated haemoglobin measurement^a

2003, 2006, 2008-2011

Glycated haemoglobin (HbA _{1c}) 48mmol/mol (6.5%) or more ^b	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
2003	-	0.3	2.9	3.4	7.6	12.4	9.7	4.2
2006	1.1	1.1	2.4	6.3	8.3	17.4	14.4	5.9
2008	0.6	1.0	3.8	5.5	9.1	15.2	14.3	5.8
2009	-	2.5	3.1	6.1	11.4	16.7	17.3	6.8
2010	0.5	-	3.5	3.4	9.9	14.8	15.7	5.4
2011	-	3.3	3.4	9.8	13.8	13.4	15.9	7.5
Women								
2003	0.3	1.3	2.2	2.1	3.5	8.3	10.3	3.4
2006	-	1.1	0.8	3.1	6.2	7.7	8.7	3.5
2008	0.3	1.0	2.8	4.6	6.5	10.1	10.5	4.5
2009	0.9	0.5	4.3	3.2	5.2	9.7	15.3	4.9
2010	1.3	0.7	2.9	4.3	10.1	10.8	10.5	5.2
2011	1.2	1.0	3.9	6.1	8.1	13.2	16.9	6.3
<i>Bases (unweighted)</i>								
Men 2003	300	538	763	707	680	492	302	3782
Men 2006	261	416	667	594	680	234	134	2986
Men 2008	291	410	604	594	675	436	308	3318
Men 2009	87	118	207	203	193	173	86	1067
Men 2010	132	209	318	330	302	257	169	1717
Men 2011	114	226	316	315	337	252	162	1722
Women 2003	334	593	897	806	820	540	427	4417
Women 2006	286	499	807	749	753	259	191	3544
Women 2008	276	501	734	723	773	486	400	3893
Women 2009	81	123	267	215	234	171	132	1223
Women 2010	141	240	407	467	384	272	230	2141
Women 2011	145	296	401	423	408	310	199	2182
<i>Bases (weighted)</i>								
Men 2003	571	707	777	674	576	401	278	3985
Men 2006	537	588	707	583	534	361	256	3566
Men 2008	546	570	676	586	531	348	256	3514
Men 2009	169	175	212	189	169	113	88	1116
Men 2010	291	316	353	332	272	193	142	1898
Men 2011	285	322	351	330	284	196	144	1912
Women 2003	560	707	789	667	601	449	427	4199
Women 2006	517	603	712	602	545	399	422	3800
Women 2008	513	587	699	597	545	384	370	3694
Women 2009	159	179	212	188	179	121	121	1158
Women 2010	279	319	341	336	285	211	196	1967
Women 2011	278	316	353	345	293	213	201	1999

^a Including those with and without diagnosed diabetes.

^b Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

Table 4.15

Prevalence of diagnosed and undiagnosed diabetes, by age and sex								
Aged 16 and over with a valid glycated haemoglobin measurement ^a								2011
Diagnosed diabetes or raised glycated haemoglobin (HbA _{1c})	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Doctor-diagnosed diabetes	-	2.6	1.8	6.4	12.4	13.9	21.3	6.7
Undiagnosed diabetes ^b	-	1.0	1.6	3.5	4.8	3.2	2.8	2.3
All diabetes	-	3.6	3.4	10.0	17.2	17.2	24.1	9.1
Women^c								
Doctor-diagnosed diabetes	1.2	0.8	3.1	4.7	5.1	10.2	10.9	4.6
Undiagnosed diabetes ^b	-	0.2	1.0	1.6	3.2	4.0	8.2	2.2
All diabetes	1.2	1.0	4.1	6.3	8.3	14.2	19.1	6.8
<i>Bases (unweighted)</i>								
Men	114	226	316	315	337	252	162	1722
Women	145	296	401	423	408	309	198	2180
<i>Bases (weighted)</i>								
Men	285	322	351	330	284	196	144	1912
Women	278	316	353	345	293	212	200	1997

^a This table is limited to those participants with a valid glycated haemoglobin measurement, so figures may differ from those provided in Tables 4.1 and 4.5.

