

Outcomes of diabetes care in England and Wales

A summary of findings from the National Diabetes Audit 2015–16: Complications and Mortality reports



About this report

This report is for people with diabetes and their families, and anyone interested in the quality of diabetes care provided by the NHS. It summarises the latest National Diabetes Audit report on complications and mortality for England and Wales 2015–16.

The report is in two sections. They look at the effect that diabetes has on long-term health and mortality. They were published together in July 2017 and can be downloaded [here](#).

At the back of this report is a glossary explaining some of the technical words and medical terms we have used. There is also a list of organisations that can provide further information.

Diabetes UK talked to people with diabetes about what audit information they wanted to see and the best way of presenting it. We used their views to help create this report.

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About the National Diabetes Audit

What is the National Diabetes Audit?

The National Diabetes Audit (NDA) is a national clinical audit. Each year, the NDA collects information from GP practices and hospitals about the regular care they provide for people with diabetes. The NDA findings for 2015–16 can be viewed and downloaded [here](#).

NHS Digital carries out the data collection, analysis and reporting for the NDA. Diabetes UK is a key partner in the NDA, working with NHS Digital to make sure there are contributions from both diabetes clinicians and people with diabetes to the NDA, and helping to communicate the report's findings.

What's included in this report?

This report includes a summary of some of the key findings from the NDA Complications and Mortality analysis. The report provides an overview of the long-term consequences or outcomes of diabetes.

Each section looks at how people with diabetes compare to the general population. For example, how many people with diabetes have had a stroke compared to how many people without diabetes had a stroke. This analysis helps to identify what additional health risks are faced by people with diabetes. In this way, the findings can help NHS services to plan the right care to prevent these risks and help inform people with diabetes about how they can reduce their own risk.

The final section gives a brief summary of some completely new findings from analysis. This looks at whether there is a link between having incomplete diabetes health checks and a greater risk of complications and/or early death.

Want to know more?

If you are interested in learning more about the findings of the complications and mortality analysis, two national reports and an interactive database are available online:

- **Report 2a: Complications and Mortality (complications of diabetes).** This report looks at the likelihood of people with diabetes developing complications, whether this varies across the country, and the impact this has on hospital admissions
- **Report 2b: Complications and Mortality (associations between disease outcomes and preceding care).** This looks at whether there is an association between getting diabetes annual healthcare checks and achieving treatment targets and the likelihood of developing complications
- **Interactive database.** This includes information at a Clinical Commissioning Group (CCG) and Local Health Board (LHB) level. You can search for data about your local CCG or LHB.

Where the data comes from

This report compares the rates of health conditions in people with diabetes with rates of conditions in the non-diabetic population. Below is a brief explanation of where this data comes from.

People with diabetes – this data is taken from the National Diabetes Audit 2014–15 and includes all people whose data was included in this audit and were alive on 31 March 2015. A total of 171,678 people with Type 1 diabetes and 1,863,871 people with Type 2 diabetes have been included in this analysis.

Complications – this data is taken from a database of all hospital admissions, called Hospital Episode Statistics (HES) in England or Patient Episode Database for Wales (PEDW) for the year following the above data (1st April 2015 and 31st March 2016).

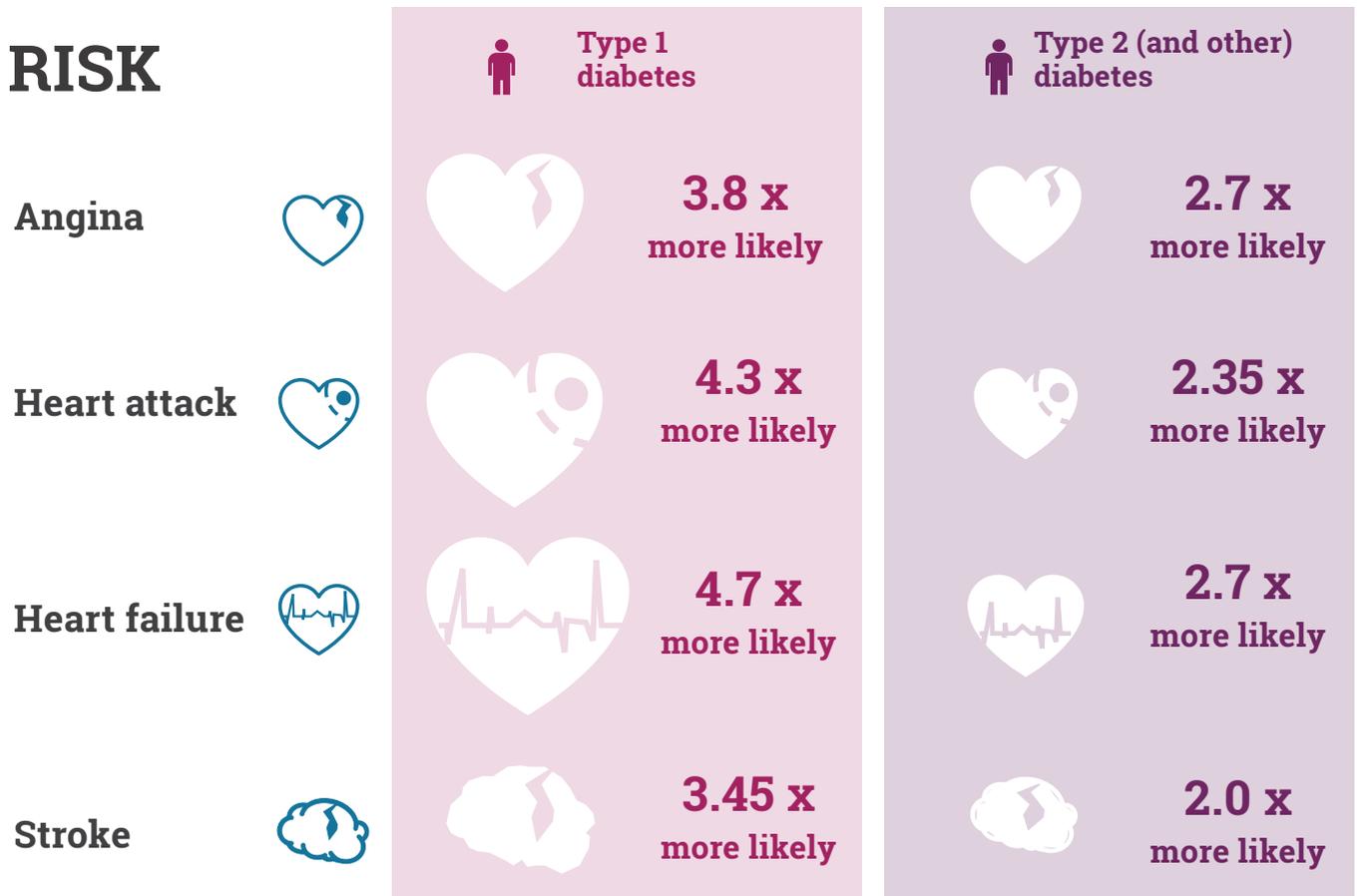
Non-diabetic population – data from all people who have experienced a health complication is also taken from the HES/PEDW data. Then all the people with diabetes who have ever been included in any NDA data are removed. This leaves a database of people who have experienced a health complication but don't have diabetes.

Cardiovascular disease

The term cardiovascular disease (CVD) includes heart disease, stroke and all other diseases of the heart and circulation. The audit looked at the data about people with diabetes who had angina, a heart attack, heart failure or stroke. The data about people with diabetes with CVD was compared to those with CVD who did not have diabetes. This analysis found that cardiovascular disease was much more common in people with diabetes.

CVD risk for people with diabetes compared to people without diabetes

RISK



Hospital admissions for CVD complications

About 5% of the adult population has diabetes. The audit found that between 25–30% of hospital admissions are for CVD complications in people with diabetes.

The audit also found that people with Type 1 diabetes who are admitted to hospital with CVD are younger than those without diabetes. However, the ages for those with Type 2 diabetes and CVD were similar to those in the general population.



Steps you can take to prevent CVD

Whilst these are quite startling findings, there are steps that people with diabetes can take to help prevent CVD. We know that blood vessels are damaged by high blood glucose levels, high blood pressure, smoking or high levels of cholesterol. So, it is important for people with diabetes to manage these levels by:

-  Stopping smoking, if you smoke
-  Eating a healthy, balanced diet
-  Being more physically active
-  If you are overweight, trying to get down to a healthy weight. Any weight loss will be of benefit
-  Taking your medication as prescribed
-  Getting your blood glucose levels, blood pressure and blood cholesterol checked at least once a year and working to keep to the target agreed with your healthcare team.