^b Glycated haemoglobin level of 48mmol/mol (6.5%) or more but no diagnosis of diabetes, indicating undiagnosed diabetes.

^c Excluding diabetes only during pregnancy.

Table 4.16

Trends in prevalence of diagnosed and undiagnosed diabetes, 2003-2011, by sex					
Aged 16 and over with a valid glycated haemoglobin measurement ^a					2003, 2006, 2009-11
Diagnosed diabetes or raised glycated haemoglobin (HbA _{1c})	Year				
	2003	2006	2009	2010	2011
	%	%	%	%	%
Men					
Doctor-diagnosed diabetes ^a	3.9	5.4	5.9	5.4	6.7
Undiagnosed diabetes ^b	1.6	1.9	2.5	1.7	2.3
All diabetes	5.5	7.3	8.5	7.1	9.1
Women^c					
Doctor-diagnosed diabetes ^a	3.2	3.7	3.1	4.5	4.6
Undiagnosed diabetes ^b	1.1	1.0	2.3	2.0	2.2
All diabetes	4.3	4.7	5.4	6.5	6.8
<i>Bases (unweighted)</i>					
Men	3778	2983	1067	1716	1722
Women	4414	3542	1223	2140	2180
<i>Bases (weighted)</i>					
Men	3981	3563	1116	1898	1912
Women	4196	3798	1158	1966	1997

^a This table is limited to those participants with a valid glycated haemoglobin measurement, so figures may differ from those provided in Table 4.5.

^b Glycated haemoglobin level of 48mmol/mol (6.5%) or more but no diagnosis of diabetes, indicating undiagnosed diabetes.

^c Excluding diabetes only during pregnancy.

Table 4.17

Glycated haemoglobin levels (age-standardised), by doctor-diagnosed diabetes status and sex		
Aged 35 and over with a valid glycated haemoglobin measurement ^a		2011
Glycated haemoglobin (HbA _{1c})	With doctor-diagnosed diabetes	Without doctor-diagnosed diabetes
	%	%
Men		
Less than 48mmol/mol (6.5%) ^b	15	97
48-58mmol/mol (6.5%-7.5%) ^c	38	3
More than 58mmol/mol (7.5%) ^d	47	1
Women^e		
Less than 48mmol/mol (6.5%) ^b	9	97
48-58mmol/mol (6.5%-7.4%) ^c	35	3
More than 58mmol/mol (7.5%) ^d	56	1
<i>Bases (unweighted)</i>		
Men	125	1257
Women	93	1646
<i>Bases (weighted)</i>		
Men	112	1220
Women	79	1354

^a The analysis is restricted to those aged 35 and over due to the small numbers of people aged under 35 with diabetes.

^b Indicating no diabetes or good blood glucose control.

^c Target range for those with Type 2 diabetes.

^d Indicating poor blood glucose control.

^e Excluding diabetes only during pregnancy.

Table 4.18

Prevalence of raised glycated haemoglobin, by age within BMI status and sex

Aged 16 and over with a valid BMI and a valid glycated haemoglobin measurement

2011

Glycated haemoglobin (HbA _{1c}) 48mmol/mol (6.5%) or more ^a	Men			Women		
	Not overweight ^b %	Overweight ^b %	Obese ^b %	Not overweight ^b %	Overweight ^b %	Obese ^b %
16-34	0.4	1.9	[6.9]	-	-	6.1
35-44	1.7	0.8	11.7	-	3.6	8.6
45-54	3.8	3.7	21.9	0.8	5.1	14.4
55-64	3.1	6.2	30.7	4.1	7.0	14.8
65 and over	6.6	10.2	25.5	8.8	13.8	21.8
All	1.9	4.4	20.2	1.8	6.0	13.8
<i>Bases (unweighted)</i>						
16-34	162	104	43	236	102	63
35-44	88	147	62	140	138	91
45-54	69	133	87	146	121	115
55-64	70	131	107	119	137	110
65 and over	69	198	91	129	173	138
All	458	713	390	770	671	517
<i>Bases (weighted)</i>						
16-34	315	166	72	317	130	84
35-44	96	163	69	119	120	83
45-54	70	138	95	114	101	98
55-64	66	105	91	83	96	82
65 and over	58	157	78	103	134	116
All	604	728	404	735	582	462

^a Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

^b Not overweight = BMI below 25kg/m²; Overweight = BMI 25 to less than 30kg/m²; Obese = BMI 30kg/m² or more.