Chronic kidney disease (CKD)

Anyone can develop Chronic Kidney Disease (CKD), but it is much more common in people with diabetes and those with high blood pressure. CKD has five stages of disease progression and happens when the kidneys do not function correctly. It develops very slowly and is most common in people who have had diabetes for over 20 years. The table below shows the percentage of people with diabetes at each stage of CKD.

CKD stages for people in the 2015/16 audit

	 Type 1 diabetes	 Type 2 (and other) diabetes
No CKD	 35%	 21%
CKD 1	 18%	 59.5%
CKD 2	 36%	 46%
CKD3 moderate	 6.3%	 12.3%
CKD3 worsening	 3.1%	 6%
CKD4	 1.2%	 1.4%
CKD5 ESKD	 0.7%	 0.3%

Many people with CKD 3 and all those who have CKD 4 will require substantial treatment. End Stage Kidney Disease (ESKD) is the final stage when the kidneys no longer work well enough and Renal Replacement Therapy (support from dialysis treatment or a kidney transplant) is required.

The main way that kidney disease is monitored is via the annual health diabetes review. Everyone with diabetes should have an annual urine test, which checks for the presence of a protein called 'microalbumin'. It is present in the first stages of kidney disease. At this stage, kidney disease can often be treated successfully. A blood test at the annual review will also measure urea, creatine, and estimated glomerular function (eGFR), which shows how well the kidneys are working.

CKD 1 and 2 are detected through the annual diabetes health checks and can be treated successfully if picked up at an early stage.

When the data for people with diabetes with CKD stage 5 (ESKD) was compared to the non-diabetic population it was found that people with diabetes were at much higher risk.

The audit looked at the numbers of people with diabetes who had CKD over the past seven years and found that there has been:

- a decline in the numbers of people who have CKD stages 3–5
- consistent levels or rising levels in the numbers of people who have CKD stages 1 and 2

The fact that more people are being detected at the early treatable stages of CKD and fewer are progressing to serious kidney failure is encouraging. These tests are an essential part of the diabetes annual review, but are often done less regularly than other checks. Every effort must be made to ensure that these checks are carried out.

Hospital admissions for ESKD

About 5% of the adult population has diabetes. However, between 35–42% of hospital admissions for severe kidney disease are in people with diabetes. People with diabetes admitted to hospital for severe kidney disease are younger than people admitted for that condition who do not have diabetes.

Steps you can take to prevent kidney disease



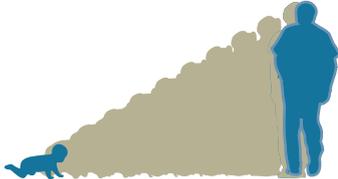
Whilst the data confirms strong links between diabetes and CKD, there are steps that people with diabetes can take to help prevent kidney disease. We know that kidney disease is caused by damage to small blood vessels. So, keeping blood glucose levels as near normal as possible can greatly reduce the risk of kidney disease developing. It is also very important to keep blood pressure controlled.

Taking care of your kidneys is an essential part of managing diabetes and should include:

-  Keeping blood glucose levels and blood pressure levels within target range
-  Having urine tested for protein and a blood test to measure kidney function at least once a year
-  Getting help to stop smoking, if needed
-  Eating healthily and keeping active.

Amputations

The table below shows the number of people with diabetes who have experienced either a minor or a major amputation in one year.

Age range	0-64	65-79	80+
Number (and %) or people with diabetes experiencing:			
Major amputation	623 (0.07%)	681 (0.09%)	211 (0.07%)
Minor amputation	1,593 (0.17%)	1,345 (0.18%)	503 (0.17%)

The audit shows that the longer someone has had diabetes, the greater their risk of having any kind of amputation, regardless of their age.

Hospital admissions for amputations

About 5% of the adult population has diabetes. However, between 40–70% of hospital admissions for amputations are in people with diabetes and they are younger than those without diabetes.

Steps you can take to prevent foot problems



People with diabetes are at risk of developing problems with their feet. This results from the damage raised blood glucose levels cause in sensation (feeling) and circulation (blood flow). If left untreated, these problems can cause foot ulcers followed by infections and, at worst, may lead to amputations.

However, most foot problems are preventable. Making sure that you get good, regular foot care is an essential part of managing diabetes. This should include:

-  Keeping blood glucose levels and blood pressure levels within target range
-  Having a foot check with your diabetes team at least once a year
-  Contacting your GP or diabetes team immediately if you have any concerns about your feet
-  Getting help to stop smoking, if needed
-  Eating healthily and keeping active.

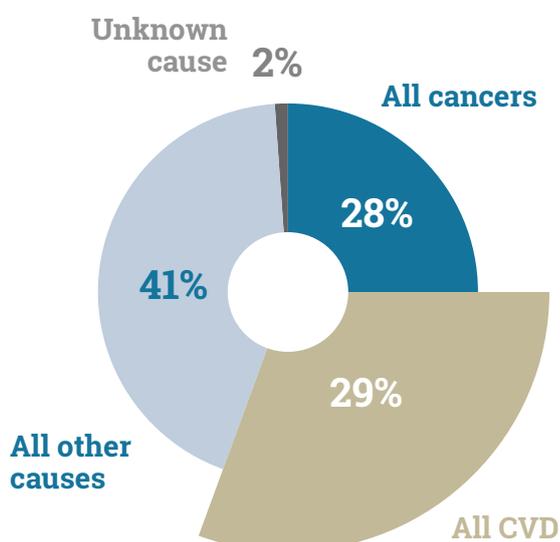
Mortality

In addition to looking at people with diabetes who develop complications, the audit investigated the main causes of death in people with diabetes. It also looked at whether having diabetes meant you were at risk of dying at a younger age than people without diabetes.

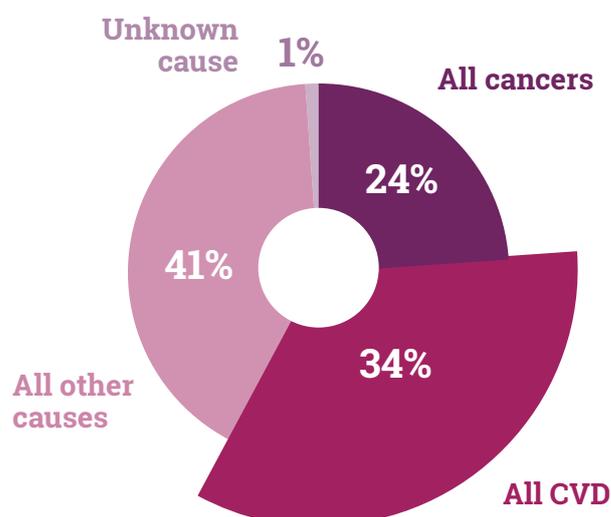
Causes of death

The audit examined data about causes of death since 2005. The numbers of people, with or without diabetes, who die from cardiovascular disease has been steadily declining. However, cardiovascular disease is still the leading single cause of death in people with diabetes and causes more deaths than cancer.

Causes of death –
General population 2015



Causes of death –
People with diabetes 2015



Risk of premature death

The audit looked at the data for people with diabetes who were included in the 2013–4 audit and those who died in the subsequent year (2015). The audit found that people with diabetes were 32% more likely to die prematurely than their peers in the general population.

Compared to the general population, the risk of death for people with Type 1 diabetes was 128% higher. For those with Type 2 diabetes, it was 28% higher than for the general population.

These figures look dismal. However, early death in people with diabetes is mostly related to the health complications of diabetes and, as shown above, there is lots that can be done to prevent them. Keeping healthy with diabetes requires ongoing and consistent management. Annual diabetes checks and jointly agreed care plans and treatment are the key, as the next section shows.

Link between incomplete healthcare checks and diabetes complications

The data that was used for this analysis included people with diabetes (aged 20+ years) who were included in the NDA 2006–7 and were alive at 31 March 2013. Therefore, the analysis includes seven years of data for these people. The audit looked at whether this group of people:

- Had completed three of the annual recommended healthcare checks (HbA1c, blood pressure and cholesterol) over the seven-year period (2006–13)
- Had achieved the treatment targets for HbA1c, blood pressure and cholesterol over the seven-year period (2006–13)
- Were admitted to hospital between 2013 and 2015 for heart failure or Renal Replacement Therapy
- Had died during the period 2013–15.

What are 'complete' and 'incomplete' healthcare checks?