Table 4.19

Prevalence of raised glycated haemoglobin, by age within waist circumference and sex

Aged 16 and over with a valid waist measurement and a valid glycated haemoglobin measurement

2011

Glycated haemoglobin (HbA _{1c}) 48mmol/mol (6.5)% or more ^a	Men		Women	
	Waist circumference up to 102cm	Waist circumference more than 102cm	Waist circumference up to 88cm	Waist circumference more than 88cm
	%	%	%	%
16-34	1.2	5.0	0.3	3.5
35-44	1.2	9.1	0.6	7.2
45-54	3.7	18.5	1.9	9.9
55-64	4.5	23.1	4.0	10.2
65 and over	6.3	20.9	5.3	20.1
All	2.6	16.9	1.7	11.3
<i>Bases (unweighted)</i>				
16-34	285	52	330	105
35-44	230	86	223	171
45-54	180	132	223	190
55-64	172	159	171	232
65 and over	197	211	191	305
All	1064	640	1138	1003
<i>Bases (weighted)</i>				
16-34	520	81	438	148
35-44	254	97	189	157
45-54	187	138	177	160
55-64	145	134	119	171
65 and over	155	179	146	255
All	1260	630	1069	890

^a Indicating undiagnosed diabetes or less than optimal control of diagnosed diabetes.

Table 4.20		
Prevalence of raised blood pressure (age-standardised), by doctor-diagnosed diabetes status and sex		
<i>Aged 35 and over with a valid blood pressure measurement^a</i>		2011
Blood pressure (mmHg)	With doctor-diagnosed diabetes	Without doctor-diagnosed diabetes
	%	%
Men		
Below 130/80	35	46
130/80 or above but below 140/90	22	29
140/90 or above	43	25
Women		
Below 130/80	49	56
130/80 or above but below 140/90	23	21
140/90 or above	28	23
<i>Bases (unweighted)</i>		
<i>Men</i>	<i>169</i>	<i>1479</i>
<i>Women</i>	<i>129</i>	<i>1942</i>
<i>Bases (weighted)</i>		
<i>Men</i>	<i>102</i>	<i>957</i>
<i>Women</i>	<i>74</i>	<i>1098</i>

^a The analysis is restricted to those aged 35 and over due to the small numbers of people aged under 35 with diabetes.

Table 4.21		
WEMWBS^a mean scores (age-standardised), by doctor-diagnosed diabetes status and sex		
<i>Aged 35 and over^b</i>		2011
Mean score	With doctor-diagnosed diabetes ^c	Without doctor-diagnosed diabetes
	%	%
Men		
Mean	49.2	51.9
Standard error of the mean	0.93	0.21
Median	51.0	53.0
90th percentile ^d	61.0	62.0
10th percentile	35.0	41.0
Women		
Mean	47.9	51.6
Standard error of the mean	1.15	0.16
Median	49.0	52.0
90th percentile ^d	63.0	62.0
10th percentile	32.0	41.0
<i>Bases (unweighted)</i>		
<i>Men</i>	<i>215</i>	<i>2089</i>
<i>Women</i>	<i>175</i>	<i>2726</i>
<i>Bases (weighted)</i>		
<i>Men</i>	<i>199</i>	<i>2075</i>
<i>Women</i>	<i>146</i>	<i>2337</i>

^a The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) is designed to measure mental well-being of adults in the UK. The scale has 14 items, each scored from 1 to 5 on a Likert scale, and a total score between 14 and 70 is calculated.

^b The analysis is restricted to those aged 35 and over due to the small numbers of people aged under 35 with diabetes.

^c Excluding diabetes only during pregnancy.

^d Percentiles have been presented in this table for reference only. The percentiles show a set of points within a scale from 1-100 which is divided into groups based on order of magnitude. For example, the group of those with a score that is equal to or more than the value of 90% of those with a score is expressed as the 90th percentile.