So that we could compare those who had regularly received their annual healthcare checks to those who hadn't, the group of people with diabetes was split into two groups:

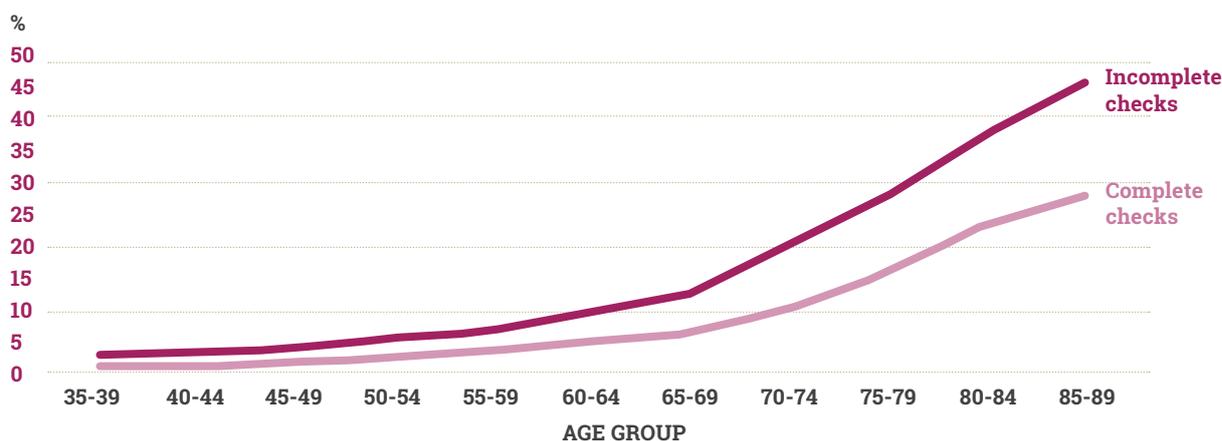
- 1. Complete healthcare checks** includes all those who had three healthcare checks (HbA1c, cholesterol and blood pressure) each year for seven years (ie they had had 21 healthcare checks in total)
- 2. Incomplete healthcare checks** includes all those who had 12 or less healthcare checks over the seven-year period.

The analysis found people who had received all of their annual healthcare checks over the seven-year period had better outcomes, including:

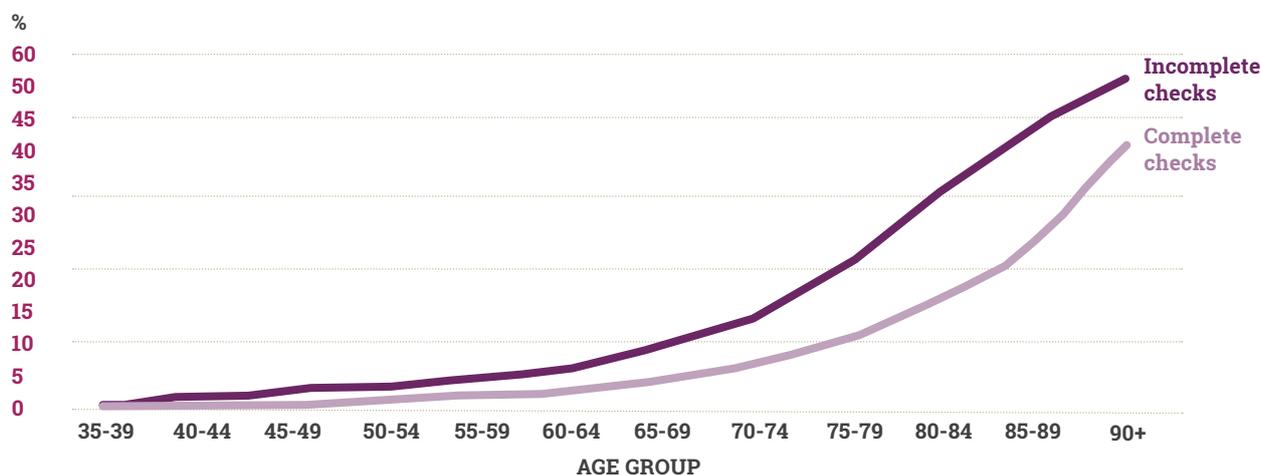
- Lower mortality
- Reduced progression to heart failure
- Reduced progression to Renal Replacement Therapy.

The main finding was that those who had had every annual HbA1c check, cholesterol test and blood pressure measurement over seven years were half as likely to die as those who had less than 60% of their checks. This was the case for all ages and in people with any type of diabetes, as shown in the graphs below.

Percentage of people with Type 1 diabetes (by age) who died during the follow-up period



Percentage of people with Type 2 diabetes (by age) who died during the follow-up period



The analysis also looked at whether the data showed an association between how successful people were at achieving treatment targets for blood glucose, cholesterol and blood pressure, and their chances of going on to develop complications. The factors influencing any links are complex. Age, other health complications and medication can influence whether someone goes on to develop diabetes complications. The NDA does not have all the data on these influencing factors, so it is difficult to provide absolute conclusions from this analysis. In future years, the NDA will be investigating this further and will make more information available.

If you are interested in looking at the analysis in more detail, see [Report 2b](#).

Recommendations

For people with diabetes

If you have diabetes, it is important to keep blood glucose, blood pressure and blood cholesterol levels within the recommended target. This will help reduce the risk of developing complications. Lifestyle changes such as stopping smoking, cutting down on salt and alcohol, and taking regular exercise can help reduce risks.

Diabetes management starts with knowing the results of your annual health checks. The results of these checks will provide important information about whether adjustments to your diabetes management are needed. If you do need to make adjustments, your doctor or nurse should work with you to agree an individual care plan. Your care plan should take into account the results of your checks and your individual circumstances. This report shows that annual health checks are literally a 'life and death' matter.

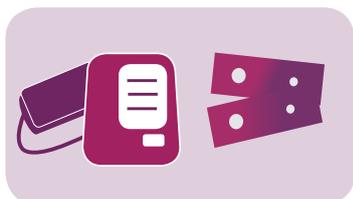
Diabetes UK recommends that people with diabetes use the **15 healthcare essentials** checklist. This gives details of the nine NICE recommended annual health checks, along with other important parts of diabetes care that should be provided as a minimum to all people with diabetes.

If you have any questions or concerns about your healthcare checks or if there are any checks you are not getting, it is important to speak to your doctor or nurse. You may find it helpful to take a copy of the checklist with you to help with your discussion.

Help to improve care in your local area

People with diabetes can also help make a difference to diabetes services and care by joining Diabetes Voices. This is a network of volunteers working with Diabetes UK to campaign for and influence change. Go to [Diabetes Voices](#) to find out more and join.

Keep within recommended targets



Stop smoking



Reduce alcohol and salt intake



Take regular exercise



Get your healthcare checks



Influence change



For diabetes services

All general practices and hospital diabetes services should:

- Recognise the high cardiovascular risks associated with all types of diabetes
- Ensure that every effort is made to reduce cardiovascular risk in people of working age and younger, as they have the greatest relative risks including premature death
- Include an assessment of cardiovascular risk and its preventive care within every annual care planning review:
 - Primary prevention with diet, exercise, weight management, early sustained blood glucose control, target blood pressure, effective statins
 - Secondary prevention with all of the above, plus low-dose aspirin.

The findings of this analysis highlight the importance of regular reviews for all people with diabetes. A concerted effort must be made to ensure that all people are able to attend for their diabetes healthcare checks.

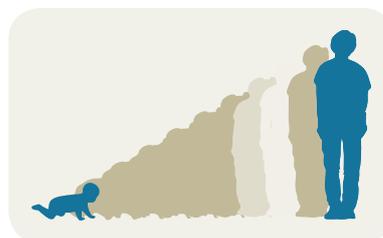
As this report highlights, diabetes care and management care affect wider health issues and even lead to premature death. It is vital that healthcare professionals support and encourage people with diabetes to be actively involved in discussions about their diabetes. Every effort must be made to give people with diabetes the opportunity to talk about the impact of diabetes on their wider health.

People with diabetes should also have support and information to help them make decisions about their treatment and care. Getting all the checks, seeing the right healthcare professionals, receiving structured education and understanding their condition are all essential in helping people to manage their diabetes.

Recognise high cardiovascular risks for all types of diabetes



Reduce cardiovascular risks in people of working age and younger



Include an assessment of cardiovascular risks for primary prevention



Include an assessment of cardiovascular risks for secondary prevention

+



Further information

Glossary – explaining the technical words and medical terms used in this report

Clinical audit

A way to measure the performance and the quality of care of local NHS organisations against national guidelines and use the information to suggest improvements.

Blood creatinine

A substance found in blood plasma and urine. Raised levels of creatinine in the blood can be a sign of kidney disease.

Blood glucose

The main sugar the body makes from the food we eat. Glucose moves around the body through the bloodstream, delivering energy to all the body's living cells. However, in order to release the glucose our cells also need insulin.

Blood pressure

The force of the blood against the artery walls. When you have your blood pressure measured, there are two numbers: the highest (systolic) is for the heart pumping blood into the blood vessels, and the lowest (diastolic) is for the heart at rest.

Cholesterol

A substance similar to fat found in the blood, muscles, liver, brain, and other body tissues.

Proteins carry cholesterol through your bloodstream, and when the two combine, we call them lipoproteins. There are both harmful and protective lipoproteins – known as LDL and HDL – and also called 'bad' and 'good' cholesterol.

LDL carries cholesterol from your liver to the cells that need it. If there is too much cholesterol for the cells to use, it can build up in the artery walls, leading to disease of the arteries.

Clinical commissioning group (CCG)

CCGs commission most of the hospital and community NHS services needed in a local area. They decide on the services needed, and arrange for their provision. All GP practices now belong to a CCG.

Complications of diabetes

These are potentially harmful physical conditions that can develop as a side effect of diabetes.

Some, like hypoglycaemia, can happen any time. Others develop when a person has had diabetes for months or years. These include damage to the retina of the eye (retinopathy), the blood vessels (angiopathy), the nervous system (neuropathy), and the kidneys (nephropathy).

Studies show that keeping blood glucose levels as close to the normal range as possible helps prevent, slow, or delay harmful effects to the body – including eyes, kidneys, nerves, heart and brain.

Diabetes

The short name for the health condition called diabetes mellitus. Diabetes results when the body cannot use blood glucose as energy, either because it produces too little insulin or none at all, or because it is unable to use insulin fully. See also Type 1 diabetes and Type 2 diabetes.

HbA1c test

A test that shows the average glucose level in the blood over the previous three months. The result will show if blood glucose is within the recommended levels.

Local Health Board (LHB)

LHBs are responsible for delivering all NHS healthcare services within a defined geographic area of Wales.

Treatment targets

The recommended levels or measurement for each of the healthcare checks. Achieving them helps a person with diabetes to avoid health problems or complications.

Type 1 diabetes

A condition in which the pancreas makes little or no insulin so the body can't use blood glucose as energy. People with Type 1 diabetes need to take insulin to control their condition.

Type 2 diabetes

A condition in which the body either makes too little insulin or can't use the insulin it makes to use blood glucose as energy. Type 2 diabetes is often successfully controlled through diet and exercise. Some people with Type 2 diabetes have to take insulin or other medications.

Urinary microalbumin

A protein found in blood plasma and urine. The presence of microalbumin in the urine can be a sign of kidney disease.

Where to go for more information

Community Health Councils (Wales)

If you live in Wales and have a question about local health services or an enquiry about health matters

[Community Health Council](#)

Diabetes UK

For more information about diabetes and living with the condition go to

<https://www.diabetes.org.uk/Guide-to-diabetes>

or call Diabetes UK's Helpline on 0345 123 2399 for advice and support

If you want to help make a difference to diabetes services and care, find out more about joining

[Diabetes Voices](#)

Find out more about Diabetes UK's work in [your area](#)

Diabetes UK Cymru

Find out more about Diabetes UK's work in [Wales](#)

Healthcare Quality Improvement Partnership (HQIP)

To find out more about clinical audits and patient involvement in national clinical audits.

[HQIP website](#)

National Diabetes Audit (NDA)

Information about the NDA, and copies of their current and previous reports, are on the NHS Digital's [website](#)

National Institute for Health and Care Excellence (NICE) guidelines

There is more information about NICE and how they develop guidelines on their [website](#)

Guidelines about diabetes include:

- *Type 2 Diabetes: the Management of Type 2 Diabetes* (NICE clinical guideline 87),
- *Type 1 Diabetes: Diagnosis and Management of Type 1 Diabetes in Children, Young People and Adults* (NICE clinical guideline 15)
- *Diabetes in Adults Quality Standard (QS6)*

You can download the full guidance or a summary for the public from the [diabetes](#) section of their website

NHS Choices (England)

Provides information about your health, and finding and using NHS Services in England.

[NHS Choices](#)

Patient Advice and Liaison Service (PALS)

If you have a question about local health services or an enquiry about health matters

[PALS](#)

Together for Health: a Diabetes Delivery Plan (Wales)

Sets out the Welsh Government's expectations of the NHS in Wales to tackle diabetes

[Together for Health – a diabetes delivery plan](#)

**We welcome your views on how
we can improve this report.**

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